

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
24 December 2008 (24.12.2008)

PCT

(10) International Publication Number
WO 2008/157516 A1

(51) International Patent Classification:
G06F 3/03 (2006.01)

(21) International Application Number:
PCT/US2008/067162

(22) International Filing Date: 16 June 2008 (16.06.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/944,263 15 June 2007 (15.06.2007) US
60/956,567 17 August 2007 (17.08.2007) US

(71) Applicant (for all designated States except US): **MARVELL SEMICONDUCTOR, INC.** [US/US]; 5488 Marvell Lane, Santa Clara, CA 95054 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MCKINLEY, Patrick, A.** [US/US]; 3820 NW Estaview Pl, Corvallis, OR 97330 (US). **JAMES, Jeffrey, S.** [US/US]; 3301 Vista Roca, Escondido, CA 92029 (US). **CARLSON,**

Gregory, F. [US/US]; 2726 SW Titleist Circle, Corvallis, OR 97333 (US). **GOSS, Steven** [US/US]; 5922 Sw Amberwood, Corvallis, OR 97333 (US). **BLEDSOE, James, D.** [US/US]; 29216 Lakeside Drive, Corvallis, OR 97333 (US).

(74) Agents: **LEMOND, Kevin, T.** et al.; Schwabe, Williamson & Wyatt, P.c., Pacwest Center, Suite 1900, 1211 Sw Fifth Avenue, Portland, OR 97204 (US).

(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, 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, JP, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, 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,

[Continued on next page]

(54) Title: EXECUTING OPERATIONS IN CONNECTION WITH ONE OR MORE IMAGES WITH A PRINTER

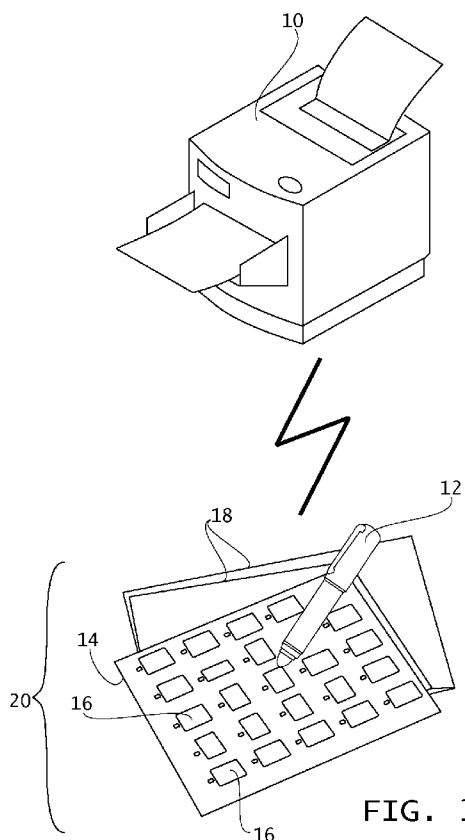


FIG. 1

(57) Abstract: Methods and systems are provided to facilitate a printer to execute one or more operations in connection with one or more images are described herein. The methods may include methods that may, at least in part, be implemented at a printer including tracking one or more locations of a scan device with respect to a sheet having a first one or more pictures associated with one or more corresponding images, wherein the tracking is based, at least in part, on electronic data provided by the scan device. The printer may then based at least in part on the tracking, execute at least one operation in connection with all or a selected subset of the one or more corresponding images.



GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

EXECUTING OPERATIONS IN CONNECTION WITH ONE OR MORE IMAGES WITH A PRINTER

CROSS-REFERENCES TO RELATED APPLICATIONS

The present application claims priority to U.S. Provisional Patent
5 Application No.60/944,263 filed June 15, 2007, entitled "METHOD AND
APPARATUS FOR IMAGE SELECTION FROM A THUMBNAIL CONTACT PRINT
SHEET FOR SUBSEQUENT VIEWING OR PRINTING OF FULL SIZE IMAGES,"
and U.S. Provisional Patent Application No. 60/956,567 filed August 17, 2007,
entitled "INTERACTIVE EDITING OF IMAGES USING A PRINTER," the entire
10 disclosures of which are hereby incorporated by reference in their entirety for all
purposes.

TECHNICAL FIELD

Embodiments of the present invention relate to the field of printers, and
more particularly, to executing operations with respect to one or more images
15 using a printer in conjunction with a scan device such as an electronic pen.

BACKGROUND

The popularity of electronic devices such as digital cameras and video
recorders for taking photographic pictures or images has exploded in recent
20 years. In order to obtain hard copies (i.e., photographs) of the digitized images
stored using such devices, users of such devices will typically take such a device
or a memory card from the device to a photo shop to download the digitized
images stored in the device or its memory card. The user will then view the
images at the photo shop and select which of the images stored in the device or
25 its memory card to print. Alternatively, users of such devices can purchase
relatively low cost photo printers and directly print their own pictures using such
printers. To date, there have been two primary mechanisms to browse and select
photos using these types of low cost photo printers.

The first mechanism is to utilize, for example, a color liquid crystal display
30 (LCD) to browse and select images to be printed. The user can scroll through the
images and mark or tag specific images for some later action, such as printing.
This solution can be cumbersome for the user given the relatively small size of

the display that typically comes with the printers. For many novice customers, this selection mechanism is also not intuitive.

5 The second mechanism is to print a thumbnail contact proof sheet of the images available. This printed proof sheet, which may also be referred to as an "index sheet," has "Scantron" equivalent circles that the user shades and then consequently scans using a scan head that may be included with the printer. During the scan process, the printer recognizes where the user filled in the circles to tag images for some later action, such as printing. Although this provides a more natural user interface that people are accustomed to, the rescanning of the
10 entire page is an additional step that is not intuitive or simple. Further, a scan head is needed with the printer in order to perform the scanning operation, thus adding to the overall costs of the printer.

SUMMARY OF INVENTION

15 According to various embodiments of the present invention, methods, and systems are provided to facilitate a printer to execute one or more operations in connection with one or more images. The methods may include methods that may, at least in part, be implemented at a printer including tracking one or more locations of a scan device with respect to a sheet having a first one or more
20 pictures associated with one or more corresponding images, wherein the tracking is based, at least in part, on electronic data provided by the scan device. And based at least in part on the tracking, executing at least one operation in connection with all or a selected subset of the one or more corresponding images.

25 In some embodiments, the executing may comprise of printing a second one or more pictures on one or more sheets. For these embodiments, the printing of the second one or more pictures on one or more sheets may include printing pictures of all or the selected subset of the one or more corresponding images. In some embodiments, the printing of the second one or more pictures
30 on one or more sheets may include modifying all or the selected subset of the one or more corresponding images, and printing pictures of all or the selected subset of the one or more corresponding images that have been modified on one or more sheets.

In some embodiments the modifying all or the selected subset of the one or more corresponding images comprises removing red-eye from all or the selected subset of the one or more corresponding images. In some embodiments, the modifying all or the selected subset of the one or more corresponding images may comprise cropping a portion or portions of all or the selected subset of the one or more corresponding images. In some embodiments, the modifying all or the selected subset of the one or more corresponding images may comprise adjusting contrast or enhancement of portion(s) of all or the selected subset of the one or more corresponding images.

10 In some embodiments, the modifying all or the selected subset of the one or more corresponding images comprises enlarging at least portion(s) of all or the selected subset of the one or more corresponding images, and the printing pictures of all or the selected subset of the one or more corresponding images that have been modified on one or more sheets comprises printing the at least

15 portion(s) of all or the selected subset of the one or more corresponding images that were enlarged.

In some embodiments, the tracking of the one or more locations of the scan device may include tracking the one or more locations of a nib of the scan device with respect to one or more locations on the sheet. In some

20 embodiments, said tracking includes tracking wirelessly the one or more locations of the scan device. In some embodiments, said scan device generates the electronic data based on scanning one or more selective portions of the sheet and reading embedded data in the one or more selective portions of the sheet, and said tracking comprises determining a particular location of the scan device

25 with respect to the sheet by processing the generated electronic data. For these embodiments, said tracking comprises determining one or more identities of all or the selected subset of the one or more corresponding images by processing said electronic data.

In some embodiments, the methods may include printing the sheet with

30 embedded data, wherein the embedded data is used to facilitate said tracking. For these embodiments, said printing comprises printing the sheet with a pattern of dots and data to indicate locations of the dots with respect to the sheet. In

some embodiments said printing comprises printing the sheet with identities associated with the one or more corresponding images.

In some embodiments, said executing comprises at least one of emailing all or the selected subset of the one or more corresponding images and/or

5 displaying all or the selected subset of the one or more corresponding images. In some embodiments, said tracking comprises tracking movement of the scan device with respect to the sheet by determining multiple locations of the scan device with respect to the sheet over an interval of time, and said executing is based, at least in part, on the relative movement of the scan device with respect
10 to the sheet.

In some embodiments, the methods may include methods that may be implemented at a scan device that includes scanning by the scan device one or more selective portions of a sheet having first one or more pictures while not scanning other portions of the sheet, said scanning including reading embedded
15 data in the one or more selective portions of the sheet; and said first one or more pictures being associated with one or more corresponding images. The scan device may then generate electronic data based on the embedded data, said electronic data indicating, at least in part, one or more relative positions of the scan device with respect to the sheet, and transmit the electronic data to a printer
20 to facilitate the printer in executing at least one operation in connection with all or a selected subset of the corresponding images.

For these embodiments, said electronic data may be transmitted wirelessly to the printer. Further, for these embodiments, the sheet may include a pattern of dots and data to indicate locations of the dots with respect to the sheet, and said
25 reading includes reading at least one dot and data that indicates the location of the at least one dot with respect to the sheet. In some embodiments, the sheet may include identities associated with the one or more corresponding images, and said reading includes reading at least one identity. In some embodiments, said scanning comprises scanning multiple selective portions of the sheet over an
30 interval of time and reading embedded data in the multiple selective portions, and generating and transmitting to the printer electronic data indicating the one or more relative positions of the scan device relative to the sheet during the interval

of time to facilitate the printer in determining relative movement of the scan device with respect to the sheet.

In some embodiments of the present invention, a system is provided which includes a system comprising a scan device and a printer. For these
5 embodiments, the scan device may be configured to scan one or more selective portions of a sheet having first one or more pictures while not scanning other portions of the sheet, to read embedded data in the one or more selective portions of the sheet and to generate and transmit electronic data based on the embedded data, the first one or more pictures being associated with one or more
10 corresponding images. The printer may be communicatively coupled to the scan device to receive the electronic data and to track one or more locations of the scan device with respect to the sheet based on the electronic data, and to execute at least one operation in connection with all or a selected subset of the one or more corresponding images based, at least in part, on the tracking of the
15 location or locations of the scan device.

In some embodiments, the printer may be configured to perform the at least one operation by printing a second one or more pictures on one or more sheets based, at least in part, on the electronic data received from the scan device. In some embodiments, said printer is further configured to print the sheet
20 with the first one or more pictures, and to print the embedded data onto the sheet. In some embodiments, said scan device includes an interface to wirelessly transmit the electronic data to the printer. In some embodiments, said printer includes another interface to wirelessly receive the electronic data from the scan device.

25 These and other aspects of various embodiments of the present invention will be described in greater detail in the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be described by way of exemplary
30 embodiments, but not limitations, illustrated in the accompanying drawings in which like references denote similar elements, and in which:

FIG. 1 illustrates a printer, a scan device, and mark-up sheets, in accordance with various embodiments of the present invention;

FIG. 1A illustrates a scan device, and mark-up sheets, in accordance with various embodiments of the present invention;

FIG. 2 is a flow process, in accordance with various embodiments of the present invention;

5 **FIG. 3A** is a block diagram that schematically illustrates various components of the printer of **FIG. 1**, in accordance with various embodiments of the present invention;

10 **FIG. 3B** is a block diagram that schematically illustrates various components of the scan device of **FIG. 1**, in accordance with various embodiments of the present invention;

FIG. 3C illustrates the index sheet of **FIG. 1**, in further detail, in accordance with various embodiments of the present invention; and

FIGS. 4A to 4G illustrates a photograph as depicted in **FIG. 1** with different markings, in accordance with various embodiments of the present invention.

15

DETAILED DESCRIPTION

In the following detailed description, reference is made to the accompanying drawings which form a part hereof wherein like numerals designate like parts throughout, and in which is depicted by way of illustration
20 embodiments in which the invention may be practiced. It is to be understood that other embodiments may be utilized and structural or logical changes may be made without departing from the scope of the present invention. Therefore, the following detailed description is not to be taken in a limiting sense, and the scope of embodiments in accordance with the present invention is defined by the
25 appended claims and their equivalents.

Various operations may be described as multiple discrete operations in turn, in a manner that may be helpful in understanding embodiments of the present invention; however, the order of description should not be construed to imply that these operations are order dependent.

30 For the purposes of the instant description, the phrase “A/B” means A or B. For the purposes of the instant description, the phrase “A and/or B” means “(A), (B), or (A and B).” For the purposes of the instant description, the phrase “at least one of A, B and C” means “(A), (B), (C), (A and B), (A and C), (B and C) or

(A, B and C).” For the purposes of the instant description, the phrase “(A)B” means “(B) or (AB),” that is, A is an optional element.

Reference in the specification to “one embodiment” or “an embodiment” means that a particular feature, structure, or characteristic described in

5 connection with the embodiment is included in at least one embodiment. The appearances of the phrase “in one embodiment” in various places in the specification do not necessarily all refer to the same embodiment, but they may.

According to various embodiments of the present invention, methods and systems are provided that provide low-cost solutions for executing selective

10 operations connected to one or more images in a printer. Embodiments of the present invention may employ at least a scan device, such as an electronic digital pen (or simply “electronic pen”), a printer, such as a photo printer, that is communicatively coupled to the scan device, and one or more “mark-up” sheets with embedded data that may be read by the scan device in order for the printer

15 to determine the location(s) of the scan device with respect to the mark-up sheets. A “mark-up” sheet, as used herein, may be an index sheet containing a plurality of printed pictures of images, a photograph containing a single printed picture, or any other media having one or more printed pictures. A “sheet” as used herein may refer to any type of printable media such as paper, although not

20 limited thereto. For ease of illustration and explanation, the word “image” will be used herein in reference to an electronic or digitized image, while the word “picture” will be used in reference to a printed version or hardcopy of the image.

The scan device may be used by a user to mark a mark-up sheet to indicate which operations the user wishes the printer to perform. While the user

25 marks the mark-up sheet, the scan device may scan only selective location(s) of the mark-up sheet reading only the embedded data located in those selective location(s) that fall within the field of view of the scan device. The scan device may then provide to the printer, based on the read embedded data, electronic data that may be processed by the printer to determine which actions or

30 operations to execute without the need to scan the entire mark-up sheet as is required using, for example, the Scantron technique. Thus, the scan device may be used to virtually “mark-up” printed image(s).

The printer, which may be communicatively coupled to the scan device, may automatically execute various operations such as editing and/or printing selective images on to one or more sheets, based at least in part on the electronic data provided by the scan device. In particular, the printer may track the location(s) of the scan device with respect to the mark-up sheet in order to determine the appropriate operations to be performed. Based on this determination of the location(s) of the scan device with respect to the mark-up sheet, and more specifically, with respect to particularly points or locations on the mark-up sheet, the printer may determine the appropriate operation(s) to perform, and execute them. The operation(s) to be executed may be in connection with all or a subset of a plurality of images that may have been previously loaded onto the printer. As used herein, the word "subset" may mean one or some. Note that the term "operation" and "action" will be used interchangeably throughout the following and are, therefore, synonymous unless otherwise indicated. These and other aspects of various embodiments will be described in greater detail herein.

FIG. 1 illustrates a printer **10**, a scan device **12** that is communicatively coupled to the printer **10**, and a plurality of mark-up sheets **20**, which in this case include an index sheet **14** and photographs **18**, in accordance with various embodiments of the present invention. The index sheet **14** includes a plurality of "thumbnail" pictures **16**, which are miniaturized pictures of images that may have been loaded and/or stored in the printer **10**. In contrast, each of the photographs **18** is an individual picture of one of the images that have been downloaded and/or stored in the printer **10**. FIG. 1A further illustrates index sheet 14 and photograph 18. In Fig. 1A photograph 18 includes action menu 22, which includes action selections 24 that a user may select with scan device 12 to select various actions to be performed on photograph 18. Thus, scan device 12 may be used as a pointer to both select menu actions and targeted areas of photograph 18.

In various embodiments, the printer **10** may load image files for a collection of digitized images from a variety of sources such as, for example, a digital camera, a memory card such as SD or CF photo card, CD-ROM or other storage media, a computing device such a laptop or desktop, or through the Internet. The collection of digitized images (or simply "images") may then be

stored in, for example, a volatile memory, such as dynamic random access memory (DRAM) or static random access memory (SRAM). In some embodiments, the printer **10** may be configured to print mark-up sheets **20** (e.g., index sheet **14** and/or photographs **18**), and to print embedded data onto the mark-up sheets **20** to facilitate the tracking of the location(s) of the scan device **12** with respect to the mark-up sheets **20** when the scan device **12** is being used by a user to mark the mark-up sheet **20**. In some alternative embodiments, however, the printer **10** may be supplied with printable blank sheets that already include preprinted embedded data. In embodiments where the printer **10** prints the embedded data onto to a mark-up sheet **20**, the data to be embedded may include data that may be embedded into a special ink layer printed underneath the visible ink layers. Thus, in some embodiments, such data may be invisible to the naked eye.

In some embodiments, the embedded data printed onto a mark-up sheet **20** may be encoded into a dot pattern that is printed onto the mark-up sheet **20** (i.e., index sheet **14** or photograph **18**). The dots may be yellow or IR grid dots that may be printed onto the mark-up sheet **20** at regular intervals on the surface of the index sheet **20**. The embedded data may also include data that indicates the locations of each of the grid dots. Such data may be in the form of microdots that are smaller than the grid dots. In some alternative embodiments or in the same embodiments, the embedded data may also include identifiers or identities that are associated with each of the corresponding images that are associated with the thumbnail pictures **16**. The identities may be in the form of file names, file numbers, or other metadata. The general concept of embedding data in a printable media is known in the art and will, therefore, not be further described.

The scan device **12**, in essence, may be used by a user to indicate to the printer **10**, which action(s) should be performed on which image(s) that have been loaded onto the printer **10**. In particular, the scan device **12** may be used by a user to write marks on the mark-up sheet **20** in order to edit or modify one or more images loaded on the printer **10** and/or for executing actions (i.e., printing, emailing, and so forth) in connection with all or a selected subset of the one or more images. In various embodiments, the scan device **12** may operate without any input from the printer **10**, and therefore, operate independently from the

printer **10**. The scan device **12** may be used by a user to mark a mark-up sheet **20** to designate selective action(s) to be performed in connection with selective image(s) loaded on the printer **10**.

The scan device **12** may include a stylus or an ink cartridge for use by a user to mark a mark-up sheet **20**, as well as a scanhead to assist the printer **10** in tracking the location(s) of the scan device **12** with respect to the mark-up sheet **20** when the user is marking the mark-up sheet **20**. As will be further described, the scan device **12** may include a scanhead that includes, for example, a camera, to scan selective portion(s) of a mark-up sheet **20** (i.e., index sheet **14** or photograph **18**). In various embodiments, the scan device **12** may communicate with the printer **10** via a wired link (e.g., USB), or via a wireless link using one a variety of interface standards such as Institute of Electrical and Electronic Engineers (IEEE) 182.11 standard (i.e., WiFi), IEEE 182.15 standard (i.e., BluetoothTM), or other standards.

The following is an example of how the printer **10**, the scan device **12**, and a mark-up sheet **20** may be used together in accordance with some embodiments of the present invention. When a mark-up sheet **20** is being marked by a user using the scan device **12**, the scan device **12** may read the embedded data included in the sections of the surface of the mark-up sheet **20** that will come within the field of vision of the scan device **12** as the mark-up sheet **20** is being marked by the user. As the scan device **12** is being used to mark the mark-up sheet **20**, the scan device **12** may transmit to the printer **10** electronic data that may be generated as a result of reading the embedded data. Alternatively, the electronic data may be stored by the scan device **12**, and transmitted to the printer **10** at some later time. The electronic data received by the printer **10** may be processed by the printer **10**, and upon processing the data, the printer **10** may determine the location(s) as well as the relative movement of the scan device **12** with respect to the mark-up sheet **20** (and more particularly, with respect to specific points or locations on the mark-up sheet **20**) as the user uses the scan device **12** to mark the mark-up sheet **20**. Based on this determination, the printer **10** may execute the appropriate action(s) in connection with the appropriate image(s).

FIG. 2 is a flow process for executing one or more actions on one or more images in a printer in accordance with various embodiments of the present invention. The process **100** may begin when the printer **10** is loaded with image(s) at block **102**. After image(s) are loaded, the printer **10** may print a mark-up sheet **20**, which may be an index sheet **14** and/or a photograph **18** that includes one or more pictures associated with one or more corresponding images at block **104**. In some embodiments, the one or more corresponding images may have been loaded to the printer **10**. The mark-up sheet **20** may be embedded with data that may be printed onto the mark-up sheet **20** by the printer **10**.

Alternatively, the embedded data may have been preprinted on the mark-up sheet **20**. The embedded data may include data that provides location information with respect to specific locations on the mark-up sheet **20**, identifiers associated with the corresponding one or more images, page number of the mark-up sheet **20**, and/or other information.

Selective portion(s) of the mark-up sheet **20** may then be scanned with a scan device **12** when a user uses the scan device **12** to mark the mark-up sheet **20**. As the scan device **12** scans the selective portion(s), the scan device **12** may read the embedded data in the selective portion(s) of the mark-up sheet **20** at block **106**. The embedded data in the selective portion(s) may indicate the location(s) of the scan device **12** with respect to the mark-up sheet **20**. In particular, the embedded data read by the scan device **12** may indicate the location(s) of the scan device **12** with respect to specific locations or points on the mark-up sheet **20**. The scan device **12** may then transmit electronic data generated as a result of the scan of the selective portion(s) of the mark-up sheet **20** to the printer **10** at block **108**. The printer **10** may then process the received electronic data to determine the location(s) of the scan device **12** with respect to the mark-up sheet **20**. Such a determination may indicate to the printer **10**, which action(s) are to be performed on which image(s) loaded on the printer **10** at block **110**. As will be further described, the action(s) to be executed may include, for example, editing or modifying of selective images, sizing of images for proof printing and final printing, printing of selective modified or unmodified images on one or more sheets, emailing of selective modified or unmodified images, and so forth.

FIG. 3A is a block diagram that schematically illustrates various components of printer **10** of **FIG. 1**, in accordance with various embodiments of the present invention. The printer **10** may include a printing block **30** that may include a print head **32** and other mechanics for printing pictures onto a print media, one or more processors **34**, volatile memory **36**, persistent memory **38**, and a communication interface **40** for communicating with a scan device **12**. The interface **40**, in some embodiments, may or may not include a radio receiver **42** for receiving electronic data from the scan device **12**. Alternatively, the receiver **42** may be replaced by a transceiver in other alternative embodiments. Further, when the communication link between the printer **10** and the scan device **12** is a wired link, the interface may include a Universal Serial Bus (USB) port for receiving electronic data from the scan device **12**. Although not depicted, the printer **10** may include other interfaces to facilitate downloading of image files from a variety of sources as previously described.

Persistent memory **38** may include computer readable instructions for executing the various operations that are described herein. Such instructions may be executed by the processor(s) **34**. Volatile memory **36** may be employed to store images or image files that have been loaded to the printer **10**. Volatile memory **36** may be any type of volatile memory such as SRAM, DRAM, or other types of volatile memory.

Referring now to **FIG. 3B**, which is a block diagram that schematically illustrates various components of the scan device **12** of **FIG. 1**, in accordance with various embodiments of the present invention. The scan device **12** may include a digital scanhead ("scanhead") **50**, which may include a camera. In various embodiments, the scanhead **50** may be designed to read embedded data that may be included in a mark-up sheet **20**. The scan device **12** may further include a controller **52**, such as a processor or microcontroller, a radio transmitter **54**, which in some instances may be a transceiver, and a nib **56**. In embodiments where the scan device **12** communicates with the printer **10** via a wired link, the radio transmitter **54** may not be present. The nib **56** may be the nib of a stylus or an ink cartridge that may be included with the scan device **12** for marking the index sheet **14** or photograph **18**. By using the scan device **12** to mark a mark-up sheet **20** (i.e., index sheet **14** or photograph **18**), various selective actions may be

executed with respect to selective images that have been loaded to the printer **10**. As previously described, in some embodiments, the scan device **12** may be a digital electronic pen.

In various embodiments, the scan device **12** when used to mark an index sheet **14**, may be used to mark or tag selective pictures **16** (and the corresponding images associated with the tagged pictures **16**) in the index sheet **14**, and to select the type of action to be executed by the printer **10** in connection with the corresponding images associated with the tagged pictures **16**. In some embodiments, the scan device **12** may be used to modify an image associated with one of the pictures **16** of the index sheet **14** or an image associated with a photograph **18** by merely marking the index sheet **14** or photograph **18** with specific figures such as arrows, circles, lines, letters, and so forth, or a combination thereof, at specific locations on the index sheet **14** or photograph **18**. In order to accomplish these functions, the scanhead **50** may be configured to track the location of the nib **56** of the scan device **12** with respect to the index sheet **14** or a photograph **18**. In some embodiments, the scanhead **50** may have a very limited field of vision and its field of vision may not include the nib **56** of the scan device **56**. However, this is not a problem in determining the location of the nib **56** with respect to the index sheet **14** or a photograph **18** so long as the distance between the field of vision of the scanhead **50** and the nib **56** is known.

As the scan device **12** is being used to mark selective locations of the index sheet **14** or photograph **18**, the scanhead **50** may read the embedded data located within the portion(s) of the index sheet **14** or photograph **18** that fall within the scanhead's field of vision. The controller **52** may then generate electronic data based on the embedded data read from the portion(s) of the index sheet **14** or photograph **18** being scanned by the scanhead **50**. The electronic data generated may then be provided to the printer **10**.

FIG. 3C illustrates the index sheet **14** of **FIG. 1** in further detail, in accordance with various embodiments of the present invention. As depicted, the index sheet **14** includes a plurality of thumbnail pictures or simply "pictures" (three of the pictures being designated as ref. **16A**, **16B**, and **16C**), action buttons **70A**, **70B**, and **70C**, and check boxes (four of the check boxes being designated as **72A**, **72B**, **72C**, and **72D**) that are each adjacent to a corresponding picture or

a corresponding action button. Each of the pictures (e.g., **16A**, **16B**, and **16C**) may represent a corresponding image that may have been loaded onto the printer **10**. The check boxes may be used in order to tag selective pictures as well as to tag the corresponding images associated with the tagged pictures.

- 5 Although not depicted, the index sheet **14** may be embedded with data that may be read by the scan device **12** to facilitate the printer **10** in tracking the location(s) of the scan device **12** as a user marks the index sheet **14**.

The action buttons **70A**, **70B**, and **70C** represent an action or operation that may be performed by the printer **10**. As depicted, action button **70A** is a
10 “show” button for displaying selected images for displaying on, for example, a liquid crystal display (LCD) screen that may be included with the printer **10**, action button **70B** is an “Email” button for transmitting selected (i.e., tagged) images via email, and action button **70C** is for printing selected images. The check boxes **72A**, **72B**, and **72C** are each located at specific locations on the index sheet **14**.

15 To illustrate how the printer **10** may be used with the scan device **12** and the index sheet **14** in accordance with various embodiments, the following example is provided. Suppose a user wishes to print the image that is associated with picture **16B**. In order to do so, the user may first place the nib **56** of the scan device **12** on the surface of the index sheet **14** at check box **72B**. The placement
20 of the nib **56** at the check box **72B** may cause the scan device **12** to begin scanning at least a portion of the surface of the index sheet **14** in the vicinity of or at the location of the check box **72B** as well as in view of the field of vision of the scan device **12** to read the embedded data at that location. The scan device **12** may then transmit electronic data to the printer **10** in response to reading the
25 embedded data. In some embodiments, in order to prevent the scan device **12** from providing false or premature data to the printer **10**, the scan device **12** may be endowed with certain features that would prompt the scan device **12** to only scan and/or transmit electronic data to the printer **12** only when the nib **56** is, for example, on the surface of the index sheet **14**, in the vicinity of the surface of the
30 index sheet **14**, and/or at the prompting of the user. For example, a sensor such as a contact switch may be coupled to the nib **56** to detect when the nib **56** is in contact with the index sheet **14**. Other mechanisms may also be employed for serving similar such purposes.

In some embodiments, the field of vision of the scanhead **50** may be very limited and may not include the nib **56** or the area immediately below the nib **56**. The scanhead **50** may not need the nib **56** to be included in its field of vision so long as, for example, the distance between the nib **56** and the field of vision is known. As the user marks the check box **72B**, to tag the image associated with picture **16B** (check box **72B** is depicted with a checkmark made by the user), the scan device **12** may scan the portion(s) of the index sheet **14** that falls within its field of vision, and read the embedded data disposed at those locations.

In response to reading the embedded data, the scan device **12** may generate electronic data, which may then be transmitted to the printer **10** via wired or wireless connection. The printer **10** may then process the received electronic data to determine the location(s) of the scan device **12** with respect to the index sheet **14**. More particularly, the printer **10** may determine the location(s) of the nib **56** or the vicinity of the nib **56** with respect to specific points on the index sheet **14**. In doing so, the printer **10** may determine which of the pictures **16A**, **16B**, and **16C** (as well as their corresponding images) has been tagged. Note that the electronic data received by the printer **10** may indicate multiple locations for the nib **56** since the scan device **12** may be moving during the course of a time interval or segment. By determining the location(s) of the scan device **12** with respect to the index sheet **14** or with respect to selective points on the index sheet **14**, the printer **10** can determine which one(s) of the images associated with the pictures (e.g., **16A**, **16B**, and/or **16C**) has been tagged.

The user may also select the action(s) to be executed with respect to the selected images (in this case the image associated with picture **16B** has been selected) by marking one or more of the check boxes of action buttons **70A**, **70B**, and **70C**. This may be accomplished using the same procedures described above for tagging the pictures and their corresponding images. In this example, since the user intends to print the image associated with picture **16B**, the user would mark check box **70C** using the scan device **12**. As the check box **70D** is being marked, the printer **10** may track the location(s) of the scan device **12** with respect to the index sheet **14** as described earlier. Based on this determination, the printer **10** may determine the appropriate course of action with respect to the

tagged image, and accordingly, execute the appropriate operation. In this case, the selected image would be printed onto a sheet. At this time it should be noted that in some alternative embodiments, check boxes may not be included in the index sheet **14** in which case, the user would simply place a mark such as an "X"

5 on, for example, the pictures **16** or actions buttons **70A**, **70B**, and **70C**.

Various embodiments of the present invention may also provide for the editing or modifications of the images that are loaded on the printer **10** using procedures similar to those described above. In particular, the scan device **12** may be used in conjunction with a mark-up sheet **20** (i.e., index sheet **14** or
10 photograph **18**) to edit an image(s). Editing of an image may include, for example, removal of red-eye from an image, deleting an image, rotating an image, "zooming" in on at least a portion of an image (i.e., enlarging at least a portion of an image), cropping portion(s) of an image, adjusting contrast or enhancement of an image or a portion thereof, and so forth. In some instances,
15 some of the editing or modifications of an image may be realized only when the image is actually printed onto a printable media. Thus, editing of image(s) may be subsequently followed by a printing of the image(s) onto one or more sheets. In the following, examples of how images may be edited or modified using
20 photographs are described although in some alternative embodiments or the same embodiments, the images may also be modified using the pictures **16** of an index sheet **14**.

FIG. 4A illustrates one of the photographs **18** of **FIG. 1**, in accordance with various embodiments of the present invention. The photograph **18** may include embedded data, similar to the index sheet **14** previously described. The
25 photograph **18** may be a full-sized photograph such as a 4X6 photo, or dimensioned photos.

To remove "red-eye" from an image, which is typically an undesirable blemish on a photograph in which some or all of the eyes in a photograph appear red, a user may mark the photograph using the scan sensor **12** to draw circles **82**
30 around the red-eyes as illustrated in **FIG. 4B**. In some alternative embodiments, a dot may be placed at the red-eye area instead. The printer **10** may track the movement or motion of the scan device **12** as the scan device **12** is being used to draw the circles **82** using the techniques described previously. In particular, the

movement of the scan device **12** may be determined based on the determined locations of the scan device **12** with respect to the photograph **18** during an interval of time. Based on the tracking of the scan device **12**, the printer **10** may be facilitated in removing red-eyes.

5 In particular, drawing a circle around a red-eye area may be used as an aid to red-eye removal algorithms. Red-eye removal is typically a very difficult problem. Existing products that can perform fully automatic red-eye removal have a difficult time getting all of the red-eyes removed in a photograph and they may sometime cause certain undesirable results to occur such as turning black.

10 In order to aid the removal of red-eyes, many of these products typically require a user assisted red-eye removal algorithm where the user "points" to the red-eyes that need to be corrected. However, this requires the use of a large display such as those found on personal computers and typically not found on printers. By employing the techniques described previously, removal of red-eyes may be
15 simplified.

 In some embodiments, an image may be deleted from the printer **10** and/or from a device that the image originated from, such as a camera, by using the scan device **12** and simply drawing, for example an "X" on the corresponding photograph **18** as illustrated in **FIG. 4C**. In some embodiments, an image may be
20 rotated by using the scan device **10** and drawing an arrow on the corresponding photograph **18** as illustrated in **FIG. 4D**. For example, an image may be rotated so that it is shifted from a landscape view to a portrait view?

 In some embodiments, an image may be marked for saving into an archive or for transmission via email attachment by the user using the scan device **20** to
25 draw a particular symbol on the photograph **18** associated with the image such as drawing a particular kind of arrow and/or writing the name or email address of the email destination as illustrated in **FIG. 4E**. The image may also be marked for other actions such as printing of the image by drawing another symbol such as a "P" on the corresponding photograph **18**. In some embodiments, a portion of an
30 image may be cropped by using the scan device **12** to draw, for example, a box around the portion to be cropped on the corresponding photograph **18** as illustrated in **FIG. 4F**. In some embodiments, certain portions of an image may be contrast adjusted or enhanced by using the scan device **12** to draw, for example,

a circle around the area of interest on the corresponding photograph **18** as illustrated in **FIG. 4G** in order to select or highlight the area of interest.

By employing the scan device **12**, the printer **10** may track the locations of the scan device **12**, as well as its relative motion or movement during an interval of time, as the scan device **12** is being used to draw the various symbols and figures on a photograph **18** (as well as on pictures **16** of an index sheet **14**).

These movements or motions may be interpreted by the printer **10** to determine which actions or operations are to be executed. Again, although in the above, the markings were done on a photograph **18** that is associated with the targeted image, alternatively, marks may also be made on a corresponding picture **16** of the index sheet **14**.

Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art and others, that a wide variety of alternate and/or equivalent implementations may be substituted for the specific embodiments illustrated and described without departing from the scope of the present invention. This application is intended to cover any adaptations or variations of the embodiments discussed herein. Therefore, it is manifested and intended that various embodiments of the invention be limited only by the claims and the equivalents thereof.

CLAIMS

What is claimed is:

1. A method, comprising:
tracking one or more locations of a scan device with respect to a sheet
5 having a first one or more pictures associated with one or more corresponding
images, said tracking based, at least in part, on electronic data provided by the
scan device, and
executing at least one operation in connection with all or a selected subset
of the one or more corresponding images based, at least in part, on the tracking.
10
2. The method of claim 1, wherein said executing comprises printing a
second one or more pictures on one or more sheets.
3. The method of claim 2, wherein said printing the second one or more
15 pictures on one or more sheets includes printing pictures of all or the selected
subset of the one or more corresponding images.
4. The method of claim 3, wherein said printing the second one or more
pictures on one or more sheets includes modifying all or the selected subset of
20 the one or more corresponding images, and printing pictures of all or the selected
subset of the one or more corresponding images that have been modified on one
or more sheets.
5. The method of claim 4, wherein said modifying all or the selected subset of
25 the one or more corresponding images comprises removing red-eye from all or
the selected subset of the one or more corresponding images.
6. The method of claim 4, wherein said modifying all or the selected subset of
the one or more corresponding images comprises cropping portion(s) of all or the
30 selected subset of the one or more corresponding images.

7. The method of claim 4, wherein said modifying all or the selected subset of the one or more corresponding images comprises adjusting contrast or enhancement of portion(s) of all or the selected subset of the one or more corresponding images.

5

8. The method of claim 4, wherein said modifying all or the selected subset of the one or more corresponding images comprises enlarging at least portion(s) of all or the selected subset of the one or more corresponding images, and said printing pictures of all or the selected subset of the one or more corresponding
10 images that have been modified on one or more sheets comprises printing the at least portion(s) of all or the selected subset of the one or more corresponding images that were enlarged.

9. The method of claim 1, wherein said tracking comprises tracking one or
15 more locations of a nib of the scan device with respect to one or more locations on the sheet.

10. The method of claim 1, wherein said tracking comprises tracking wirelessly the one or more locations of the scan device.

20

11. The method of claim 1, wherein said scan device generates the electronic data based on scanning one or more selective portions of the sheet and reading embedded data in the one or more selective portions of the sheet, and said tracking comprises determining a particular location of the scan device with
25 respect to the sheet by processing the generated electronic data.

12. The method of claim 1, wherein said scan device generates the electronic data based on scanning one or more selective portions of the sheet and reading embedded data in the one or more selective portions of the sheet, and said
30 tracking comprises determining one or more identities of all or the selected subset of the one or more corresponding images by processing said electronic data.

13. The method of claim 1, further comprising printing the sheet with embedded data, wherein the embedded data is used to facilitate said tracking.

14. The method of claim 13, wherein said printing comprises printing the sheet with a pattern of dots and data to indicate locations of the dots with respect to the sheet.

15. The method of claim 13, wherein said printing comprises printing the sheet with identities associated with the one or more corresponding images.

16. The method of claim 1, wherein said executing comprises at least one of emailing all or the selected subset of the one or more corresponding images and/or displaying all or the selected subset of the one or more corresponding images.

17. The method of claim 1, wherein said tracking comprises tracking relative movement of the scan device with respect to the sheet by determining multiple locations of the scan device with respect to the sheet over an interval of time, and said executing is based, at least in part, on the movement of the scan device with respect to the sheet.

18. A method, comprising:

scanning by a scan device one or more selective portions of a sheet having first one or more pictures while not scanning other portions of the sheet, said scanning including reading embedded data in the one or more selective portions of the sheet; and said first one or more pictures being associated with one or more corresponding images;

generating electronic data based on the embedded data, said electronic data indicating, at least in part, one or more relative positions of the scan device with respect to the sheet; and

transmitting the electronic data to a printer to facilitate the printer in executing at least one operation in connection with all or a selected subset of the corresponding images.

19. The method of claim 18, wherein said electronic data is transmitted wirelessly to the printer.

5 20. The method of claim 18, wherein the sheet includes a pattern of dots and data to indicate locations of the dots with respect to the sheet, and said reading includes reading at least one dot and data that indicates the location of the at least one dot with respect to the sheet.

10 21. The method of claim 18, wherein the sheet includes identities associated with the one or more corresponding images, and said reading includes reading at least one identity.

22. The method of claim 18, wherein said scanning comprises scanning
15 multiple selective portions of the sheet over an interval of time and reading embedded data in the multiple selective portions, and generating and transmitting to the printer electronic data indicating the one or more relative positions of the scan device relative to the sheet during the interval of time to facilitate the printer in determining relative movement of the scan device with respect to the sheet.

20

23. A system, comprising:

a scan device configured to scan one or more selective portions of a sheet having first one or more pictures while not scanning other portions of the sheet, to read embedded data in the one or more selective portions of the sheet and to
25 generate and transmit electronic data based on the embedded data, said first one or more pictures associated with one or more corresponding images; and

a printer communicatively coupled to the scan device to receive the electronic data and to track one or more locations of the scan device with respect to the sheet based on the electronic data, and to execute at least one operation
30 in connection with all or a selected subset of the corresponding images based, at least in part, on the tracking.

24. The system of claim 23, wherein said printer is configured to perform said at least one operation by printing a second one or more pictures on one or more sheets based, at least in part, on the electronic data received from the scan device.

5

25. The system of claim 23, wherein said printer is further configured to print the sheet with the first one or more pictures, and to print the embedded data onto the sheet.

10 26. The system of claim 23, wherein said scan device includes an interface to wirelessly transmit the electronic data to the printer.

27. The system of claim 26, wherein said printer includes another interface to wirelessly receive the electronic data from the scan device.

15

1/9

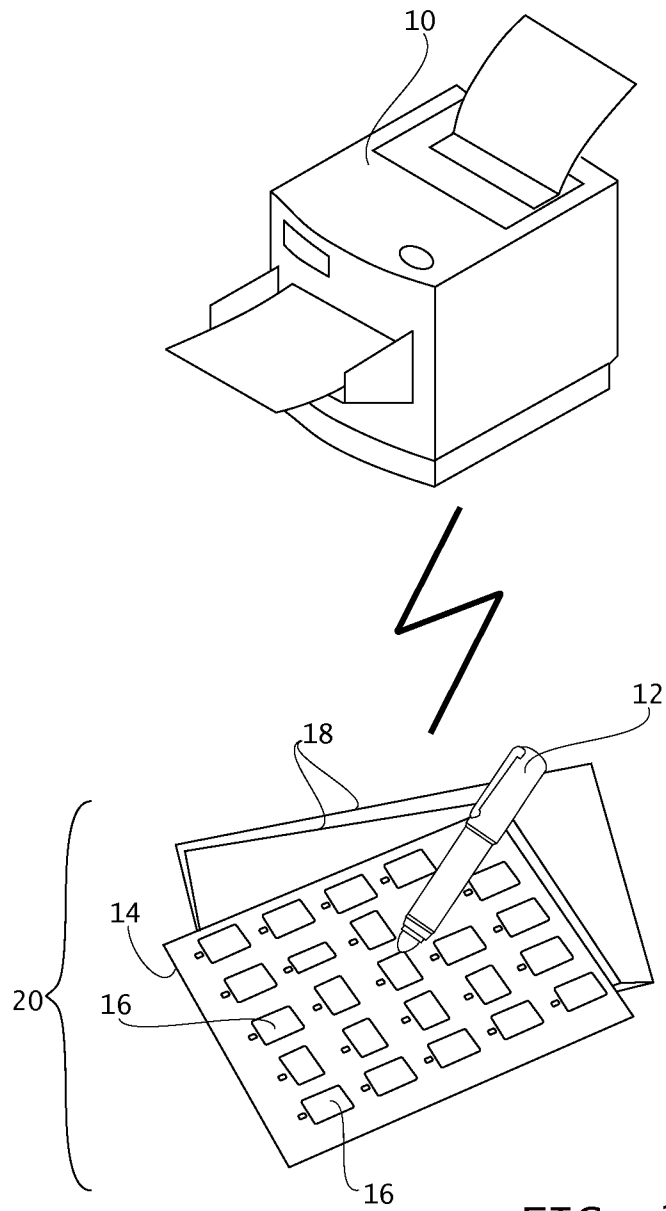


FIG. 1

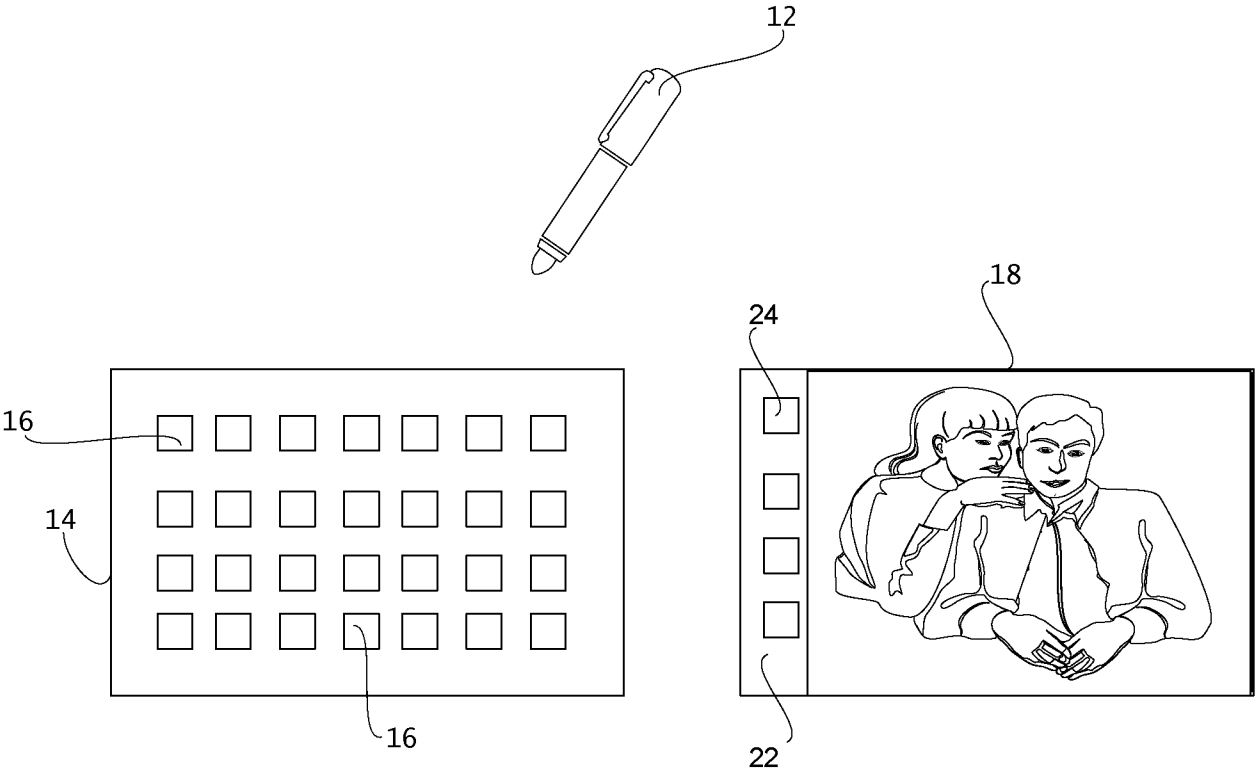


FIG. 1A

3/9

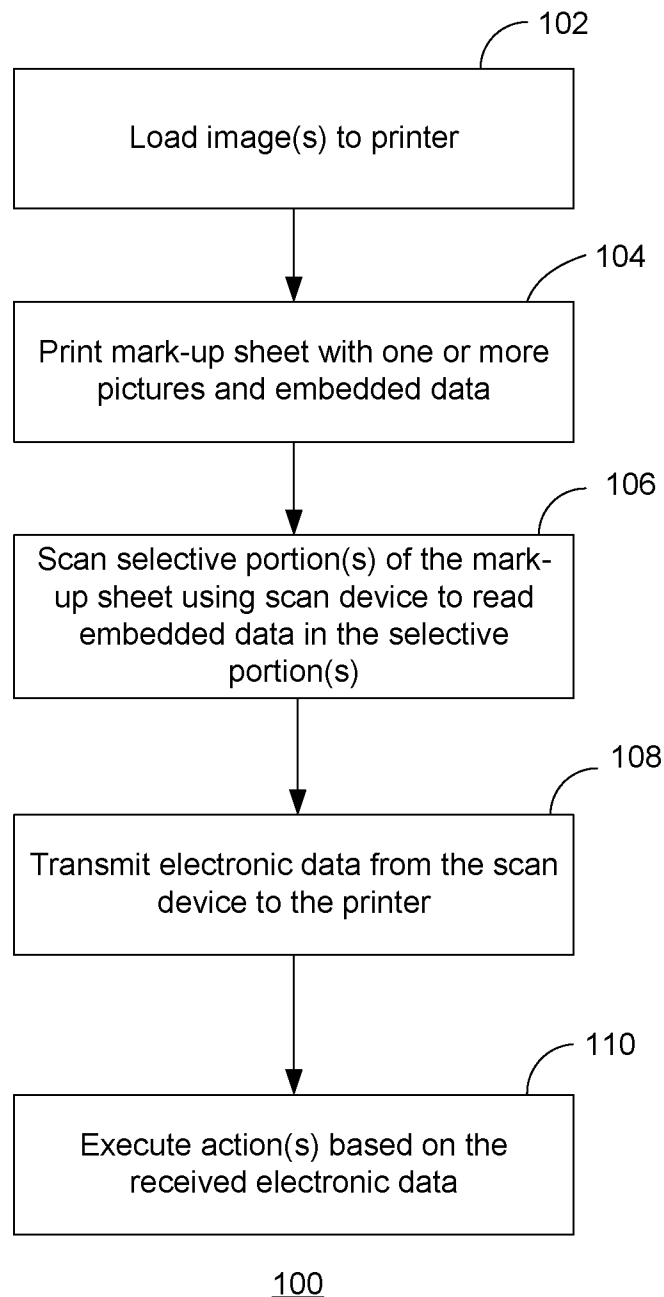


FIG. 2

4/9

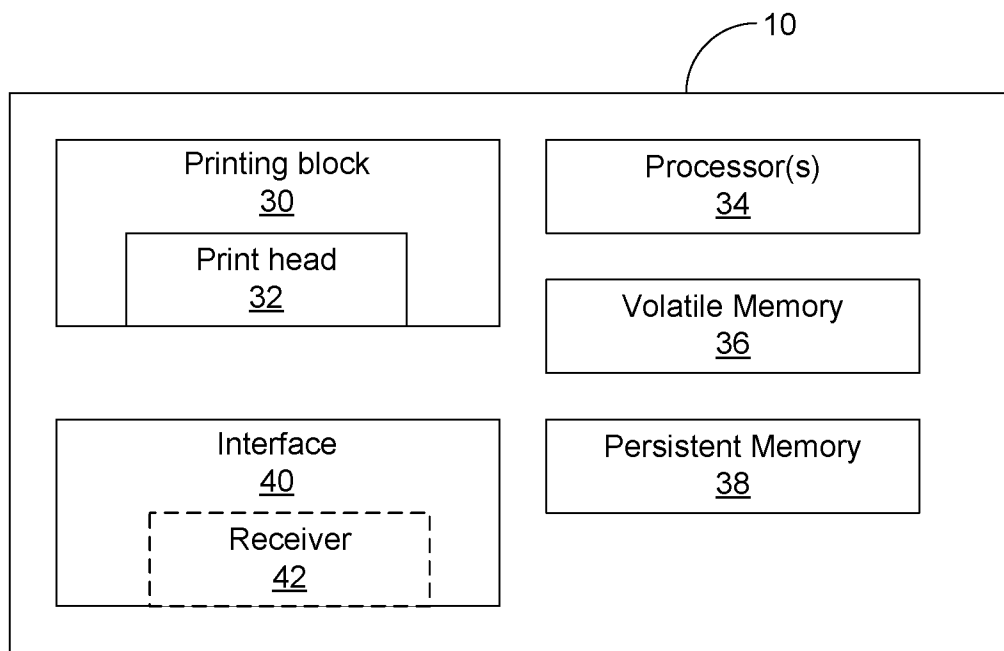


FIG. 3A

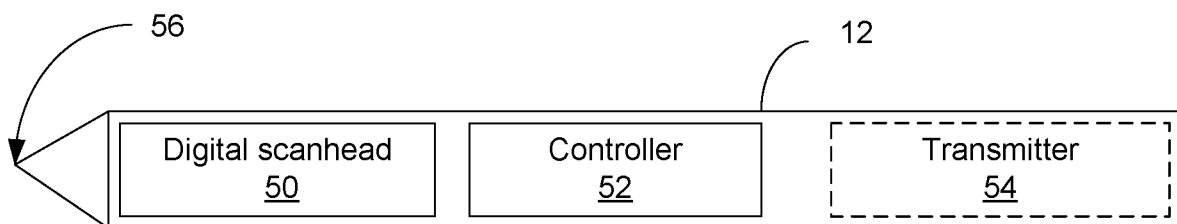


FIG. 3B

5/9

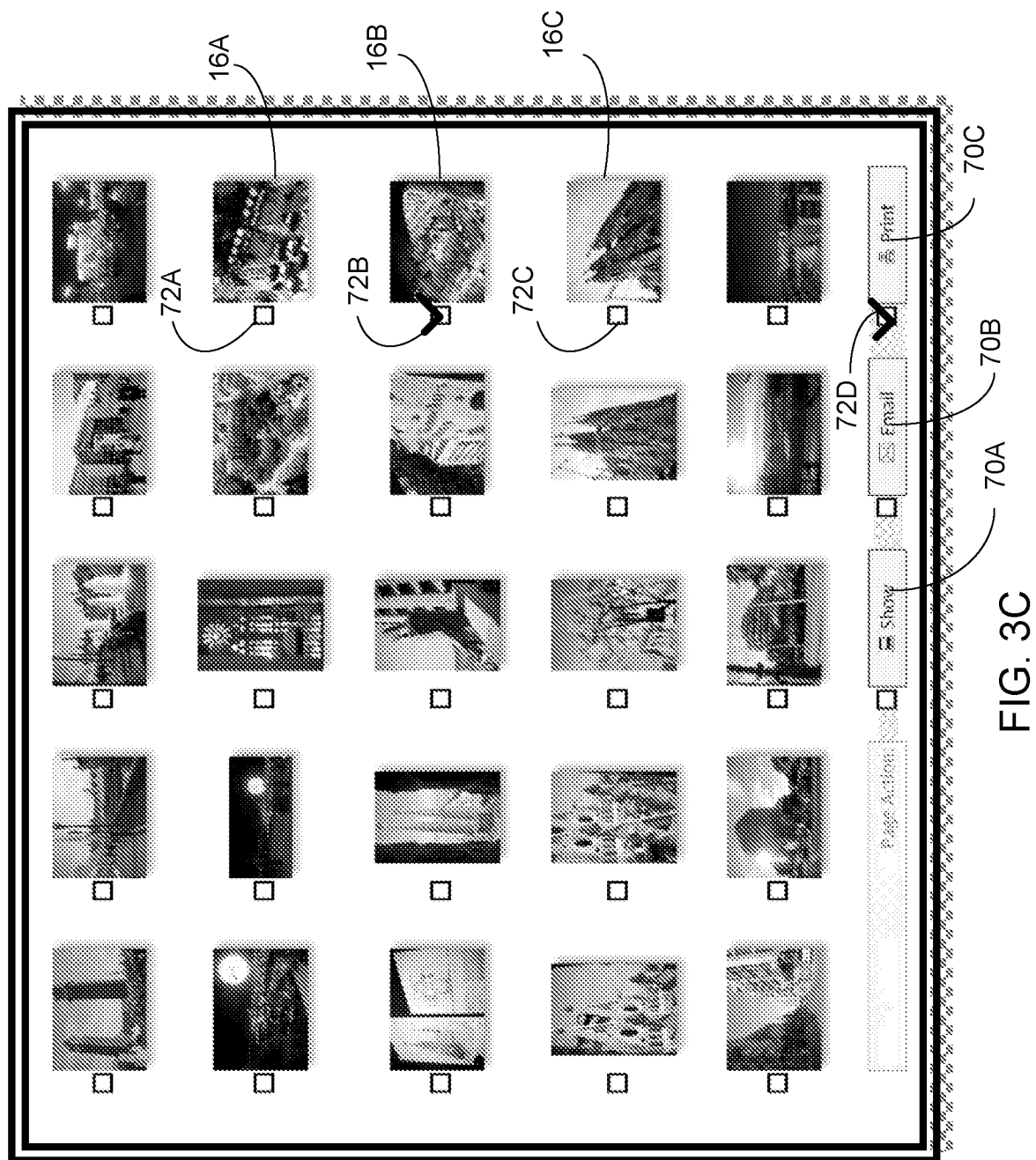


FIG. 3C

6/9

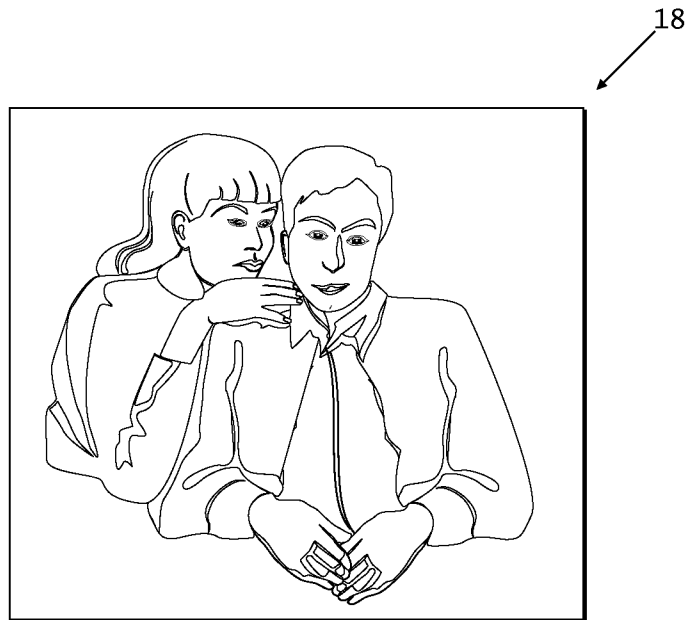


FIG. 4A

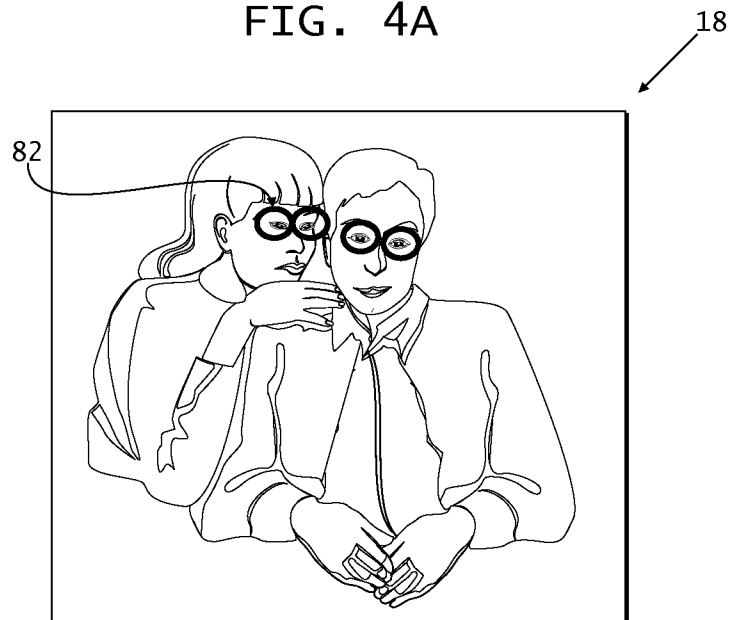


FIG. 4B

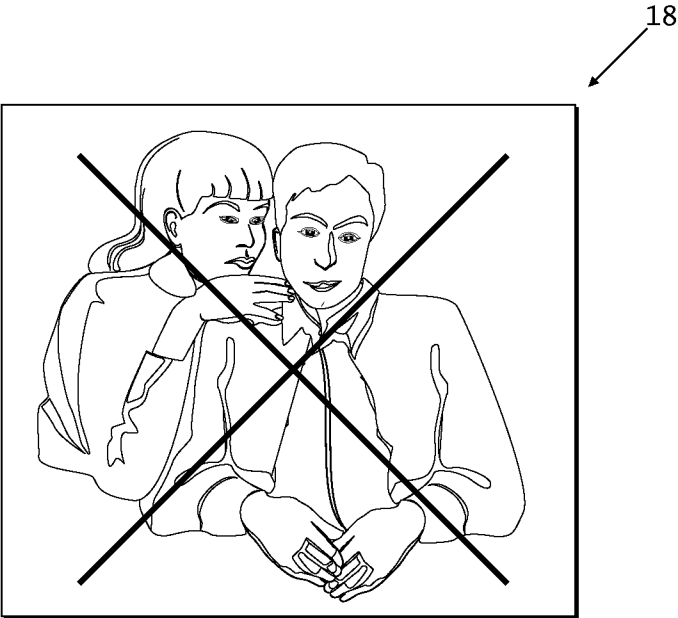


FIG. 4C

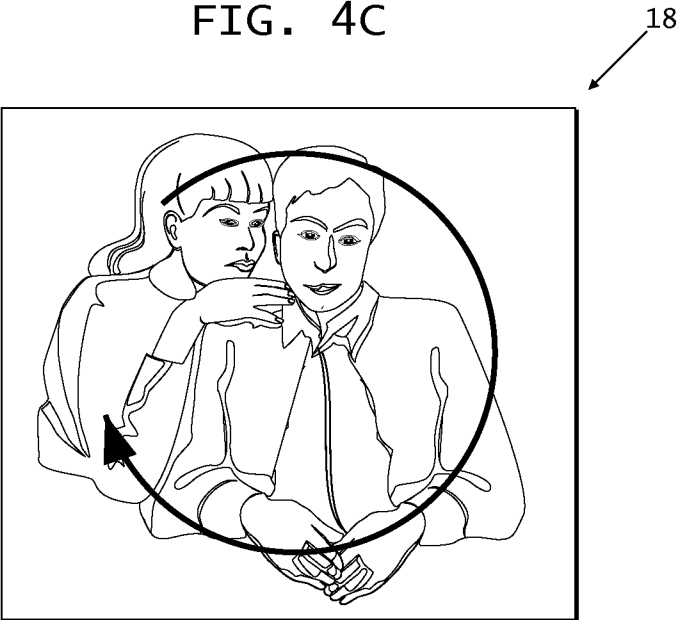


FIG. 4D

8/9

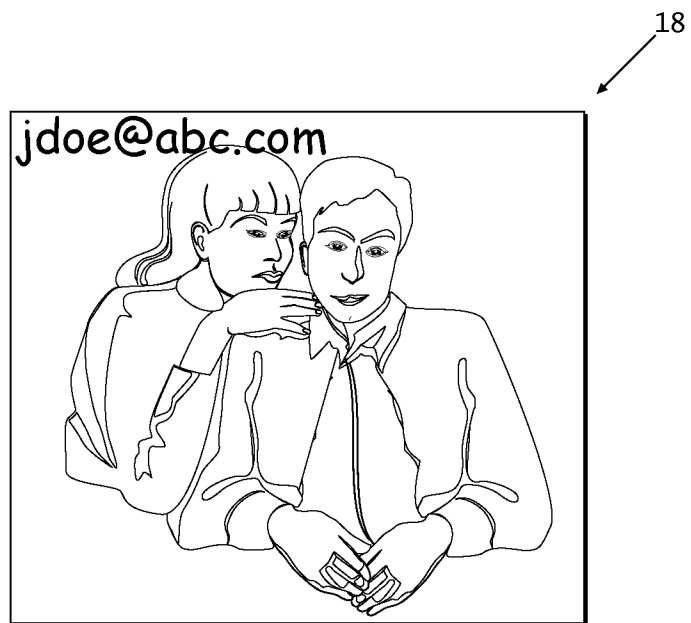


FIG. 4E

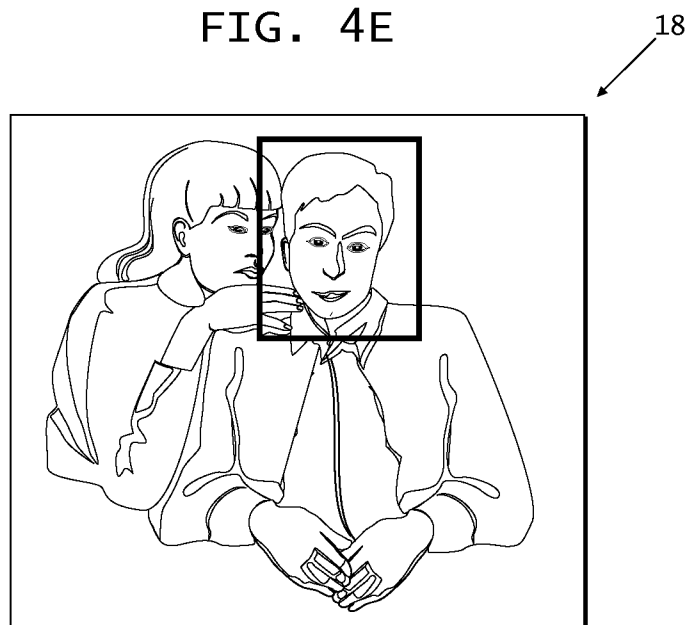


FIG. 4F

9/9

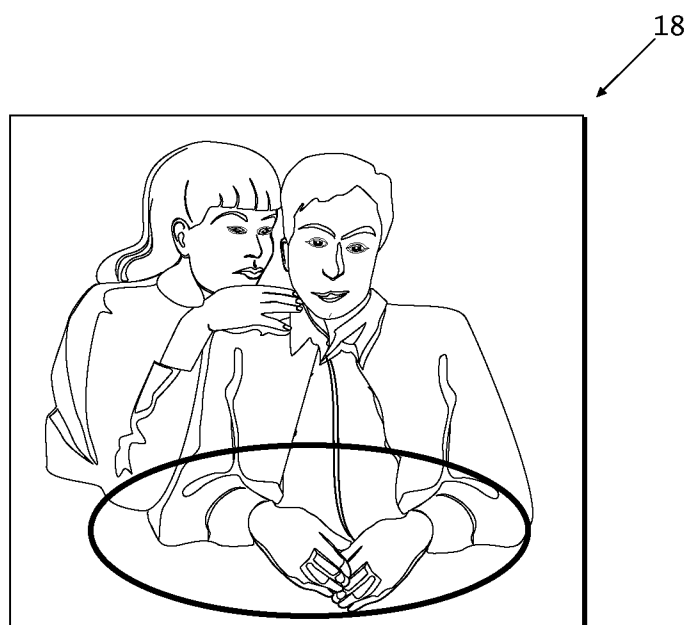


FIG. 4G

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2008/067162

A. CLASSIFICATION OF SUBJECT MATTER

INV. G06F3/03

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)

G06F

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

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

EPO-Internal, WPI Data, INSPEC, COMPENDEX, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/141060 A1 (RYDBECK NILS [US] ET AL RYDBECK NILS [US] ET AL) 30 June 2005 (2005-06-30) paragraphs [0025] - [0029] claim 20	1-27

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *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.
- *G* document member of the same patent family

Date of the actual completion of the international search

30 October 2008

Date of mailing of the international search report

06/11/2008

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Wiedmeyer, Vera

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2008/067162

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005141060	A1	30-06-2005	AT 265716 T 15-05-2004
		AU 3025501 A 27-08-2001	
		DE 60103038 D1 03-06-2004	
		DE 60103038 T2 02-09-2004	
		WO 0161631 A1 23-08-2001	
		EP 1264270 A1 11-12-2002	