

(51) International Patent Classification:
G06F 17/21 (2006.01)

(21) International Application Number:

PCT/JP2010/004287

(22) International Filing Date:

29 June 2010 (29.06.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2009-156380 30 June 2009 (30.06.2009) JP

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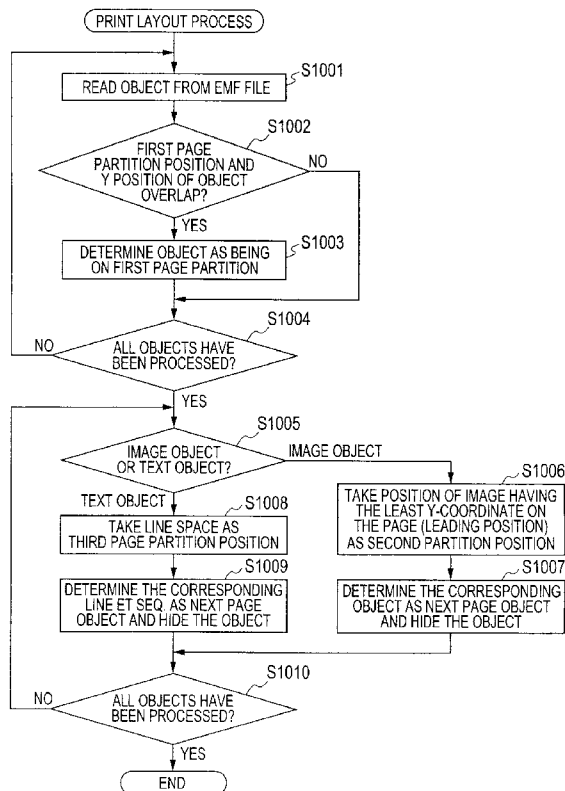
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK,

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(54) Title: IMAGE PROCESSING APPARATUS, IMAGE PROCESSING METHOD, AND STORAGE MEDIUM

[Fig. 10]



(57) Abstract: According to the invention, when a Web page in which a plurality of elements included in a structured document have been arranged is arranged to a page and output, information indicating corresponding positions of the plurality of elements arranged in the Web page in the page in which the Web page is arranged is obtained. The element(s) to be arranged to two pages among the plurality of elements arranged in the Web page are detected based on the obtained information. Whether the element(s) as detected is divided and arranged to the two pages or the element(s) is arranged to one of the two pages is determined, according to contents of the element(s). At least a part of the element(s) is arranged to one of the two pages according to the determination. An image corresponding to the page in which at least a part of the element(s) has been arranged is output. Thus, a layout of the elements to each page can be properly determined according to the contents of the element(s) and the image can be output.



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, — *with amended claims (Art. 19(1))*
GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

Description

Title of Invention: IMAGE PROCESSING APPARATUS, IMAGE PROCESSING METHOD, AND STORAGE MEDIUM

Technical Field

[0001] The invention relates to an image processing apparatus for outputting an image based on a structured document.

Background Art

[0002] In recent years, a Web page is displayed by accessing a server on the Internet and various kinds of information can be obtained. The Web page is a structured document described by a structured language (markup language) such as HTML (Hyper Text Markup Language) or XHTML (Extensible Hyper Text Markup Language). By analyzing the structured document by software called Browser corresponding to the described structured language, the Web page can be displayed on a display.

[0003] In the case of printing those Web pages, the Web pages are arranged onto a page to be printed and a printing or a print preview is performed. However, there is a case where the Web pages cannot be fully arranged in the page to be printed.

[0004] To solve such a problem, therefore, a method of reducing an image so that the whole image is included in a page has been disclosed in the Official Gazette of Japanese Patent Application Laid-Open No. 11-015749.

[0005] However, according to the above method in the related art, there is a case where by reducing the image and printing, it becomes difficult for the user to recognize contents of the image included in a printed matter.

[0006] When the Web page is arranged to a plurality of pages, since it is arranged to the different pages, there is a case where it becomes difficult for the user to recognize the contents of the printed matter in dependence on the contents of the Web page.

[0007] Therefore, the invention provides an image processing apparatus for properly deciding a layout of elements to each page according to contents of the elements and outputting an image.

Citation List

Patent Literature

[0008] PTL 1: Japanese Patent Application Laid-Open No. H11-015749

Summary of Invention

[0009] According to the invention, a layout of elements to each page is properly decided according to the contents of the elements and an image can be output.

[0010] Further features of the present invention will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

Brief Description of Drawings

- [0011] [fig.1]FIG. 1 is a diagram illustrating a construction of a network system including a print control apparatus.
- [fig.2]FIG. 2 is a block diagram illustrating a construction of a PC 101.
- [fig.3]FIG. 3 is a block diagram illustrating a construction of software on the PC 101.
- [fig.4]FIG. 4 is a block diagram illustrating a construction of software in a print layout section 307.
- [fig.5]FIG. 5 is a diagram illustrating an example of a GUI screen which is displayed by the software on the PC 101.
- [fig.6]FIG. 6 is a diagram illustrating an example of a GUI screen which is displayed by the software on the PC 101.
- [fig.7]FIG. 7 is a diagram illustrating an example of a GUI screen which is displayed by the software on the PC 101.
- [fig.8]FIG. 8 is a conceptual diagram illustrating an outline of the operation in an embodiment.
- [fig.9]FIG. 9 is a flowchart illustrating processes in the embodiment.
- [fig.10]FIG. 10 is a flowchart illustrating a print layout process (page partition process).
- [fig.11]FIG. 11 is a flowchart illustrating a print layout process of a second page.
- [fig.12]FIG. 12 is a diagram for describing a determination of a page partition.
- [fig.13]FIG. 13 is a diagram for describing a determination of a page partition.
- [fig.14]FIG. 14 is a flowchart illustrating a processing procedure at the time of a page division.
- [fig.15]FIG. 15 is an explanatory diagram of an image detecting process associated with an image.
- [fig.16]FIG. 16 is a flowchart illustrating the image detecting process associated with the image.

Description of Embodiments

- [0012] A mode for carrying out the invention is the following embodiment.
- [0013] FIG. 1 is a diagram illustrating a construction of a network system including a print control apparatus.
- [0014] A PC 101 is a personal computer. The PC 101 is connected to an Internet 102, downloads Web pages from a plurality of WWW servers 103 onto the PC 101 through the Internet 102, and displays them. The Web page is a structured documents described by the HTML or XHTML. The PC 101 is locally connected to a printer 104, downloads the Web pages on the WWW servers 103 onto the PC 101, and allows the printer 104 to print them.

- [0015] FIG. 2 is a block diagram illustrating a construction of the PC 101.
- [0016] The PC 101 has a CPU 201, a RAM 202, a ROM 203, a hard disk 204, a communication interface 205, a display unit 206, a mouse 207, a keyboard 208, and a system bus 209.
- [0017] The CPU 201 executes arithmetic operation, discrimination and control regarding data or comments, according to a program stored in the RAM 202, ROM 203, or hard disk 204. The RAM 202 is used as a temporary storage area in the case where the CPU 201 executes various kinds of processes. An operating system (OS), a Browser, other application software, and the like are recorded in the hard disk 204. That is, the CPU 201 reads out the program stored in the ROM 203 or the hard disk 204, stores it into the RAM 202, and executes the program by using the RAM 202 as a work memory, thereby making various kinds of control.
- [0018] The communication interface 205 is, for example, an interface such as USB, SCSI, radio transmission, or the like for making data communication with the printer 104 or a network interface for making data communication with the external WWW servers 103 through the Internet 102. The display unit 206 is constructed by a CRT or a liquid crystal display and a graphics controller and performs a display in a graphics user interface (GUI). The mouse 207 and the keyboard 208 are input devices which are used for the user to issue various kinds of instructions to the PC 101. The system bus 209 performs a transmission and a reception of data between the CPU 201 and the RAM 202, ROM 203, hard disk 204, and the like.
- [0019] Subsequently, the program which operates on the PC 101 and its data processing construction will be described. FIG. 3 is a block diagram illustrating a construction of software on the PC 101. Each block illustrated in FIG. 3 is a block in which the programs stored in the ROM 203 or the hard disk 204 have been classified every function. Those programs are executed by the CPU 201.
- [0020] A browser 301 is an application to display the Web pages, downloads the Web pages on the WWW servers 103 into the hard disk 204 on the PC 101, and displays them to the display unit 206. The Web pages are structured document files such as HTML, XHTML, and the like and elements constructing a structured document such as a text or image have been described in the Web page by using tags. Another file called a Cascading Style Sheet (hereinbelow, abbreviated to "CSS") for designating a display style of those elements has been designated in the structured document. The browser 301 analyzes those structured document files and displays them onto the display unit 206.
- [0021] A structured document print module 302 is plug-in software which is called from the browser 301. When the user instructs the browser 301 to execute a printing or a print preview, the structured document print module 302 is executed. The structured

document print module 302 is classified into two sections of a set of a document cutout section 304 and an intermediate file creating section 305 and a set constructed by other sections.

[0022] When the user applies an instruction to select a print area by using the mouse 207 or the like to the document cutout section 304, the document cutout section 304 inputs the instruction and determines the print area in the Web page. Thus, the intermediate file creating section 305 creates an intermediate file 306 such as an EMF (Extend Meta File) corresponding to the decided print area or the like. The created intermediate file is stored into, for example, the RAM 202.

[0023] A print layout section 307 executes processes at the time of printing a plurality of pages, and arranges the elements included in the structured document into a page, according to a set paper size based on print settings. The print settings include information such as paper size, resolution, printable area, and the like and are obtained from a printer driver 310 through an OS (Operating System) 309. Details of a plural-page print process will be described hereinafter. A print preview section 308 displays the elements, as a print preview, arranged by the print layout section 307 onto the display unit 206. In the print process, when a print start instruction is received from the user, the printer driver 310 is allowed to execute a drawing process through the OS 309 according to layout information of the elements arranged by the print layout section 307.

[0024] The OS 309 provides an API (Application Programming Interface) for allowing the structured document print module 302 to transmit and receive the print setting data to/from the printer driver 310 and an API for executing the drawing process. Although various kinds of control software such as spooler system for managing a print job, port monitor for outputting a printer command to a port, and the like is included in the OS 309, its detailed description is omitted here. After the printer driver 310 creates print data according to the drawing process executed by the print process and converts it into the printer command, the printer driver 310 transmits the printer command to the printer 104 through the OS 309 and the printer 104 records onto paper.

[0025] Subsequently, a program which operates in the print layout section 307 and its data processing construction will be described.

[0026] FIG. 4 is a block diagram illustrating a construction of software in the print layout section 307. A document analysis section 401 fetches the intermediate file 306 serving as an EMF file. When a print area overlaps with a plurality of pages, a page partition determining section 402 determines a page partition in a print target area. An object detection section 403 detects an object arranged at the page partition determined by the page partition determining section 402. If a next page object determining section 404 determines that the detected object is a next page print element, a next page object

hiding section 405 processes so that the object is not displayed in the corresponding page.

- [0027] Each of FIGs. 5, 6 and 7 is a diagram illustrating an example of a GUI screen which is displayed by the software on the PC 101 serving as a print control apparatus. A window of the Browser 301 becomes the GUI screen illustrated in each of FIGs. 5 and 6.
- [0028] As illustrated in FIG. 5, the browser 301 displays the Web page into the window as a GUI 501. A button group 502 is arranged in the window of the browser 301. The button group 502 is constructed by a print button, a preview button, an area selection button, and a clip book button.
- [0029] When the user depresses the print button, all of the Web pages displayed by the browser 301 are printed. When the user depresses the preview button, a print preview screen is displayed. When the user further depresses the area selection button, a frame adapted to select a print target range is displayed.
- [0030] When a clip book button 601 illustrated in FIG. 6 is depressed, a thumbnail 602 of an image cut out by the print target range is displayed. Further, when the image in the thumbnail 602 is edited, an edit button 603 is depressed.
- [0031] When the edit button 603 is depressed, as illustrated in FIG. 7, an edit screen 701 including images 702, 703, and 704 which were thumbnail-displayed is displayed. As for the images 702, 703, and 704, an enlargement, a reduction, a movement, or the like can be performed by the operation of the mouse 207 or the like by the user. When a print button 705 is depressed, a result obtained by editing each of those images by the enlargement, reduction, movement, or the like is printed.
- [0032] FIG. 8 is a conceptual diagram illustrating an outline of the operation in the embodiment. FIG. 9 is a flowchart illustrating processes in the embodiment. First, the Web pages are displayed by the browser 301 (S902). An instruction by the user is input (S903). As described in FIG. 5, the processes are separated by the instruction input by the user. When the print button is depressed, the intermediate file creating section 305 creates EMFs of all of the displayed Web pages (S905). After that, a process between the pages is executed by a print layout process (S906) illustrated in FIG. 8. The printer driver 310 prints through the OS 309 (S907).
- [0033] When the preview button is depressed, the intermediate file creating section 305 creates EMFs of all of the displayed Web pages in a manner similar to that mentioned above (S909). After that, a process between the pages is executed by a print layout process (S910) illustrated in FIG. 8. The print preview section 308 allows the display unit 206 to display a print image (S911). After that, when the print button illustrated in the print preview screen is depressed (S912), the foregoing print process is executed (S907). When the edit button is depressed (S904) by the instruction of the user (S903),

the EMF files which have previously been created at the time of the selection of the print target area are read (S913). A print layout process (S914) illustrated in FIG. 8 is executed. An edit screen is displayed on the display unit 206 (S915). When the print button is depressed on the edit screen, the print process is executed (S907). When an edit process such as addition, deletion, further, enlargement/reduction, or the like is executed on the edit screen (S917), the print layout process (S914) described in FIG. 8 is executed again and the edit screen is displayed on the display unit 206 (S915).

[0034] Subsequently, the print layout process will be described in detail. In the image displayed by the browser 301, although only a part of it is displayed on the display unit 206, a case where an image constructed by two pages of a first page 808 and a second page 809 is a present print target area 801 at the time of the print layout will now be considered. The user selects the print target area 801 by scrolling or the like by using the mouse or the like. The intermediate file 306 as an EMF file is created by using the intermediate file creating section 305 from the print target area 801 cut out by the document cutout section 304.

[0035] FIG. 10 is a flowchart illustrating the print layout process (page partition process). The print layout section 307 reads a file created as an intermediate file 306 as an EMF file (S1001). The object existing at a first page partition position 802 is detected based on position information showing coordinates from a leading position of the page of each object element in the intermediate file 306 and size information of each object (S1002). It is assumed that the object element is divided into either a text object element or an image object element.

[0036] The text object element is defined by a tag in the structured document and is an element in which a corresponding character string is described in the structured document. The corresponding character string can be displayed or printed based on the text object element. The division of the text object element, which will be described hereinafter, corresponds to a process for dividing the character string included in one text object element.

[0037] The first page partition position 802 indicates a page partition of a rear edge of the first page. Subsequently, it is determined that the object detected in S1002 is the object existing at the first page partition position 802 (S1003). Subsequently, whether or not the processes of all objects detected in S1002 have been finished is discriminated (S1004). If the processes are not finished yet, the processing routine is returned to S1001. If the processes have been finished, whether the determined object is the image object or the text object is discriminated (S1005). If it is the image object, in the case where it is confirmed that another object does not exist at the leading position in the page of such an object or at a position within a predetermined distance from the leading position, such a position within the predetermined distance is set to a second

page partition position 804 (S1006).

[0038] Whether or not a text character string exists at the first page partition position 802 is discriminated based on a relative position from the leading position of the page and a size of character string (S1005). If the text character string exists, a space (line space) between such a text character string 805 and a one-preceding character string 806 near the leading position is set to a third page partition position (S1008).

[0039] The next page object determining section 404 determines that an image object 803 existing at the first page partition position 802 is an object of the next page of the corresponding page at the time of the print layout of the first page 808. Therefore, control is made in such a manner that at the first page, the next page object hiding section 405 does not display the image object 803 existing at the first page partition position 802 (S1007).

[0040] In a manner similar to the above, the next page object determining section 404 determines that the text character string 805 existing at the first page partition position 802 including its subsequent character strings is a next page object. Therefore, control is made in such a manner that at the first page, the next page object hiding section 405 does not display the text character string 805 existing at the first page partition position including its subsequent character strings (S1009). Thus, a character string 810 on the leading position side of the third page partition position of the corresponding text object is displayed at the first page. The processes of S1005 to S1009 are executed until the processes of all objects are finished (S1010). As mentioned above, the print layout process of the first page is executed.

[0041] Subsequently, a layout of the second page will be described. FIG. 11 is a flowchart illustrating a print layout process of the second page. At the second page, an image object 811 which has been determined so as to be hidden at the first page and a text object 812 are arranged. At this time, a position Y on the page at the leading position of the first object which has been determined as a next page object is assumed to be a leading position of the second page (S1101).

[0042] After the position Y of the first object which has been determined as a next page object was set to the leading position of the second page, it is compared with the positions of all of the objects which are arranged at the second and subsequent pages, thereby obtaining the leading position of the second page. First, the leading position Y of the first object which was determined as a next page object is compared with the position of the object which has been determined second as a next page object (S1102). That is, whether or not the Y coordinate of the first object is smallest (on the leading position side of the page) is discriminated. If it is determined that the first object is not the object existing at the leading position, the leading position the second page is changed to the leading position of the object which has been determined second as a

next page object (S1103). Whether or not the comparisons of all of the objects have been finished is discriminated (S1104). Also in the case where it is determined in S1102 that the leading position Y of the first object which has been determined as a next page object is located at the leading position side of the page, the processing routine similarly advances to S1104.

- [0043] When the leading position of the second page is obtained as mentioned above, based on the information showing the relative position of the object from the leading position of the second page, each object is arranged in a state where the relative position of the object at the Web page of each object has been held as illustrated in FIG. 8 (S1105). With respect to the text object, the character string displayed at the first page is not displayed at the second page.
- [0044] As mentioned above, such a situation that characters or an image is divided at the partitions of a plurality of pages can be prevented. The printing can be performed while holding the relative position at the Web page of each object element.
- [0045] By setting the page partition positions which differ depending on each object (characters or image), the partition of the characters or image at the partition positions in a plurality of pages can be prevented. The printing or print preview can be performed while holding the relative position at the Web page of each object element.
- [0046] Although the page partition has been determined based on the position from the page partition position with respect to both of the image object and the text object in the above description, an example in which the page partition position of the image object is reflected to the page partition position of the text object will be subsequently described. FIGs. 12 and 13 are diagrams for describing a determination of the page partition. FIG. 14 is a flowchart illustrating a processing procedure at the time of a page division.
- [0047] In the flowchart of FIG. 14, first, the second page partition position serving as a leading position of the image object is compared with the position of the object existing at the page partition position (S1401).
- [0048] For example, in the example illustrated in FIG. 12, characters 1205 and an image 1203 exist in a print target area 1201. If the characters 1205 or the image 1203 exists at a page partition 1202, a top position 1204 thereof is determined as a second page partition position. In this case, since the second page partition position exists on the leading side as a result of the discrimination of S1401, S1404 follows and the processing routine is finished without executing processes of S1402 and S1403. At this time, the second page partition position is set to the third page partition position serving as a page partition position of the text object. Consequently, such a situation that a character object 1209 overlaps with two pages of a first page 1206 and a second page 1207 can be prevented. The whole character object 1209 can be set to a next page

together with an image object 1208.

[0049] Subsequently, an example of another print target area is illustrated in FIG. 13. As illustrated in FIG. 13, the leading position of the image is set to a second page partition position 1304 so as to avoid an image object 1303 existing at a first page partition position 1302 as a page partition. Thus, since a character object 1306 exists on the leading side of the second page partition position 1304, S1402 follows. Whether or not the object arranged at the second page partition position 1304 is a text object is confirmed (S1402). If it is the text object, a space between the character strings corresponding to the second page partition is set to a third page partition position 1307 (S1403). Each of character objects 1310 and 1312 can be divided and printed. The processes of S1401 to S1403 are repeated to all objects existing at the page partition (S1404).

[0050] If a plurality of text objects exist at the second page partition position 1304, there are a plurality of page partitions and the page partition position is set for each text object. At this time, the page partition position of the text object is set to a line space corresponding to the second page partition position as mentioned above. Since no image object ought to exist at the second page partition position 1304, if it is determined that the image object exists, the processing routine is finished with an error (S1405).

[0051] However, in the case of determining the page partition of the image object as mentioned above, such a situation that an image and an additional image thereof are arranged on different pages can occur. For example, even in the case where a certain image does not overlap with the first page partition position and it is arranged in the corresponding page, if the additional image of such an image overlaps with the first page partition position, it is arranged to the next page.

[0052] FIG. 15 is an explanatory diagram of an image detecting process associated with an image. FIG. 16 is a flowchart illustrating the image detecting process associated with the image.

[0053] As illustrated in FIG. 15, there is a case where a second image 1502 existing near a first image 1501 is arranged in association with the image 1501 integrately with the first image 1501. Therefore, a process for discriminating whether or not the second image 1502 is an additional image of the image will be described with reference to FIG. 16.

[0054] First, in S1601, values of four sides of the first image 1501 are assumed to be (X1, X2) (Y1, Y2) and values of four sides of the second image 1502 serving as a comparison target are assumed to be (XX1, XX2) (YY1, YY2). In this case, left upper coordinates in the page of the image 1501 are set to (X1, Y1) and right lower coordinates are set to (X2, Y2). Left upper coordinates in the page of the image 1502 are set to (XX1, YY1) and right lower coordinates are set to (XX2, YY2). A value adapted

to determine the additional image is assumed to be a predetermined value M.

[0055] Subsequently, whether or not a start point value and an end point value (X1, X2) (Y1, Y2) of the first image 1501 and a start point value and an end point value (XX1, XX2) (YY1, YY2) of the second image 1502 lie within the predetermined value M is discriminated (S1602).

[0056] If it is determined that they lie within the predetermined value M, the second image 1502 serving as a comparison image is decided as an additional image (S1603). A moving process is executed so as to execute the same processes as the processes of the first image 1501.

[0057] As mentioned above, according to the embodiment, such a situation that the characters and image included in the Web page are divided by the pages can be prevented. Since the elements are divided and arranged to two pages according to the contents of the elements, the number of sheets which are used for printing can be decreased as compared with that in the case where all of the elements which are arranged to the page partition position are arranged to one of the two pages.

[0058] In the embodiment, either the mode in which the elements are divided and arranged to two pages or the mode in which the elements are arranged to one of the two pages is determined according to the contents of the elements which are arranged to the two pages. Thus, the elements can be properly arranged to each page.

[0059] The example in which in the case of discriminating the contents of the elements which are arranged to the two pages, whether the object is the image object or the text object is discriminated has been shown in the above description.

[0060] However, the invention is not limited to such an example but, for example, the number of lines and the character size of the character string corresponding to the text object or the size of text object is discriminated and either the mode in which the text object is divided and arranged or the mode in which the text object is arranged to one page may be determined according to a result of the discrimination.

[0061] Further, the contents of the text included in the text object is discriminated and a layout of the text object may be determined according to a result of the discrimination. For example, to the text included in the text object, a keyword showing a relation to another object is searched for. In the case of the text object including the keyword, it may be arranged to one page without being divided.

[0062] Either the mode in which the object is divided and arranged or the mode in which the text object is arranged to one page may be determined according to the position in the width direction in the page of the object. For example, when the image object and the text object are detected at the page partition position, if the positions in the width direction in the page of both of those objects are close, it is determined that they are the two objects which are related in the Web page, and each of the whole image object and

the whole text object may be arranged to one page. On the other hand, if a distance between the image object and the text object in the page is large, it is determined that they are not the related objects, and the text object may be divided and arranged to two pages.

[0063] The page partition in the length direction of the Web page has been described above. However, if there are elements which are arranged to two pages at the page partition position in the width direction of the Web page, the elements may be arranged to the pages according to the contents of the elements as mentioned above.

[0064] Further, a construction in which the width of Web page is changed to be congruous with the width of page adapted to arrange the Web page is also considered. In this case, the layout process of the elements to the page partition position in the length direction of the Web page described in the embodiment may be executed to the Web page whose width direction has been changed.

Other Embodiments

[0065] Aspects of the present invention can also be realized by a computer of a system or apparatus (or devices such as a CPU or MPU) that reads out and executes a program recorded on a memory device to perform the functions of the above-described embodiment(s), and by a method, the steps of which are performed by a computer of a system or apparatus by, for example, reading out and executing a program recorded on a memory device to perform the functions of the above-described embodiment(s). For this purpose, the program is provided to the computer for example via a network or from a recording medium of various types serving as the memory device (e.g., computer-readable medium).

[0066] While the present invention has been described with reference to exemplary embodiments, it is to be understood that the invention is not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

[0067] This application claims the benefit of Japanese Patent Application No. JP2009-156380, filed June 30, 2009, which is hereby incorporated by reference herein in its entirety.

Claims

- [Claim 1] An image processing apparatus for arranging a Web page in which a plurality of elements included in a structured document have been arranged to a page and outputting, comprising:
an obtaining unit configured to obtain information indicating corresponding positions of the plurality of elements arranged in the Web page in the page in which the Web page is arranged;
a detecting unit configured to detect the element(s) to be arranged to two pages among the plurality of elements arranged in the Web page, based on the information obtained by the obtaining unit;
a determining unit configured to determine whether the element(s) detected by the detecting unit is divided and arranged to the two pages or the element(s) is arranged to one of the two pages, according to contents of the element(s);
a layout unit configured to arrange at least a part of the element(s) detected by the detecting unit to one of the two pages according to the determination by the determining unit; and
an output unit configured to output an image corresponding to the page in which at least a part of the element(s) has been arranged by the layout unit.
- [Claim 2] An image processing apparatus according to claim 1, wherein if the detecting unit detects the plurality of elements, the layout unit arranges at least a part of each of the plurality of elements to the same page of one of the two pages according to the relative position of the plurality of elements in the Web page, based on the information obtained by the obtaining unit.
- [Claim 3] An image processing apparatus according to claim 1, wherein when the element detected by the detecting unit is an image object, the layout unit arranges the image object to one of the two pages.
- [Claim 4] An image processing apparatus according to claim 1, wherein when a text object is detected by the detecting unit, the layout unit divides the text object and arranges the text object to the two pages.
- [Claim 5] An image processing apparatus according to claim 4, wherein the layout unit divides the text object by a line space corresponding to a partition of the two pages and arranges the text object to the two pages.
- [Claim 6] An image processing apparatus according to claim 4, wherein an image object and the text object are detected by the detecting unit, the layout

unit divides the text object by a line space corresponding to a position in the page of the image object indicated by the information obtained by the obtaining unit and arranges the text object to the two pages.

[Claim 7] An image processing apparatus according to claim 1, wherein the output unit outputs the image corresponding to the page in which at least a part of the element(s) has been arranged by the layout unit to a printing apparatus and causes the printing apparatus to print the image.

[Claim 8] An image processing apparatus according to claim 1, wherein the output unit outputs the image corresponding to the page where at least a part of the element(s) has been arranged by the layout unit to a display apparatus and causes the display apparatus to display the image.

[Claim 9] An image processing method of arranging a Web page in which a plurality of elements included in a structured document have been arranged to a page and outputting, comprising:
obtaining information indicating corresponding positions of the plurality of elements arranged in the Web page in the page in which the Web page is arranged;
detecting the element(s) to be arranged to two pages among the plurality of elements arranged in the Web page, based on the obtained information;
determining whether the detected element(s) is divided and arranged to the two pages or the detected element(s) are arranged to one of the two pages, according to contents of the detected element(s);
arranging at least a part of the element(s) to one of the two pages according to the determination; and
outputting an image corresponding to the page in which at least a part of the element(s) has been arranged.

[Claim 10] A storage medium in which a program for allowing a computer to execute the image processing method according to claim 9 has been stored.

AMENDED CLAIMS

received by the International Bureau on 26 November 2010 (26.11.2010)

[Claim 1]

(Amended) An image processing apparatus for arranging a Web page in which a plurality of elements included in a structured document have been arranged to a page and outputting, comprising:

an obtaining unit configured to obtain information indicating corresponding positions of the plurality of elements arranged in the Web page in the page in which the Web page is arranged;

a detecting unit configured to detect the element(s) to be arranged to two pages among the plurality of elements arranged in the Web page, based on the information obtained by the obtaining unit;

a determining unit configured to determine whether the element(s) detected by the detecting unit is divided and arranged to the two pages or the element(s) is arranged to one of the two pages, according to contents of the element(s), wherein if the detecting unit detects a plurality of elements, the determining unit determines whether each of the elements detected by the detecting unit is divided and arranged to the two pages or each of the elements is arranged to one of the two pages according to contents of each of the elements;

a layout unit configured to arrange at least a part of the element(s) detected by the detecting unit to one of the two pages according to the determination by the determining unit; and

an output unit configured to output an image corresponding to the page in which at least a part of the element(s) has been arranged by the layout unit.

[Claim 2]

An image processing apparatus according to claim 1, wherein if the detecting unit detects the plurality of elements, the layout unit arranges at least a part of each of the plurality of elements to the same page of one of the two pages according to the relative position of the plurality of elements in the Web page, based on the information obtained by the obtaining unit.

[Claim 3]

An image processing apparatus according to claim 1, wherein when the element detected by the detecting unit is an image object, the layout unit arranges the image object to one of the two pages.

[Claim 4]

An image processing apparatus according to claim 1, wherein when a text object is detected by the detecting unit, the layout unit divides the text object and arranges the text

object to the two pages.

[Claim 5]

An image processing apparatus according to claim 4, wherein the layout unit divides the text object by a line space corresponding to a partition of the two pages and arranges the text object to the two pages.

[Claim 6]

An image processing apparatus according to claim 4, wherein an image object and the text object are detected by the detecting unit, the layout unit divides the text object by a line space corresponding to a position in the page of the image object indicated by the information obtained by the obtaining unit and arranges the text object to the two pages.

[Claim 7]

An image processing apparatus according to claim 1, wherein the output unit outputs the image corresponding to the page in which at least a part of the element(s) has been arranged by the layout unit to a printing apparatus and causes the printing apparatus to print the image.

[Claim 8]

An image processing apparatus according to claim 1, wherein the output unit outputs the image corresponding to the page where at least a part of the element(s) has been arranged by the layout unit to a display apparatus and causes the display apparatus to display the image.

[Claim 9]

(Amended) An image processing method of arranging a Web page in which a plurality of elements included in a structured document have been arranged to a page and outputting, comprising:

- obtaining information indicating corresponding positions of the plurality of elements arranged in the Web page in the page in which the Web page is arranged;

- detecting the element(s) to be arranged to two pages among the plurality of elements arranged in the Web page, based on the obtained information;

- determining whether the detected element(s) is divided and arranged to the two pages or the detected element(s) is arranged to one of the two pages, according to contents of the detected element(s), wherein if a plurality of elements are detected, whether each of the detected elements is divided and arranged to the two pages or each of the detected elements is arranged to one of the two pages is determined according to contents of each of the elements;

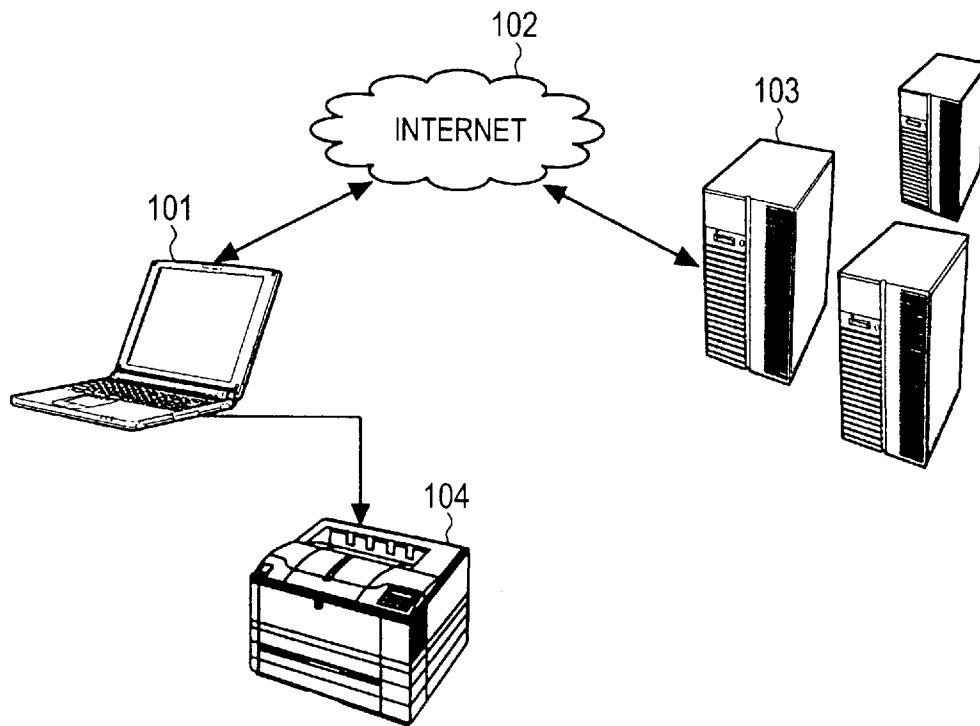
- arranging at least a part of the element(s) to one of the two pages according to the determination; and

outputting an image corresponding to the page in which at least a part of the element(s) has been arranged.

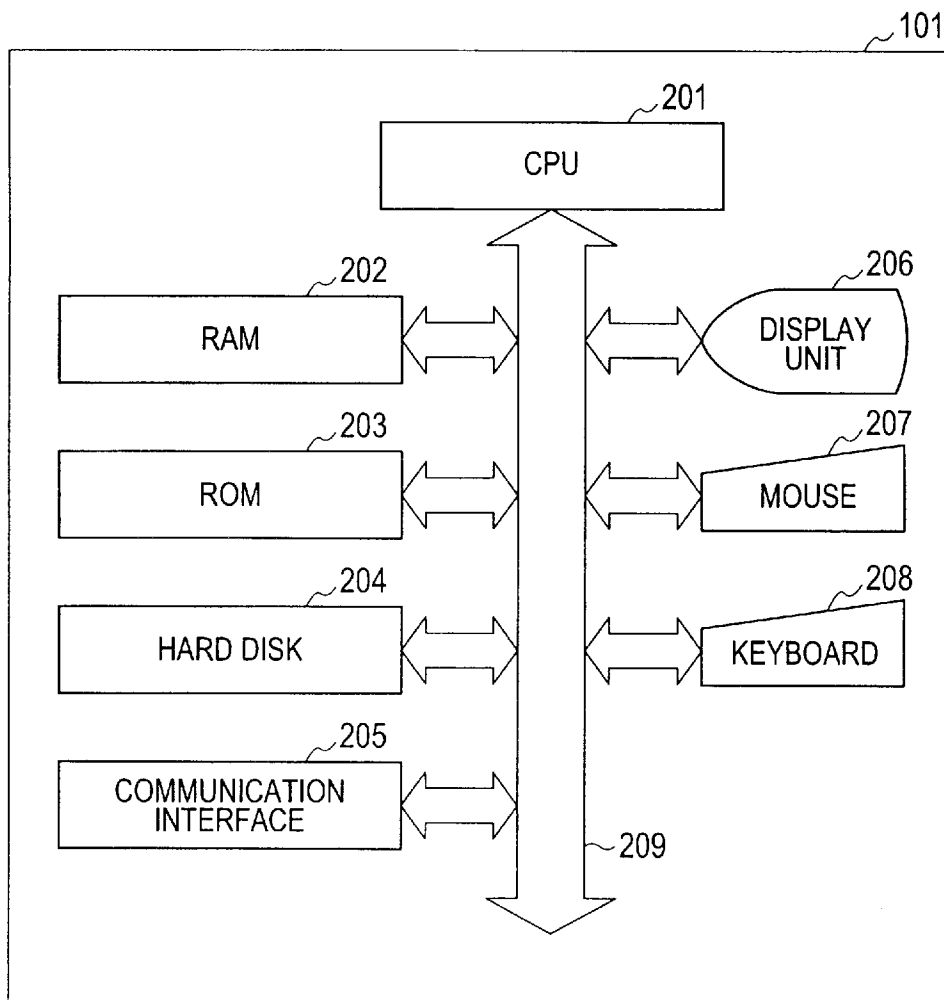
[Claim 10]

A storage medium in which a program for allowing a computer to execute the image processing method according to claim 9 has been stored.

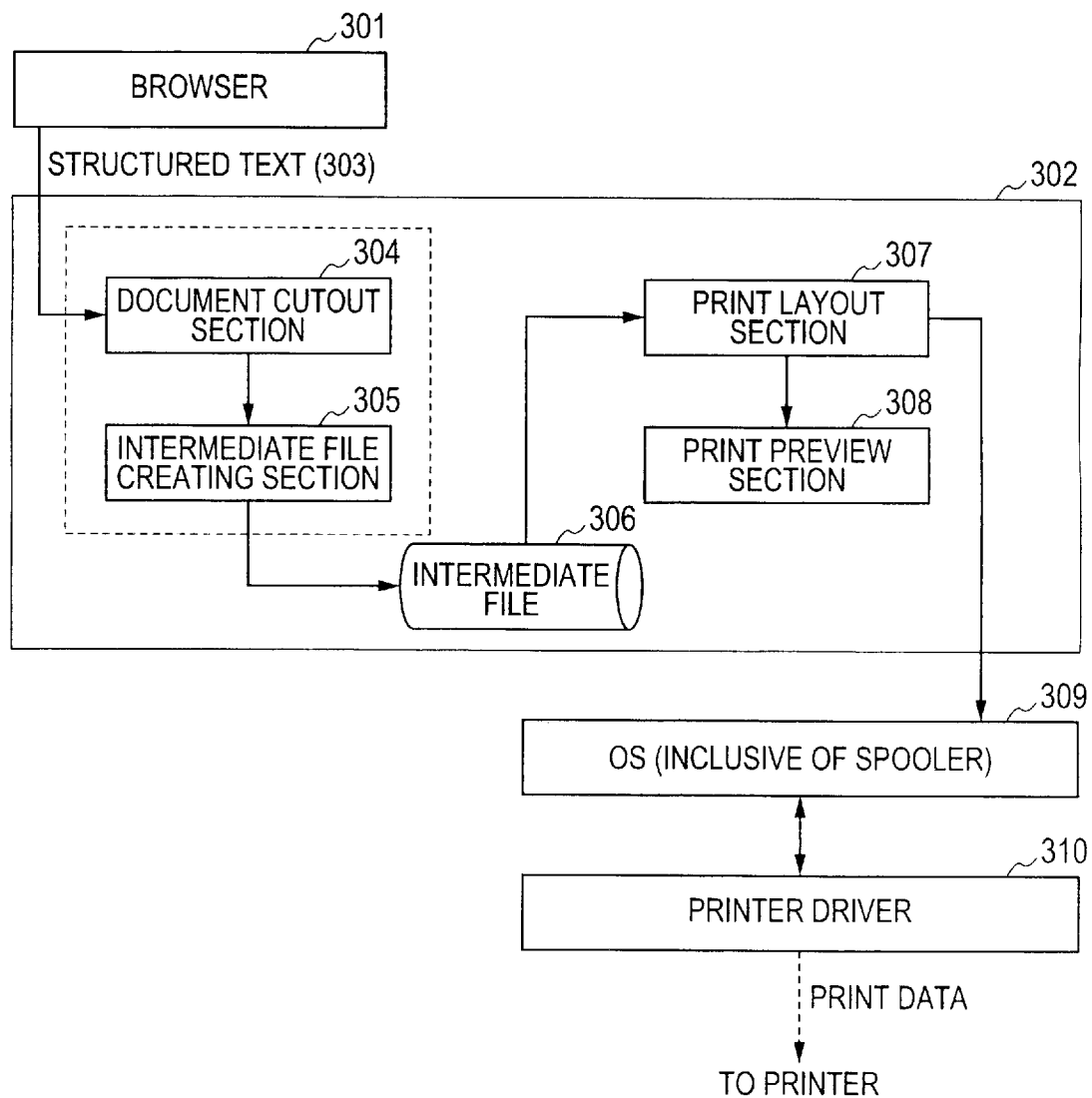
[Fig. 1]



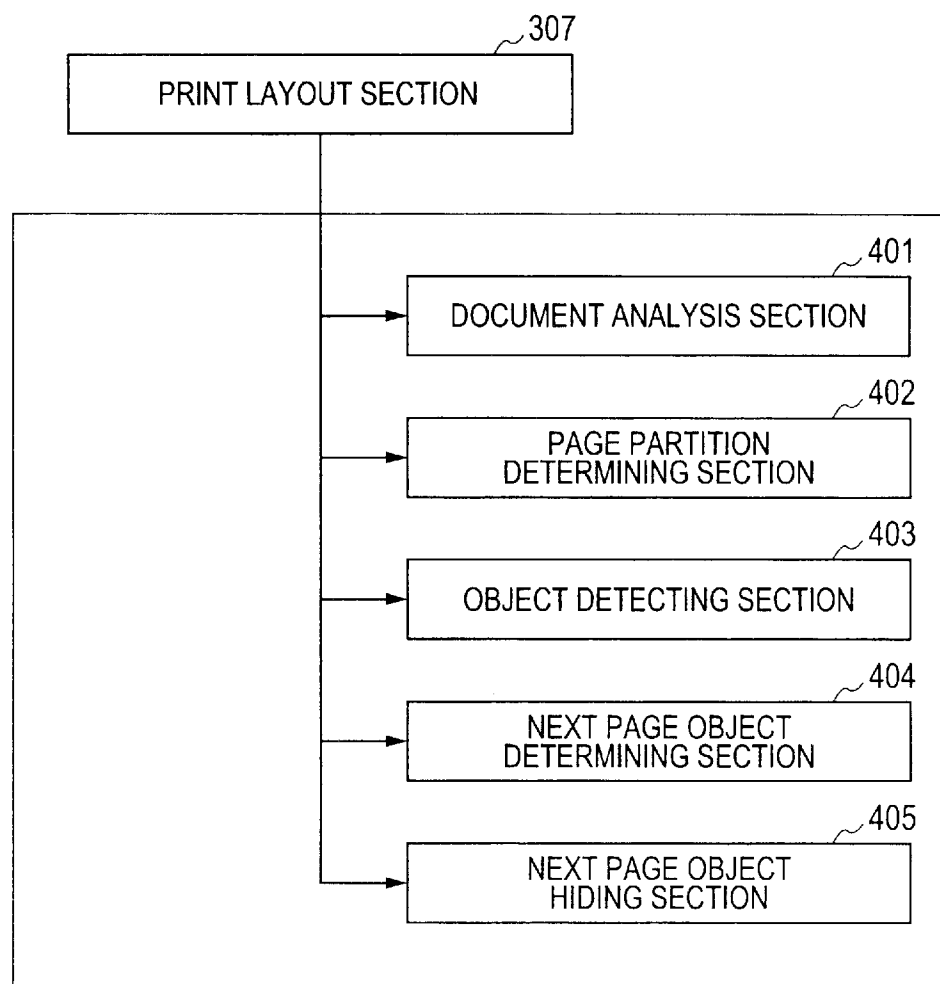
[Fig. 2]



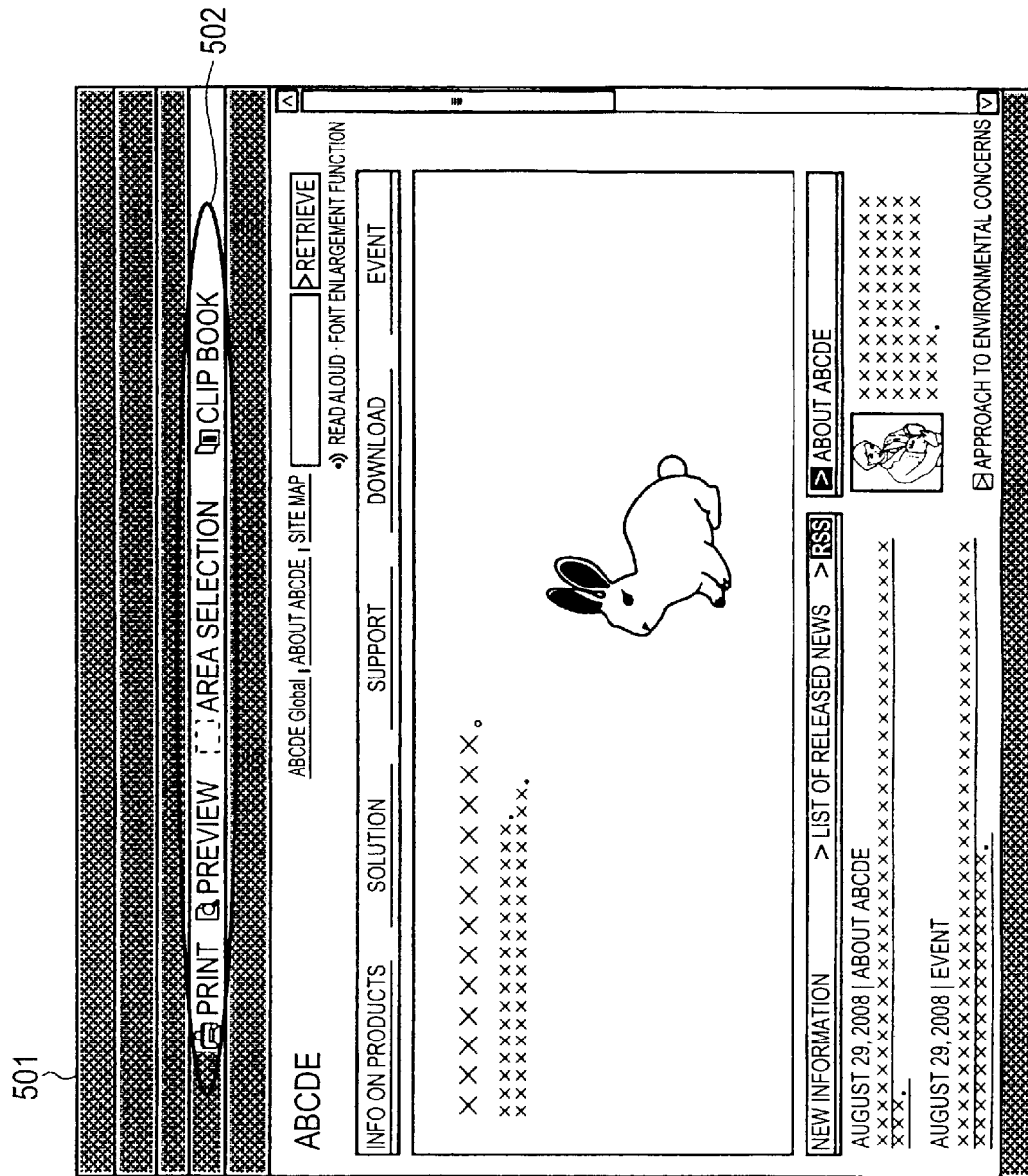
[Fig. 3]



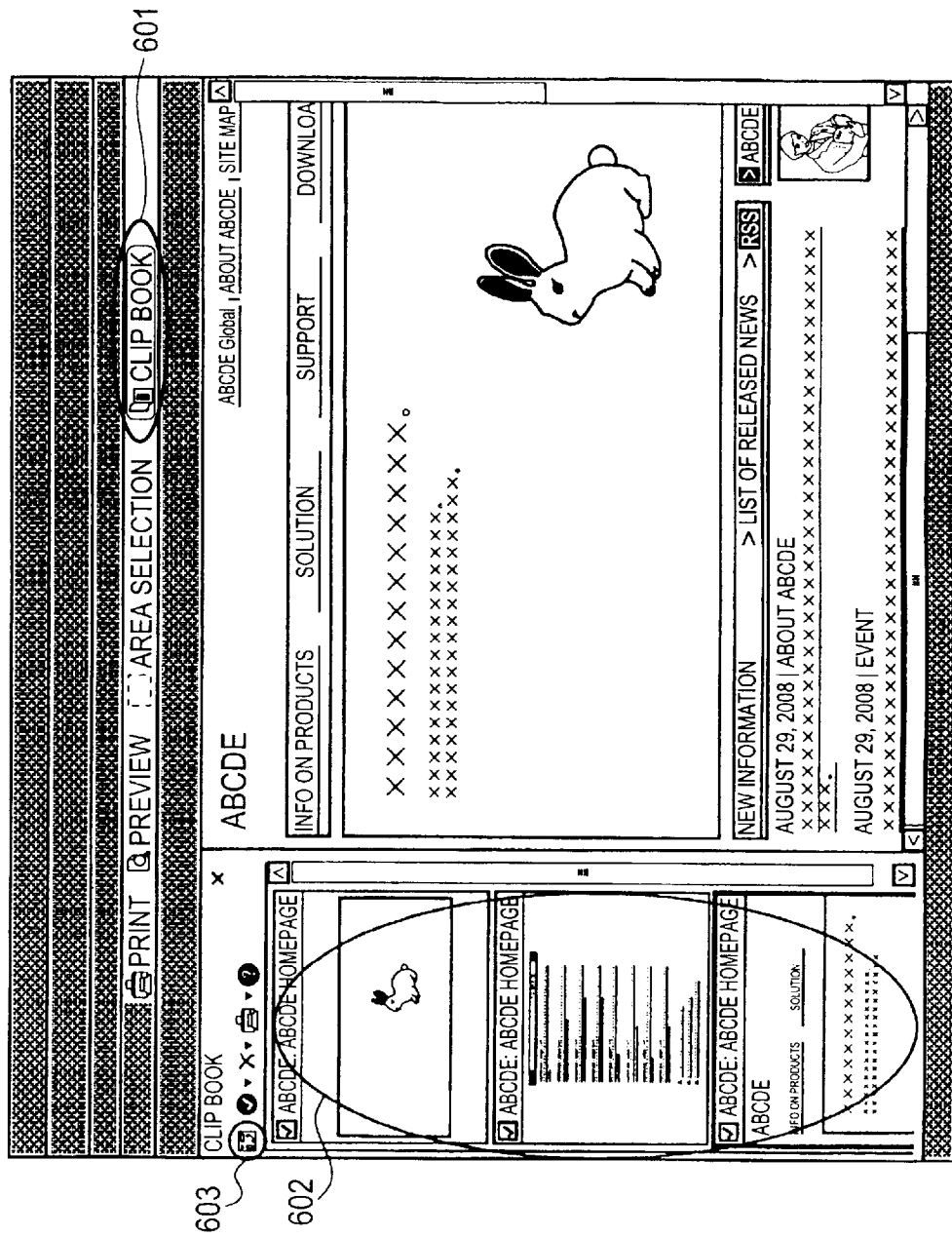
[Fig. 4]



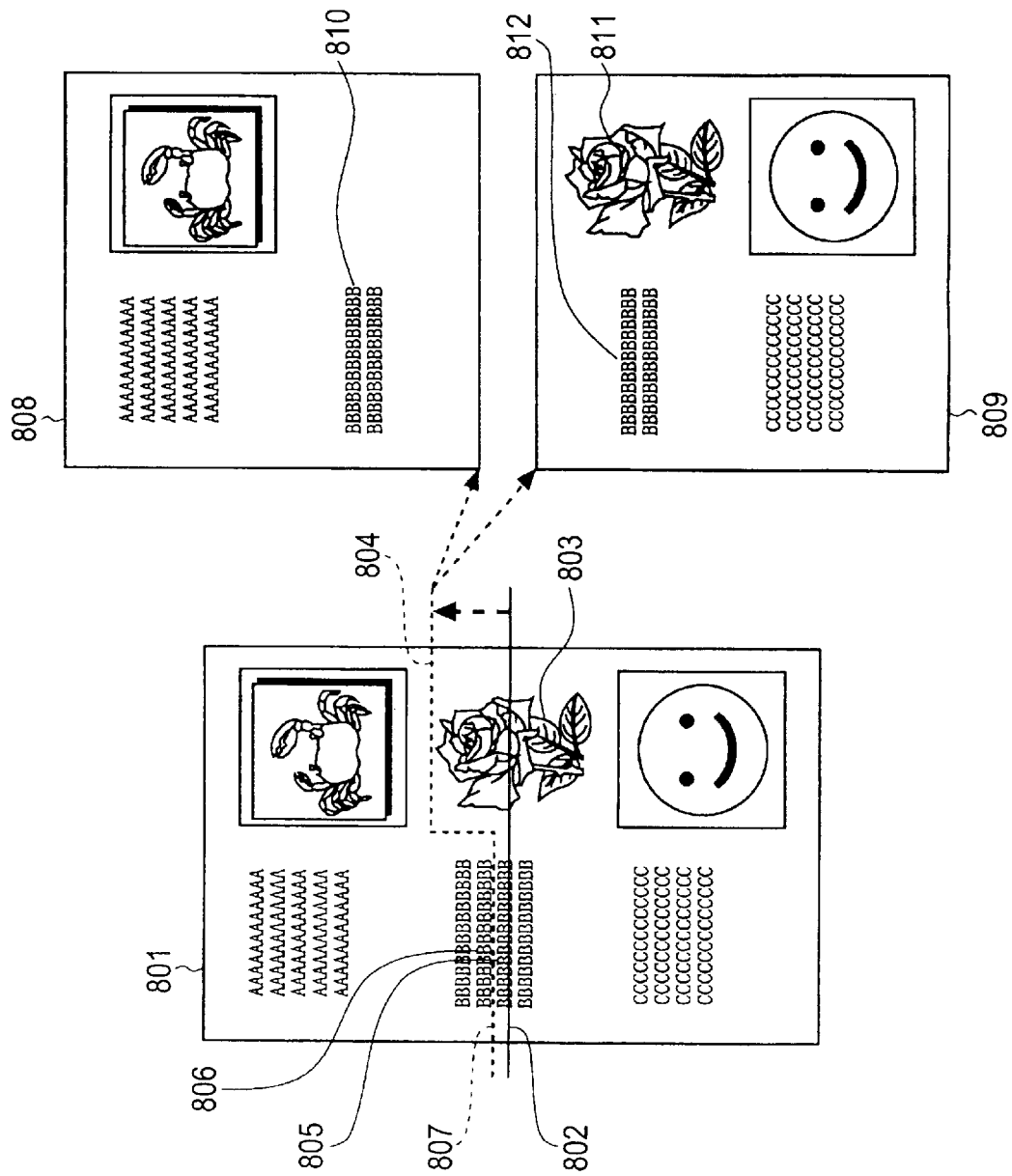
[Fig. 5]



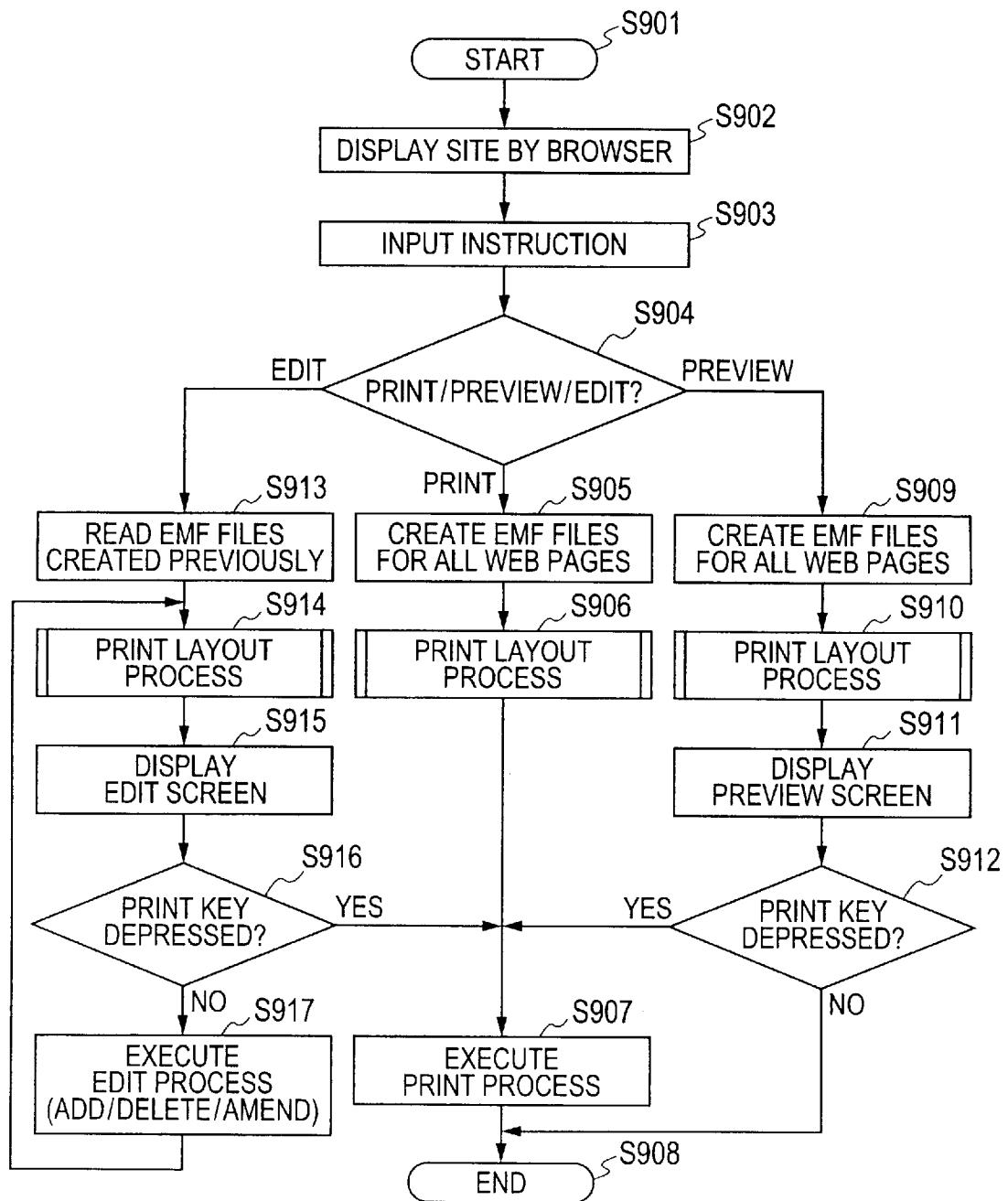
[Fig. 6]



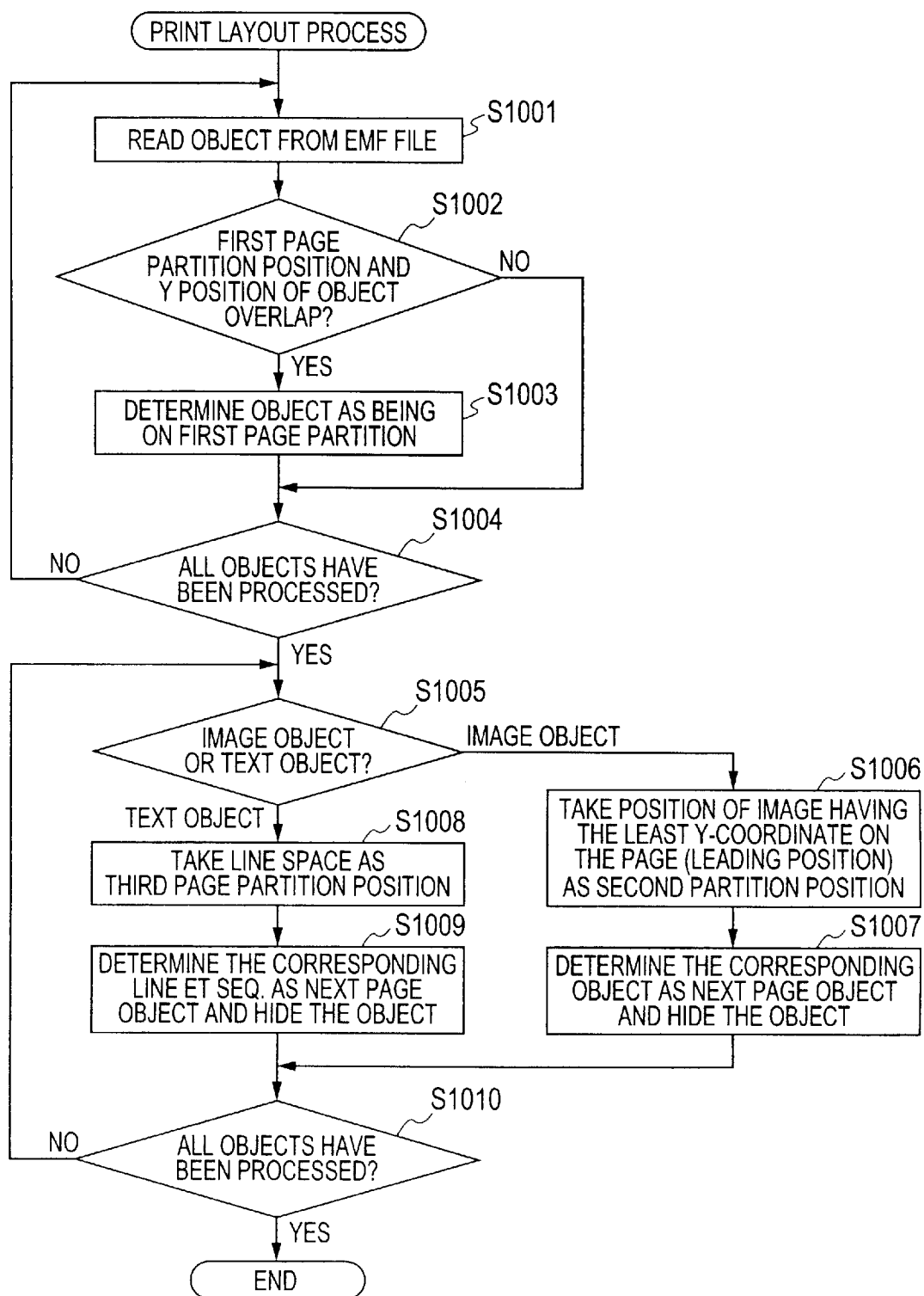
[Fig. 8]



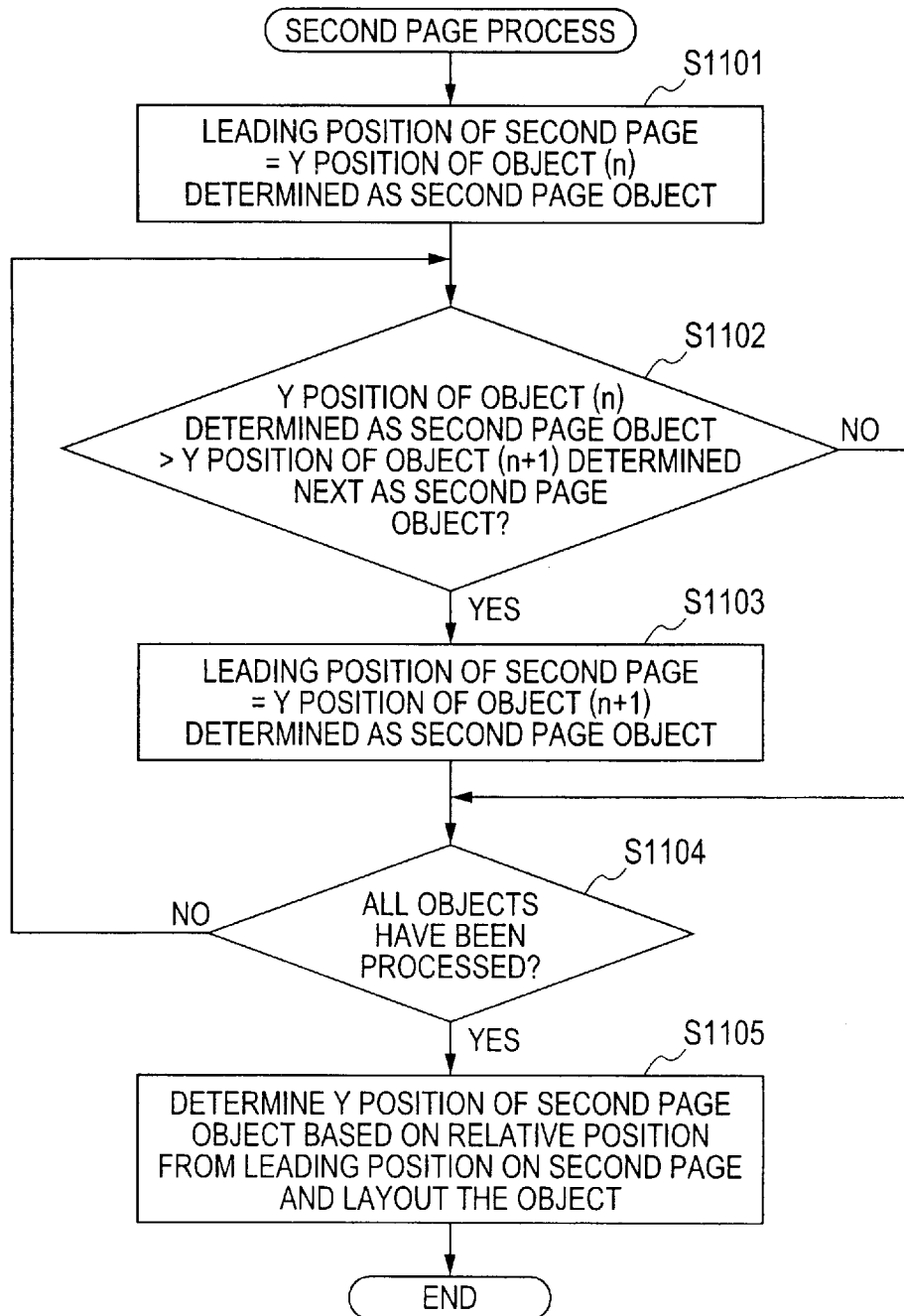
[Fig. 9]



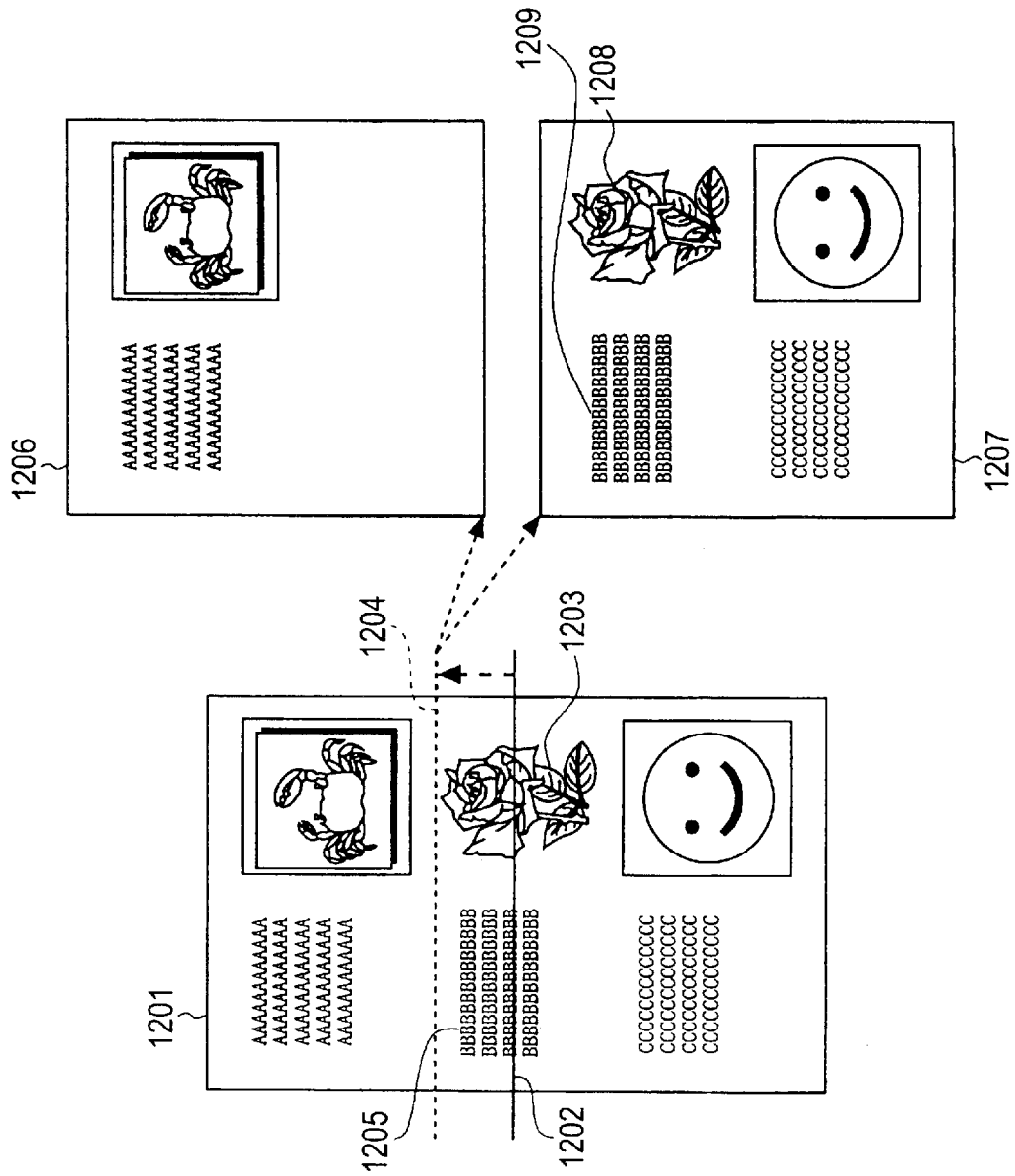
[Fig. 10]



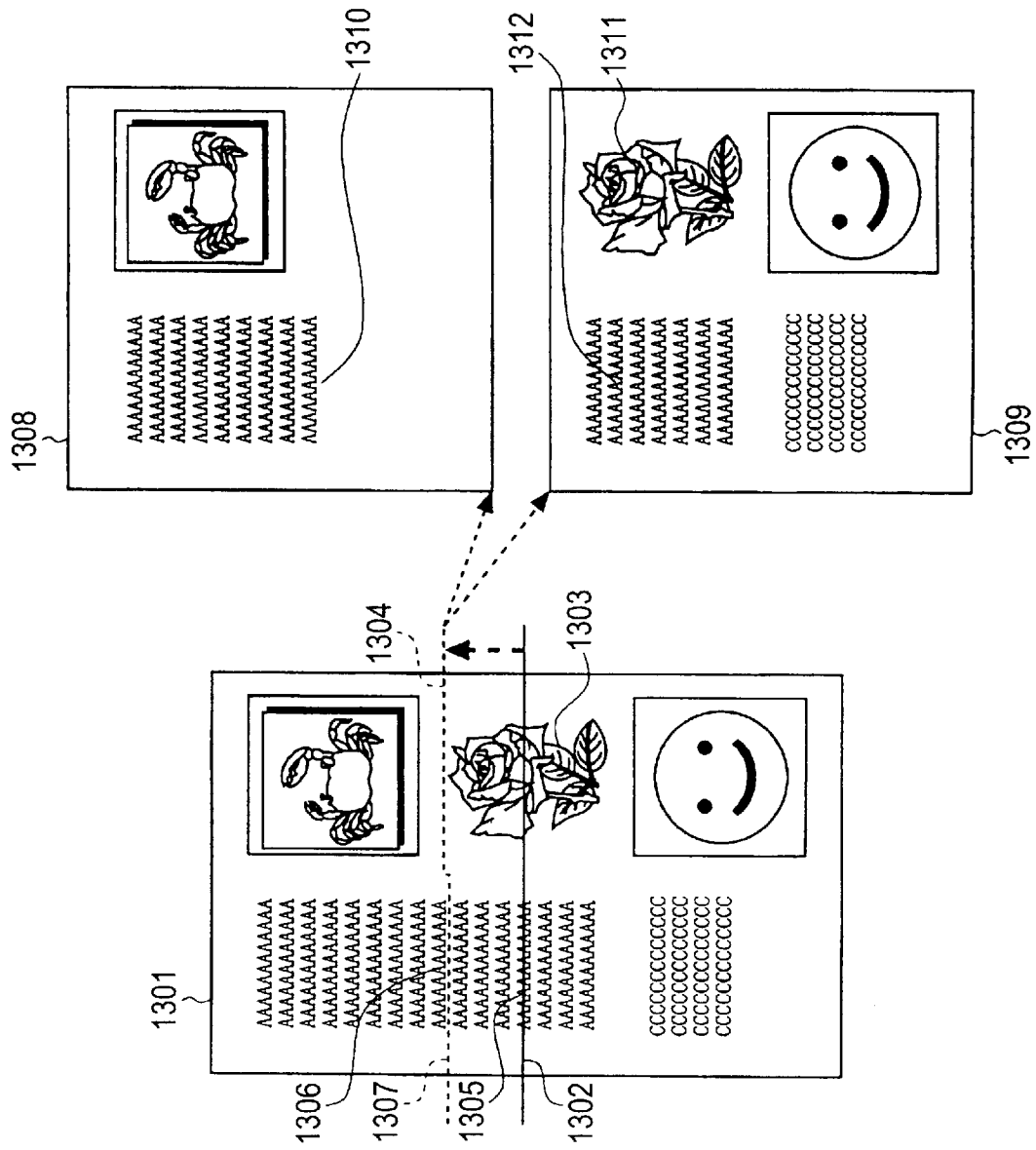
[Fig. 11]



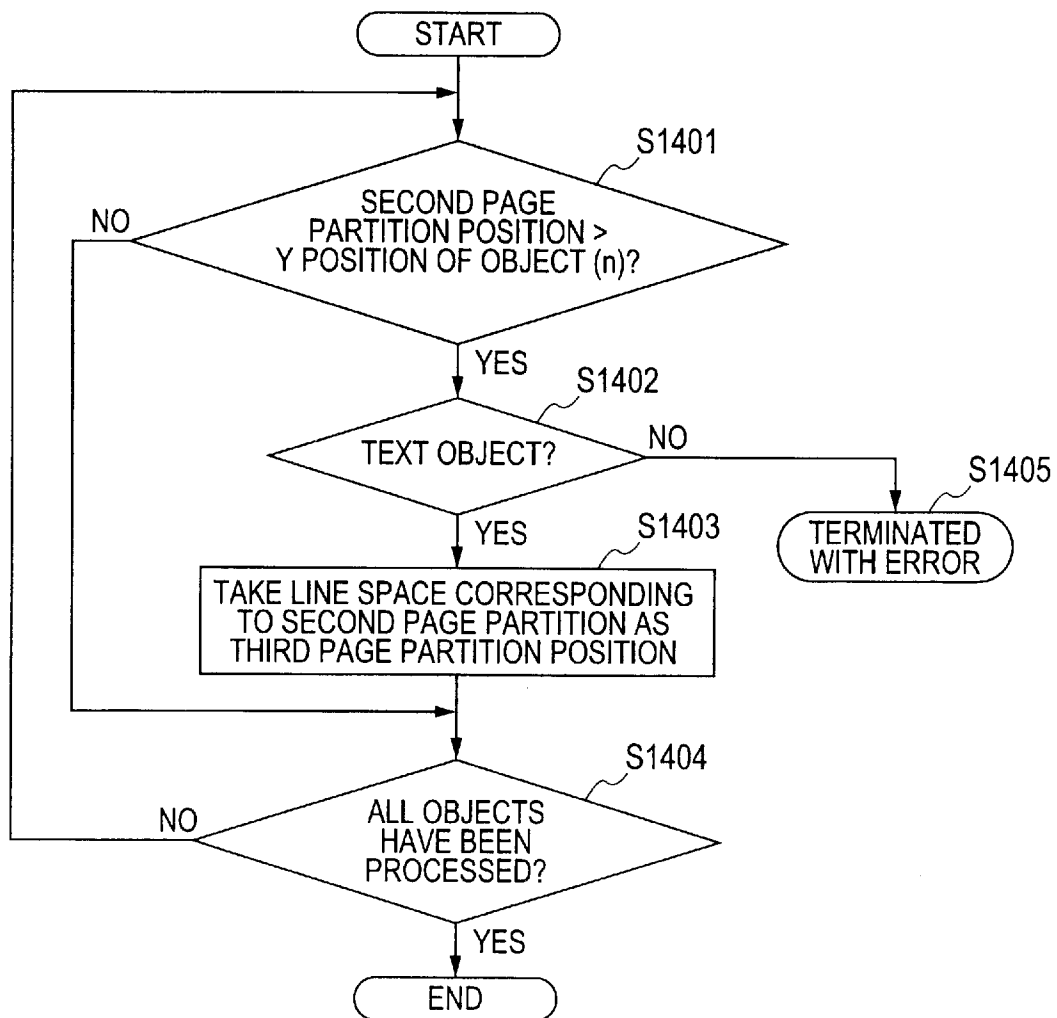
[Fig. 12]



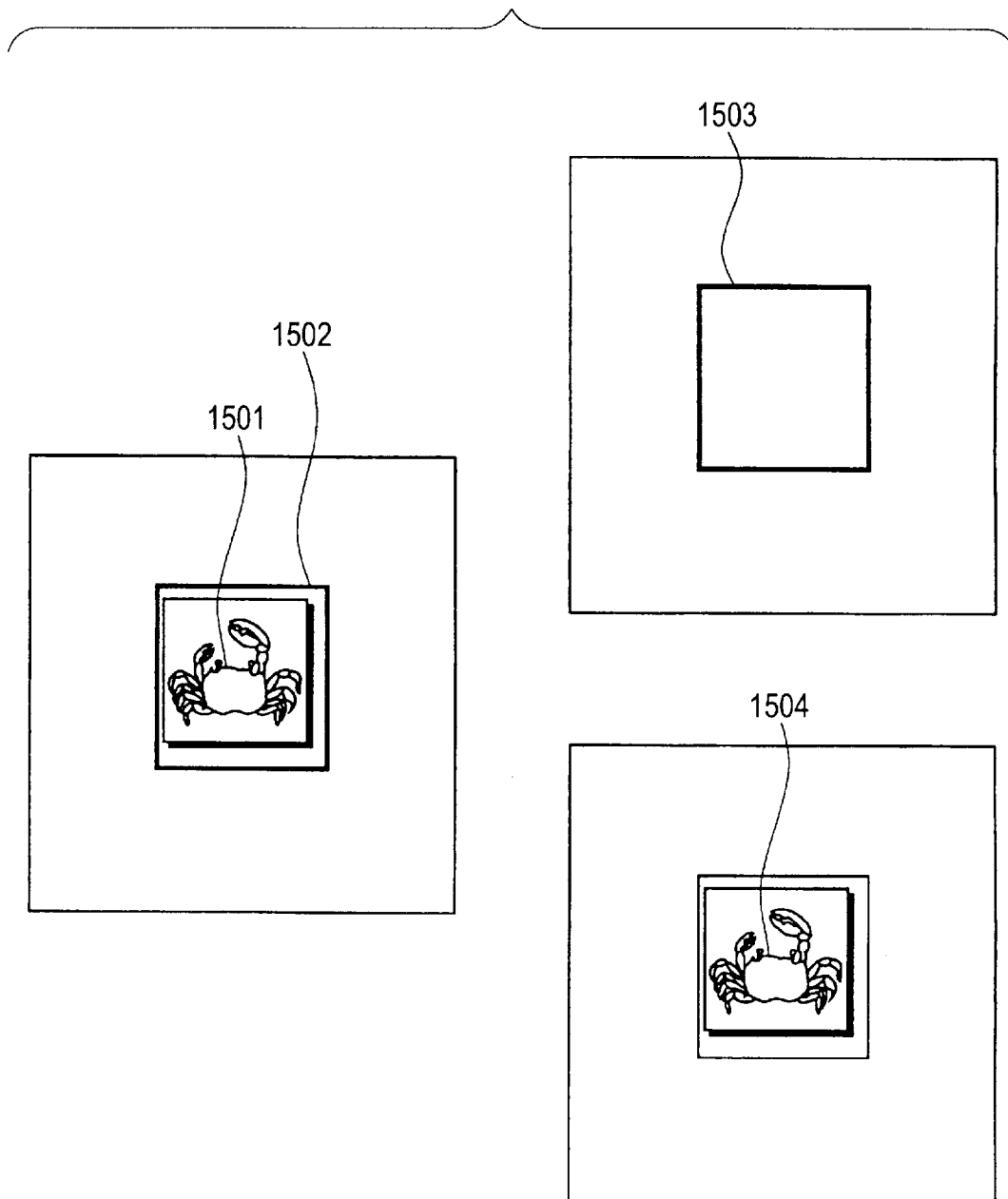
[Fig. 13]



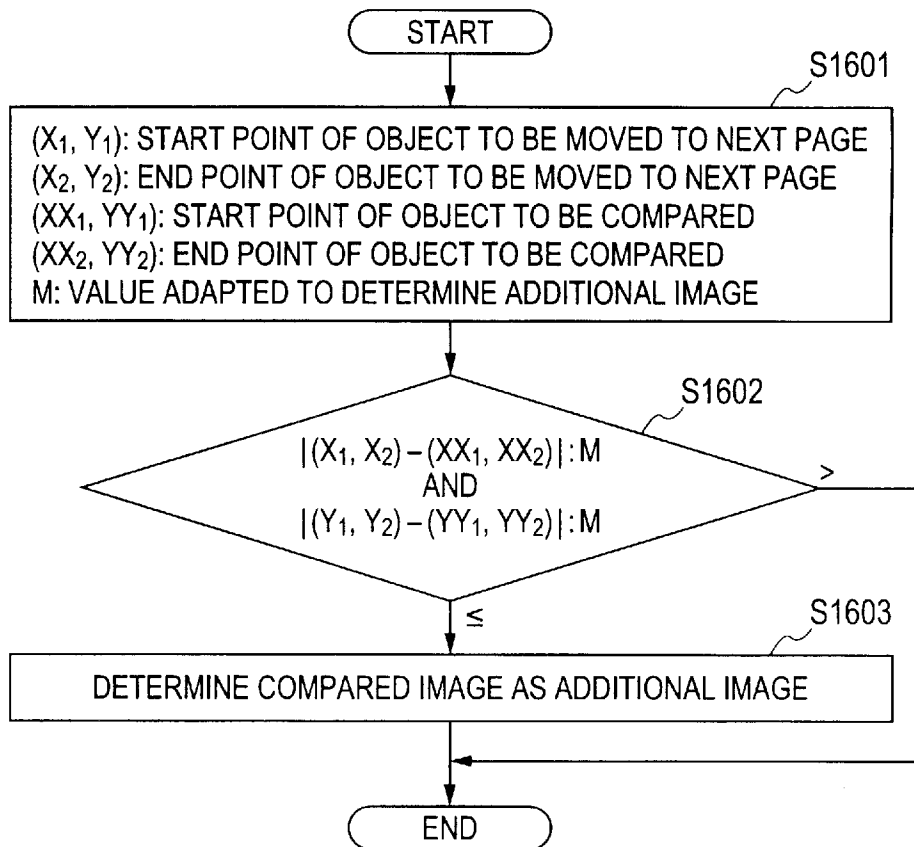
[Fig. 14]



[Fig. 15]



[Fig. 16]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/004287

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. G06F17/21 (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)

Int.Cl. G06F17/21

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

Published examined utility model applications of Japan 1922-1996
 Published unexamined utility model applications of Japan 1971-2010
 Registered utility model specifications of Japan 1996-2010
 Published registered utility model applications of Japan 1994-2010

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 09-069098 A (Sharp Corporation) 1997.03.11, paragraph 0007 (no family)	1, 3-5, 7-10
Y		2
Y	JP 06-342430 A (Fuji Xerox Co., Ltd.) 1994.12.13, paragraph 0008 (no family)	2
A	JP 03-196253 A (SANYO Electric Co., Ltd.) 1991.08.27, the whole document (no family)	1-10
A	JP 01-216462 A (TOSHIBA CORPORATION) 1989.08.30, the whole document (no family)	1-10



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

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

14.09.2010

Date of mailing of the international search report

28.09.2010

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