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(71) Applicant(s)
Matsushita Electric Industrial Co., Ltd
(Incorporated in Japan)
1006, Oaza Kadoma, Kadoma-shi, Osaka 571, Japan

(72) Inventor(s)
Tatsuaki Kasai
Michiharu Eumatsu
Eiichi Saito

(74) Agent and/or Address for Service
A A Thornton & Co
Northumberland House, 303-306 High Holborn,
LONDON, WC1V 7LE, United Kingdom

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GB 2209904 A WO 92/05656 A US 5631723 A
US 5258880 A US 4655577 A

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INT CL$^6$ H04N 1/21 1/32
Online Databases: WPI, JAPIO

(54) Abstract Title

**Video image pick-up or printing device using recording medium containing both image data and printing instructions**

(57) When an object is photographed with a digital still camera, 11 a photographed image is converted into an image data file at an image pickup unit and recorded in a recording medium 13 together with information appendant to each image such as a file name. Printing information is registered in the recording medium 13 through a control unit. This is accomplished by selecting whether or not to print an image after confirming it on a display unit by reproducing the image data recorded in the recording medium with a reproduction unit. The recording medium 13 is then removed from the digital still camera 11 and fitted to a printer 12. The printer 12 reads the printing information file registered in the recording medium 13 with a read unit, analyzes the contents with an analysis unit, again reads an image data file from the recording medium 13 according to a result of the analysis, and prints the image with a printing unit 12 while at the same time storing the image data file in the memory unit.

The image pick-up and the printing units may be combined as one integrated unit with a detachable recording medium.

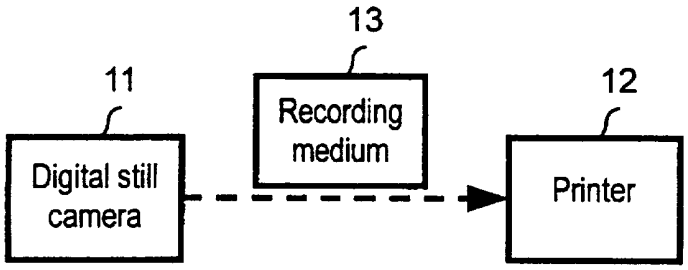



FIG. 2A

GB 2 328 104 A

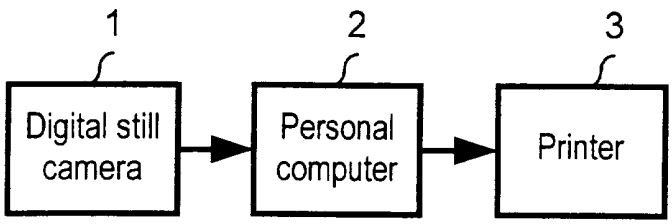



FIG. 1A PRIOR ART

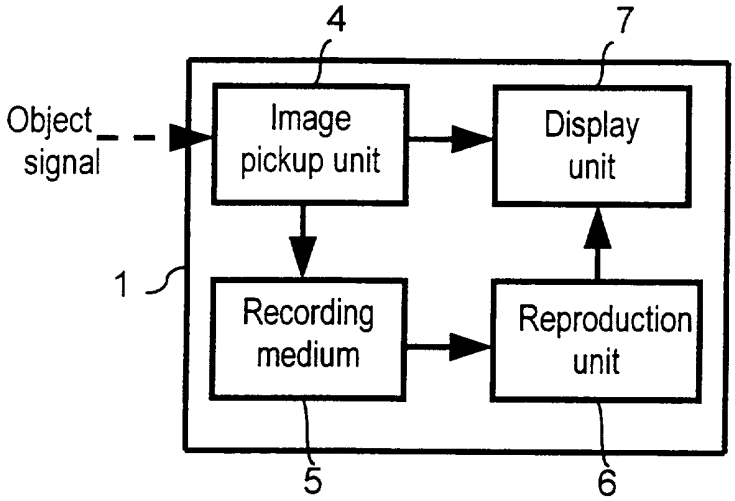



FIG. 1B PRIOR ART

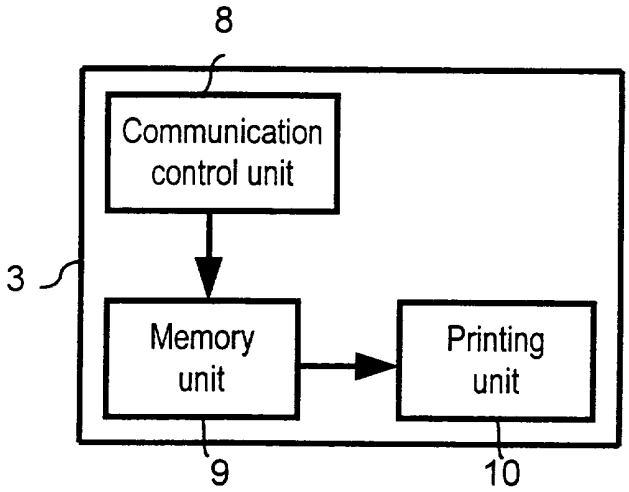



FIG. 1C PRIOR ART

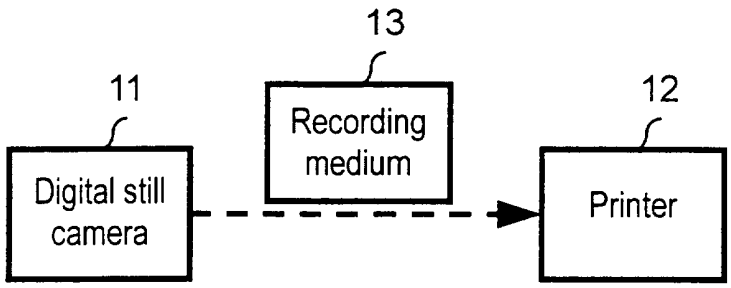



FIG. 2A

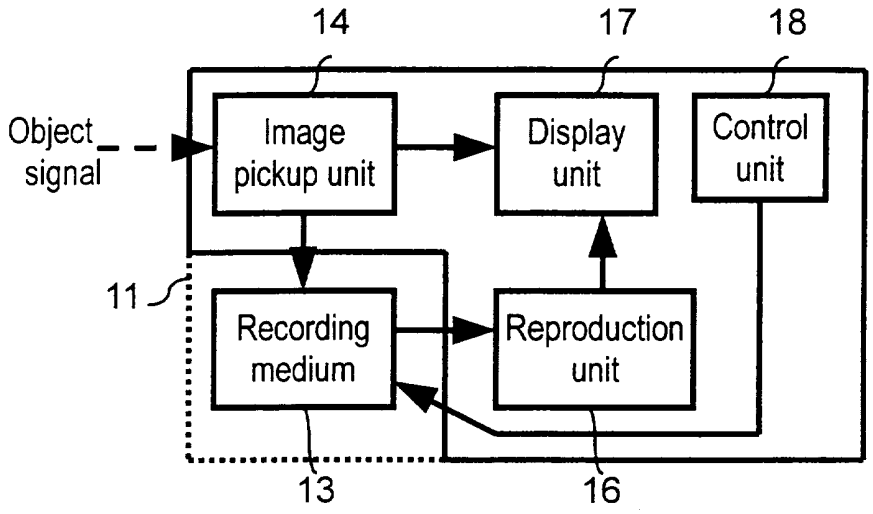



FIG. 2B

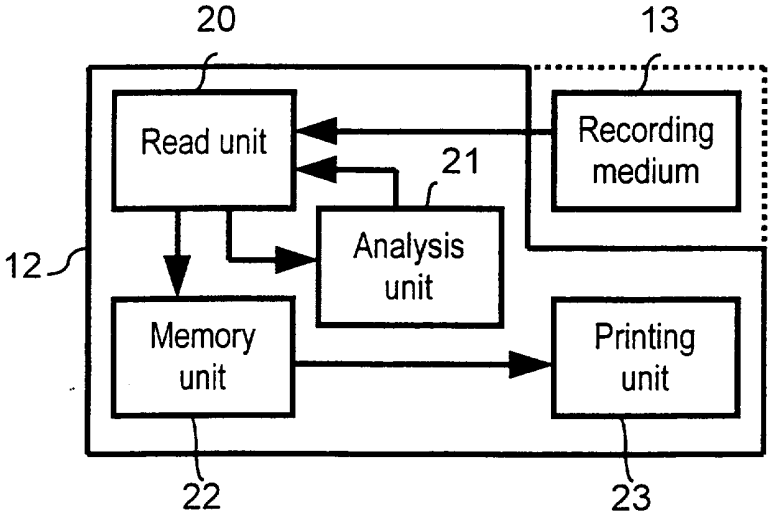



FIG. 2C

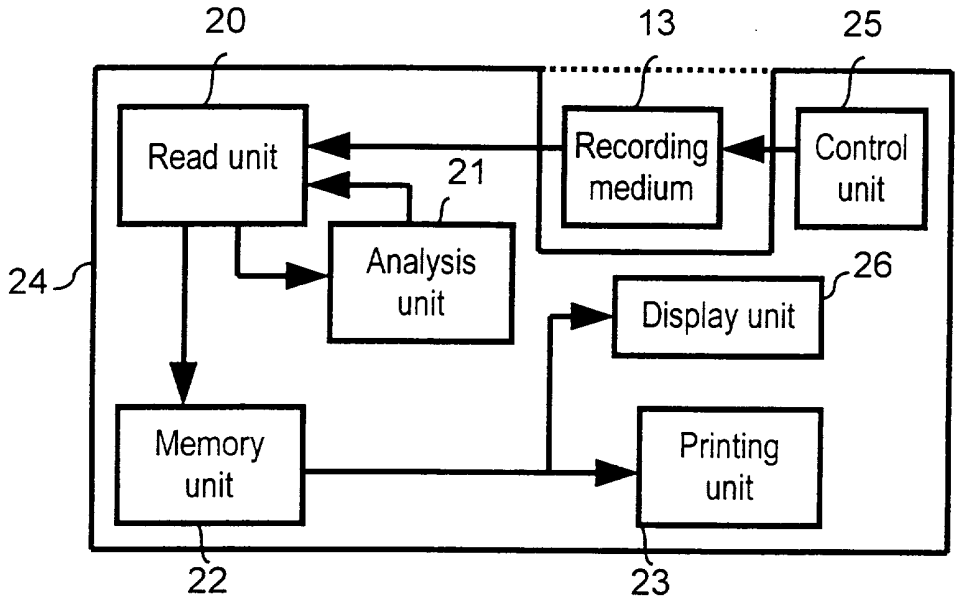

20
13
25
Read unit
Recording medium
Control unit
21
Analysis unit
24
26
Display unit
Memory unit
Printing unit
22
23

FIG. 2D

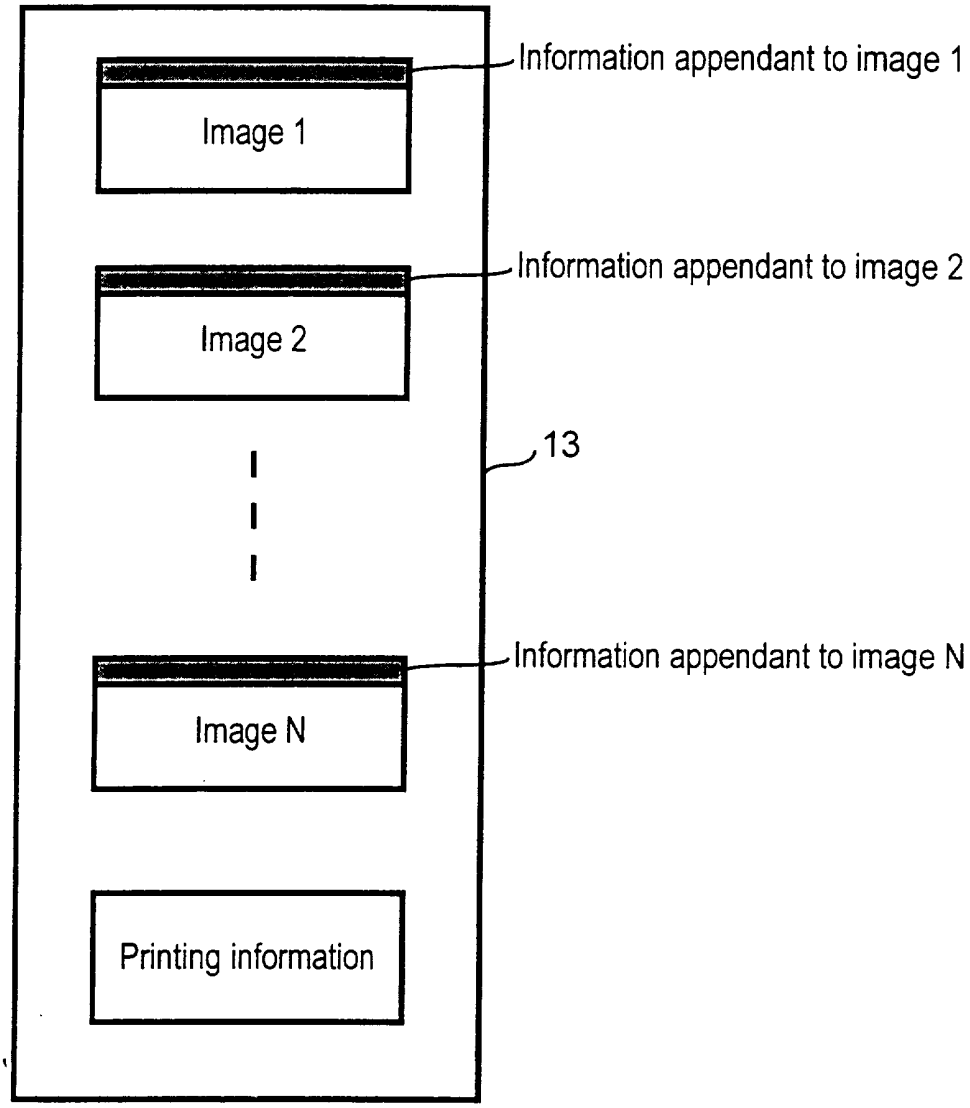

Information appendant to image 1
Image 1
Information appendant to image 2
Image 2
13
Information appendant to image N
Image N
Printing information

FIG. 3

# IMAGE PICKUP DEVICE, PHOTOGRAPHIC PRINTING DEVICE FOR PRINTING IMAGE DATA AND SYSTEM THEREOF

## FIELD OF THE INVENTION

The present invention relates to an image pickup device such as a digital still camera, etc., a photographic printing device for printing image data recorded by the image pickup device and a printing output system using the photographic printing device for printing image data file taken by the image pickup device.

## BACKGROUND OF THE INVENTION

In recent years, with the spread of digital still cameras (hereinafter referred to as "DSC") there has been an increasing demand with regard to printing output system of image data files demand has increased for printing pictures personally for simple work or utilizing commercial printing services conveniently at low price in a manner similar to silver-halide photographs.

A printing output system for image data files of the prior art is now described.

As shown in Fig.1A, the printing output system for image data files of the prior art comprises a DSC 1 for taking photographs of objects by processing them using digital signals, a personal computer (hereinafter referred to as "PC") 2 for storing within an image signal taken by the DSC 1, and a printer 3 connected with the PC 2 for printing into photographs the image signal taken by the DSC 1.

The DSC of the prior art comprises an image pickup unit 4 for processing image data input from a lens, a recording medium 5 such as a compact flash card and a floppy disc for recording the image data processed by the image pickup unit 4, a reproduction unit 6 for reproducing the image data recorded in the recording medium 5, and a display unit 7 for displaying images taken by the image

pickup unit 4 or reproduced by the reproduction unit 6 as shown in a block diagram of Fig.1B.

The printer 3 of the prior art comprises a communication control unit 8 for communicating data with the PC 2, a memory unit 9 defined as a storing means for storing data from the PC 2, and a printing unit 10 for printing the image data stored in the memory unit 9 as shown in a block diagram of Fig.1C.

Operation of the printing output system for image data files of the prior art as composed above is now described.

First, images of a desired object are photographed with the DSC 1. The photographed images are converted into image data files by the image pickup unit 4 and recorded into the recording medium 5 with additional information of file names and others, as shown in Fig.1B. In reproduction, the image data files recorded in the recording medium 5 are reproduced by the reproduction unit 6 and the images are displayed in the display unit 7 for confirmation.

In order to print out the recorded image data, the image data files need to be transferred to the PC 2 as shown in Fig.1A. By starting an application software program for digital images in the PC 2, the image data are taken in from the DSC 1 and the images are confirmed in a monitor screen on the PC 2. The PC 2 transfers the image data for printing to the printer 3 by controlling the printer 3 connected to it. The printer 3 prints out the images in the printing unit 10 while storing the image data from the PC 2 into the memory unit 9 via the communication control unit 8.

In the above composition of the prior art, however, printing of the images photographed by the DSC 1 is not possible without the PC 2 because the images need to be confirmed by displaying them on the monitor screen using the application software program for images after having the image data transferred to the PC 2, and yet it takes many steps of operation and a lot of time with significant

complication in order to print even if the PC 2 is available.

## SUMMARY OF THE INVENTION

An image pickup device of the present invention is capable of photographing images of an object, and capable of registering printing information in a recording medium for printing the photographed images by reproducing the images after the images are recorded in the recording medium.

The image pickup device of the present invention is also able to select in advance certain images for which printing is desired among the photographed images, and register them in the recording medium together with information of printing condition such as color correction, etc. if needed.

A photographic printing device of the present invention prints images by receiving the image data from the recording medium after having analyzed the printing information registered in the recording medium by the image pickup device.

Also the photographic printing device of the present invention comprises a read unit for reading the recorded data and the registered printing information in the recording medium, an analysis unit for analyzing the printing information read by the read unit, and a printing unit for printing the image data files read by the read unit based on the printing information analyzed by the analysis unit.

With this structure, the photographic printing device is able to print images without using a PC. It is also able to print easily only desired image data files without writing down an order information such as name of the image data files on a separate medium like a paper slip in case of making a request for printing them to a business shop equipped with the same device. In addition, since this photographic printing device receives from the recording medium only image data necessary for printing, it can effectively reduce the time required for the data transfer.

A printing output system for image data files of the present invention comprises an image pickup device, which can photograph images of objects and

register printing information of the photographed images in a recording medium by reproducing the images after they are recorded in the recording medium, and a photographic printing device for printing images by receiving the image data from the recording medium after having analyzed the printing information registered in the recording medium by the image pickup device.

This system is able to print images without using a PC, and it can also print only desired image data files easily without writing down an order information such as name of the image data files on a separate medium like a paper slip in case of making a request to a business shop for printing them.

In the image pickup device, the photographic device and the printing output system of present invention, the recording medium is detachable from both of the image pickup device and the photographic printing device. When it is fitted to the image pickup device, it can record photographed image data and can register the printing information, and when it is fitted to the photographic printing device, it gives image data recorded in the image pickup device as well as printing information registered in the image pickup device to the photographic printing device.

This system has advantages that a cable connecting the image pickup device and the photographic printing device is not necessary and faster data transmission between them can be realized.

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig.1A is a block diagram of a printing output system for image data files of the prior art;

Fig.1B is a block diagram of a DSC in the printing output system for image data files of the prior art for use in describing operation;

Fig.1C is a block diagram of a printer in the printing output system for image data files of the prior art for use in describing operation;

Fig.2A is a block diagram of a printing output system for image data

files of a first embodiment of the present invention;

Fig.2B is a block diagram of a DSC of the first embodiment of the invention;

Fig.2C is a block diagram of a printer for use as a photographic printing device of the first embodiment of the invention;

Fig.2D is a block diagram of a printer of a second embodiment of the invention; and

Fig.3 is a conceptual figure depicting an example of image data files accompanied with information appendant to the image and a printing information file in a recording medium.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

### FIRST EXEMPLARY EMBODIMENT

A printing output system for image data files in accordance with a first exemplary embodiment of the present invention is described below by referring to a structural drawing of Fig.2A. The printing output system of this embodiment comprises a digital still camera DSC 11 defined as an image pickup device for taking photographs of an object, a printer 12 defined as a photographic printing device for printing the image data taken by the DSC 11, and a recording medium 13, e.g. compact flash card, floppy disc, etc. for recording the image data taken by the DSC 11. It is desirable for the recording medium 13 to be detachable from the DSC 11 and the printer 12 in a viewpoint of transfer speed of image data files and printing information file.

The DSC 11 as an image pickup device of this embodiment is described below by referring to a block diagram of Fig.2B. The DSC 11 of this embodiment comprises an image pickup unit 14 for processing image data input from a lens, a recording medium 13 for recording the image data processed by the image pickup unit 14, a reproduction unit 16 for reproducing the image data recorded in the

recording medium 13, a display unit 17 for displaying images photographed by the image pickup unit 14 or reproduced by the reproduction unit 16, and a control unit 18 for being operated when registering information of desired image data among those reproduced.

The printer 12 as a photographic printing device of this exemplary embodiment is described below by referring to a block diagram of Fig.2C.

The printer 12 of this exemplary embodiment comprises a recording medium 13, which is detachable from the printer 12, a read unit 20 defined as a reading means for reading image data from the recording medium 13, an analysis unit 21 for analyzing the printing information file read by the read unit 20, a memory unit 22 defined as a storage means for storing image data to be printed among the image data read by the read unit 20, and a printing unit 23 for printing the image data stored in the memory unit 22. A PC card in conformity with PCMCIA2.1/JEIDA4.2 which is standardized as a memory card is used for a recording medium 13. Since the image data file system in the card has high compression rate, small file capacity, and many computers can read out in standard format, it is suitable to adopt JPEG format which is substantially standardized among the most DSCs.

Operation of the printing output system for image data files of the present invention as composed above is described hereunder.

First, images of a desired object are photographed with the DSC 11. An image of the object being photographed is displayed on the display unit 17 as it is input from the image pickup unit 14 at this time. If the image on the display is desired by a photographer, it is converted into an image data file at the image pickup unit 14.

Fig.3 is a conceptual figure depicting an example of the image data files accompanied with information appendant to the image and a printing information file in the recording medium 13. The images are recorded in the recording medium

13 as an image 1, an image 2, --- , and an image N according to an order of pickup together with information appendant to each image, such as a file name, a time code, an exposure data, a color correction information, etc. as shown in Fig.3. The photographer can confirm the images on the display unit 17 by reproducing the image data stored in the recording medium 13 by the reproduction unit 16, and operates the control unit 18 when printing out of the images is desired. By pressing a selection button, for instance, "desired" printing information for any particular image is registered in the printing information file of the recording medium 13. The "desired" printing information can be displayed even on the display unit 17. Or, by pressing the selection button again, the once registered printing information can be cancelled. The printing information may be a simple earmark of whether or not to print, or it can further include a number of printings, a size and a grade of the printing papers, and the designated information may be registered in a printing information file.

Furthermore, additional information that are to be recorded along with the images in the recording medium 13 at the time of photographing, such as whether or not to superpose a date and time of photographing on the prints may be designated and registered in a printing information file.

Moreover, information such as how to apply color correction, and other letters and marks to be superposed additionally on the prints may be designated and registered in a printing information file. As a matter of course, the printing information can be altered anytime after the registration.

An example of data arrangement of printing output information is given bellow.

| | |
|---|---|
| <PRE> | - Marker |
| CIFF_VERSION = 1.00 | - Version |
| <IMG SRC="../CTG_0001/AUT_0023.JPG"> | - Name of image data file |
| CIFF_PRINT_DATE/TIME=ON/OFF | - Date option |

CIFF_PRINT_SURFACE =GLOSSY - Option for paper

<IMG SRC = "../CTG_0001/AUT_0008.JPG"> - Name of next file

CIFF_PRINT_COUNT = 03 - Option for the number of printing

CIFF_PRINT_SIZE = 2L - Size option

The recording medium 13 is detachable from the DSC 11 and the printer 12, so that it is used with the printer 12 by fitting to it as it is removed from the DSC 11 after photographing. The read unit 20 reads the printing information file registered in the recording medium 13 when it is first fitted, and analyzes the contents by the analysis unit 21. It then reads out the image data files from the recording medium 13 according to results of the analysis by the analysis unit 21, and prints the images by the printing unit 23 while storing the image data files in the memory unit 22 at the same time. For example, only the image data files that re registered with the printing information of "desired" for printing are printed.

The memory unit 22 may be omitted, so that the read unit 20 can transfer the image data files directly to the printing unit 23 as it reads them from the recording medium 13.

Analysis by the analysis unit 21, reading out from the recording medium 13 and printing by the printing unit 23 are repeated until all the image date registered in the printing information file are completely printed out.

## SECOND EXEMPLARY EMBODIMENT

A printer in accordance with a second exemplary embodiment of the present invention is described below by referring to a block diagram of Fig.2D. The printer of this embodiment differs from the printer of the first embodiment in that a control unit 25 is furnished within the printer 24 for registering printing information in the recording medium 13, as similar to the DSC 11. By operating

the control unit 25, images to be printed, the number of printings, a size and a grade of the printing papers, a type of the printing paper may be designated, and the designated information may be registered in a printing information file.

Also, additional information that are to be recorded along with the images in the recording medium 13 at the time of photographing, such as whether or not to superpose a date and time of photographing on the prints can be designated and registered in a printing information file,

Furthermore, it is possible to designate the information such as other letters and marks to be superposed additionally on the prints and to register it in a printing information file.

A display unit 26 may be added to an output end of the memory unit 22 in this embodiment, so that images to be printed, the number of printings or a direction of "print them all" can be designated while the images are being displayed after photographing. The designated printing information can be confirmed also by displaying them on the display unit 26.

Accordingly, the present invention can print the image data without use of a PC which is needed with the prior art devices, by providing with the DSC 11 capable of registering information on the image data files to be printed by reproducing them, the printer 12 for printing the image data files by analyzing information on them, and the recording medium 13, which is detachable from the DSC 11 and the printer 12, for exchanging the data between them. Also, desired image data files are easily printed without writing down an order information such as name of the data files and image numbers on a separate medium like a paper slip in case of making a request to a print shop for printing them.

Although the recording medium 13 may be detachable as described

above, it can be housed in the DSC 11 as a built-in memory so as to transfer the data by connecting each other with a cable or the like. If that is the case, the printing information alone shall be received first for analysis, and then only the registered image data to be printed are to be transferred for printing, because it takes a considerable time for transferring image data.

Furthermore, a temporary memory medium may be provided besides the recording medium 13, although not shown in the figure, for recording the photographed image data temporarily in this memory medium. The image data is then transferred to the recording medium 13 either automatically or by a manual operation of the control unit 18 by the photographer after confirmation with the display unit 17. In this way, a memory capacity is effectively utilized since only the images that need to be kept are recorded in the recording medium 13 whereas those images with faults are discarded.

As has been described, the present invention has an outstanding advantage of being capable of printing the desired image data easily without requiring a PC to once take in an output of the DSC.

CLAIMS:

1. An image pickup device for use with a recording medium, comprising:

recording means for recording an optical image in said recording medium; and

instruction means for generating printing instructions for said optical image and for storing said printing instructions in said recording medium.

2. An image pickup device according to claim 1, further comprising:

a temporary memory medium, wherein said optical image is transferred from said temporary memory medium to said recording medium.

3. An image pickup device according to claim 1, wherein said optical image is recorded in said recording medium as an image data file, said image pickup device further comprising:

an image pickup unit for capturing said optical image;

a reproduction unit for reproducing the image data file recorded in said recording medium; and

a display unit for displaying an image corresponding to said optical image recorded in said recording medium.

4. An image pickup device according to claim 1, 2, or 3 wherein said recording medium is detachable.

5. An image pickup device according to claim 1, wherein said printing instructions stored in said recording medium are alterable.

6. An image pickup device according to claim 2, wherein said printing instructions stored in said recording medium are alterable.

7. An image pickup device according to claim 3, wherein said printing instructions stored in said recording medium are alterable.

8. An image pickup device according to claim 1, wherein said printing instructions indicates whether said optical image recorded in said recording medium is to be printed.

9. An image pickup device according to claim 3, wherein said display unit displays said printing instructions.

10. A photographic printing device, for use with a recording medium in which is stored recorded optical images and printing instructions for printing ones of said recorded optical images, said printing device comprising:

means for obtaining said recorded optical images and said printing instructions from said recording medium; and

printing means for printing said ones of said recorded optical images in accordance with said instructions.

11. A photographic printing device according to claim 10, wherein said recording medium is detachable.

12. A photographic printing device according to claim 10, further comprising a display unit for displaying said printing instructions.

13. A photographic printing device according to claim 10, further comprising means for modifying said printing instructions stored in said recording medium.

14. A photographic printing device according to claim 10, wherein said printing means evaluates said printing instructions to determine which ones of said recorded optical images are to be printed.

15. A printing output system for use with a recording medium, comprising:

recording means for recording an optical image in said recording medium;

instruction means for generating printing instructions for said optical image and for storing said printing instructions in said recording medium;

means for obtaining said recorded optical images and said printing instructions from said recording medium; and

printing means for printing said ones of said recorded optical images in accordance with said instructions.

16. A printing output system according to claim 15, further comprising:

a temporary memory medium, wherein said optical image is transferred from said temporary memory medium to said recording medium.

17. A printing output system according to claim 15, further comprising:

an image pickup unit for capturing said optical image;

a reproduction unit for reproducing the image data file recorded in said recording medium; and

a display unit for displaying an image corresponding to said optical image recorded in said recording medium.

18. A printing output system according to claim 17, wherein said instructions are displayed in said display unit.

19. A printing output system according to claim 15, wherein said printing instructions stored in said recording medium are alterable.

20. A printing output system according to claim 15 or 17, wherein said recording medium is detachable.

The Patent Office

15

**Application No:** GB 9817291.9 **Examiner:** Andrew Fearnside
**Claims searched:** 1-20 **Date of search:** 26 November 1998

# Patents Act 1977
# Search Report under Section 17

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): H4F (FEHM, FFB, FFE, FKC)

Int Cl (Ed.6): H04N (1/21, 1/32)

Other: Online databases: WPI, JAPIO

**Documents considered to be relevant:**

| Category | Identity of document and relevant passage | | Relevant to claims |
|---|---|---|---|
| X | GB 2209904 A | (SONY) See line 33 of page 2 to foot of page 3. | 10,11,14 |
| X,E | EP 0851661 A2 | (FUJI) See whole document | 10,11,14 |
| X | WO 92/05656 | (EASTMAN KODAK) See paragraph 3 of page 4, page 5 and figures 1 and 3. See paragraph 2 of page 8 to paragraph 1 of page 9 inclusive. | 1,2,3,4,10, 11,15,16, 17,20 |
| X | US 5631723 | (CANON) See column 6, lines 26 to 37. | 10,11,14 |
| X | US 5258880 | (CANON) See lines 61 of column 2 to line 9 of column 3. See paragraph 5 of column 4 & figure 5. See from line 56 of column 5 to paragraph 3 of column 6 inclusive. | 1,2,3,4,8, 10,11,14, 15,16,17, 20 |
| X | US 4655577 | (MITA) See whole document in general, but particularly the abstract and figure 5. | 1,4,10,11, 15,20 |

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|---|---|---|---|
| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art. |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention. |
| & | Member of the same patent family | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |