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Bryant et al.

(54) METHOD FOR PRODUCING ELECTRONIC JOB PAGES

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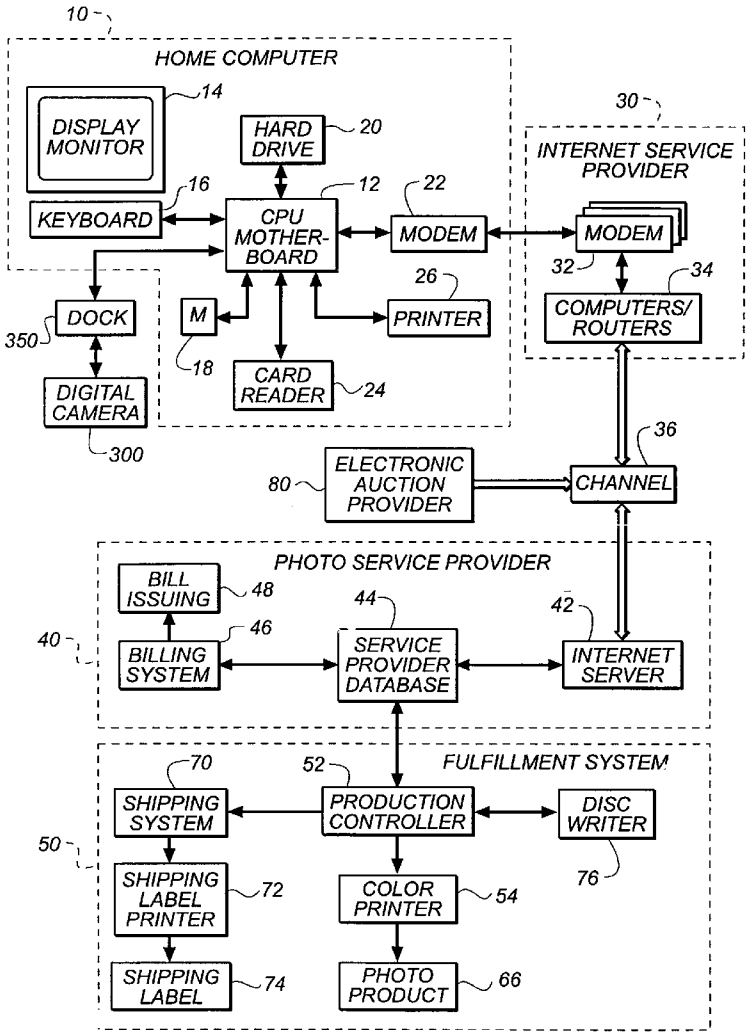
(52) **U.S. Cl.** **348/207.1**

(57) **ABSTRACT**

A method for producing a plurality of electronic job pages using a digital camera and a computer comprises the steps of capturing and storing a first group of digital images using the digital camera; designating, in response to a user input, that subsequent captured digital images are to form a second group of digital images; and capturing and storing a second group of digital images using the digital camera. The method further includes the steps of storing data in a memory of the digital camera which identifies the first and second groups of digital images; transferring the first and second group of digital images, and the data identifying the first and second groups of digital images, from the digital camera to the computer; and using the transferred data identifying the first and second groups of digital images to produce a first electronic job page including the first group of digital images and a second electronic job page including the second group of digital images.



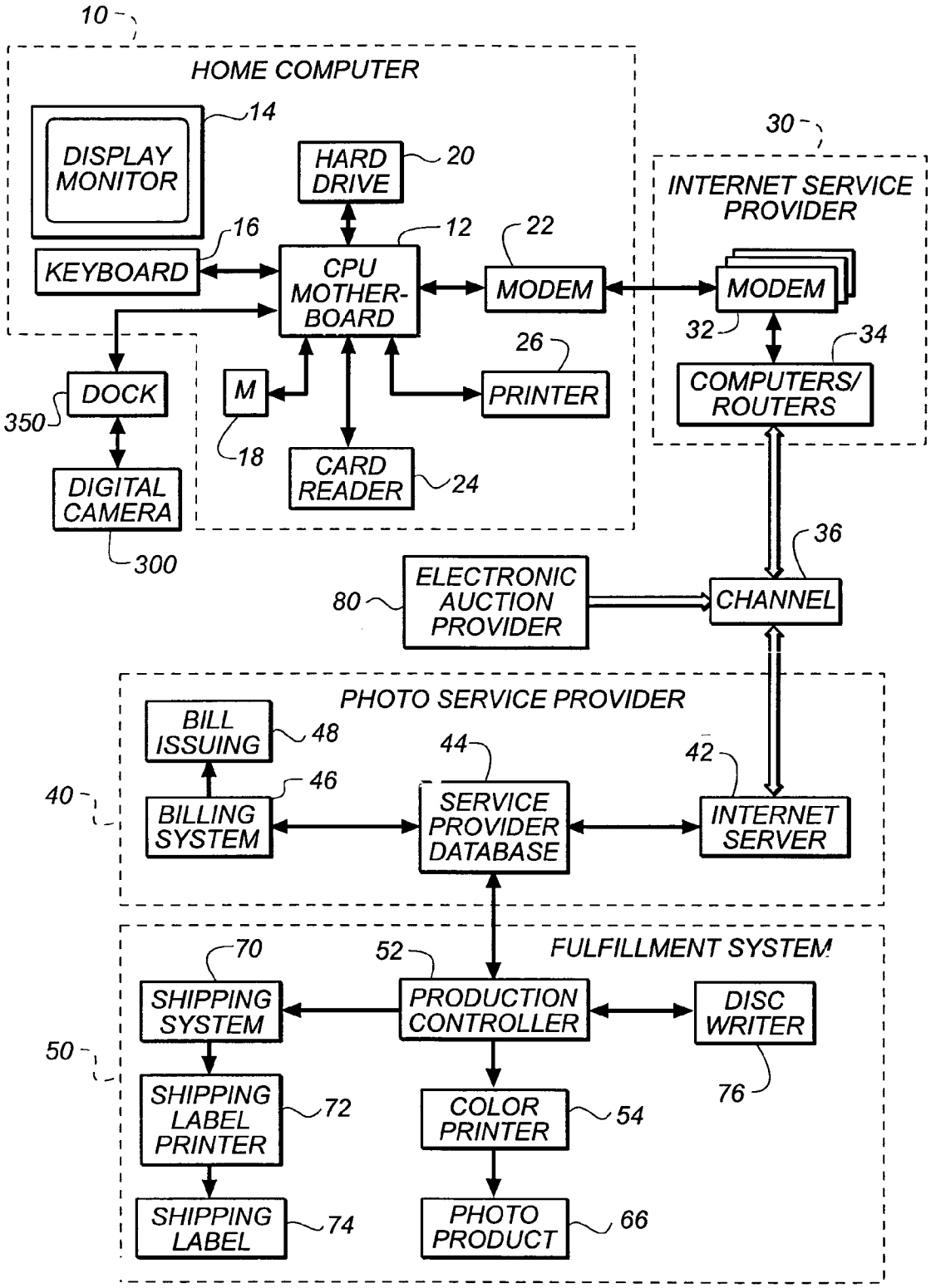

10
HOME COMPUTER
DISPLAY MONITOR
14
HARD DRIVE
20
KEYBOARD
16
CPU MOTHER-BOARD
12
MODEM
22
30
INTERNET SERVICE PROVIDER
MODEM
32
34
COMPUTERS/ ROUTERS
DOCK
350
M
18
PRINTER
26
CARD READER
24
DIGITAL CAMERA
300
36
ELECTRONIC AUCTION PROVIDER
80
CHANNEL
PHOTO SERVICE PROVIDER
BILL ISSUING
48
44
42
40
BILLING SYSTEM
46
SERVICE PROVIDER DATABASE
INTERNET SERVER
FULFILLMENT SYSTEM
70
52
SHIPPING SYSTEM
PRODUCTION CONTROLLER
DISC WRITER
50
76
SHIPPING LABEL PRINTER
72
COLOR PRINTER
54
SHIPPING LABEL
74
PHOTO PRODUCT
66

FIG. 1

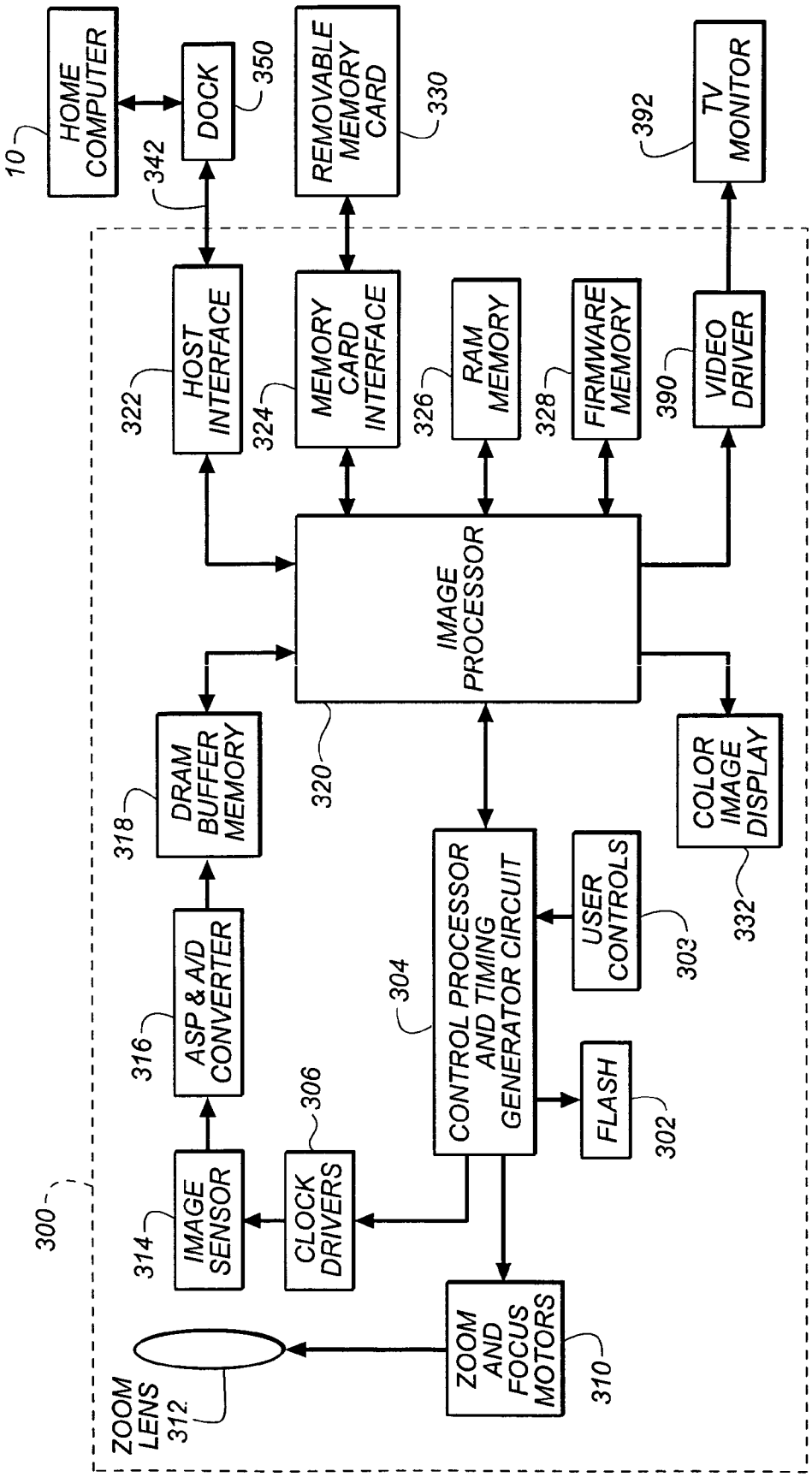

HOME COMPUTER
10
342
DOCK
350
REMOVABLE MEMORY CARD
330
392
TV MONITOR
HOST INTERFACE
322
MEMORY CARD INTERFACE
324
RAM MEMORY
326
FIRMWARE MEMORY
328
VIDEO DRIVER
390
IMAGE PROCESSOR
320
DRAM BUFFER MEMORY
318
COLOR IMAGE DISPLAY
332
USER CONTROLS
303
CONTROL PROCESSOR AND TIMING GENERATOR CIRCUIT
304
ASP & A/D CONVERTER
316
FLASH
302
306
CLOCK DRIVERS
300
IMAGE SENSOR
314
ZOOM AND FOCUS MOTORS
310
ZOOM LENS
312

FIG. 2

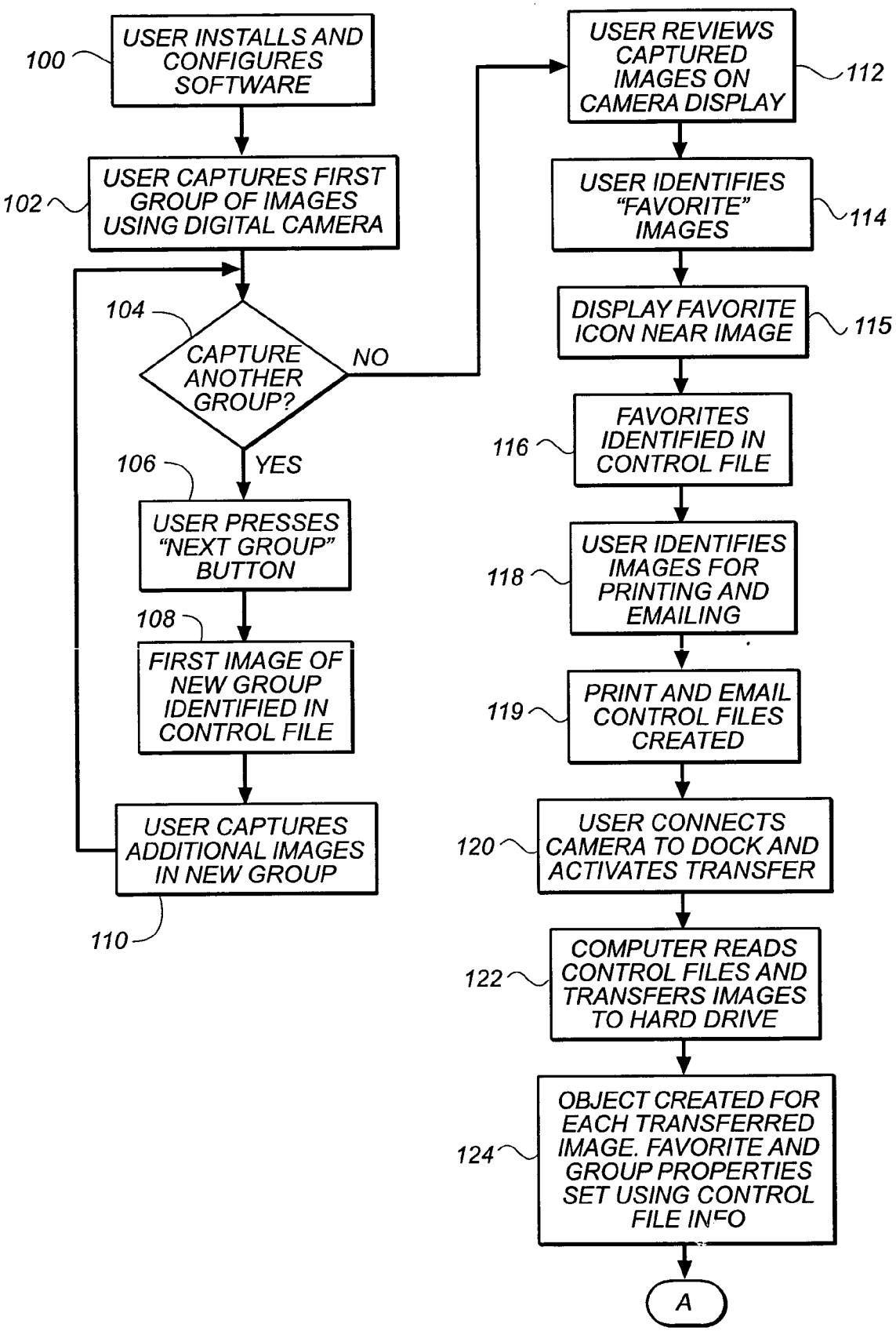

100
USER INSTALLS AND CONFIGURES SOFTWARE
102
USER CAPTURES FIRST GROUP OF IMAGES USING DIGITAL CAMERA
104
CAPTURE ANOTHER GROUP?
NO
YES
106
USER PRESSES "NEXT GROUP" BUTTON
108
FIRST IMAGE OF NEW GROUP IDENTIFIED IN CONTROL FILE
USER CAPTURES ADDITIONAL IMAGES IN NEW GROUP
110
USER REVIEWS CAPTURED IMAGES ON CAMERA DISPLAY
112
USER IDENTIFIES "FAVORITE" IMAGES
114
DISPLAY FAVORITE ICON NEAR IMAGE
115
116
FAVORITES IDENTIFIED IN CONTROL FILE
118
USER IDENTIFIES IMAGES FOR PRINTING AND EMAILING
119
PRINT AND EMAIL CONTROL FILES CREATED
120
USER CONNECTS CAMERA TO DOCK AND ACTIVATES TRANSFER
122
COMPUTER READS CONTROL FILES AND TRANSFERS IMAGES TO HARD DRIVE
124
OBJECT CREATED FOR EACH TRANSFERRED IMAGE. FAVORITE AND GROUP PROPERTIES SET USING CONTROL FILE INFO
A

FIG. 3A

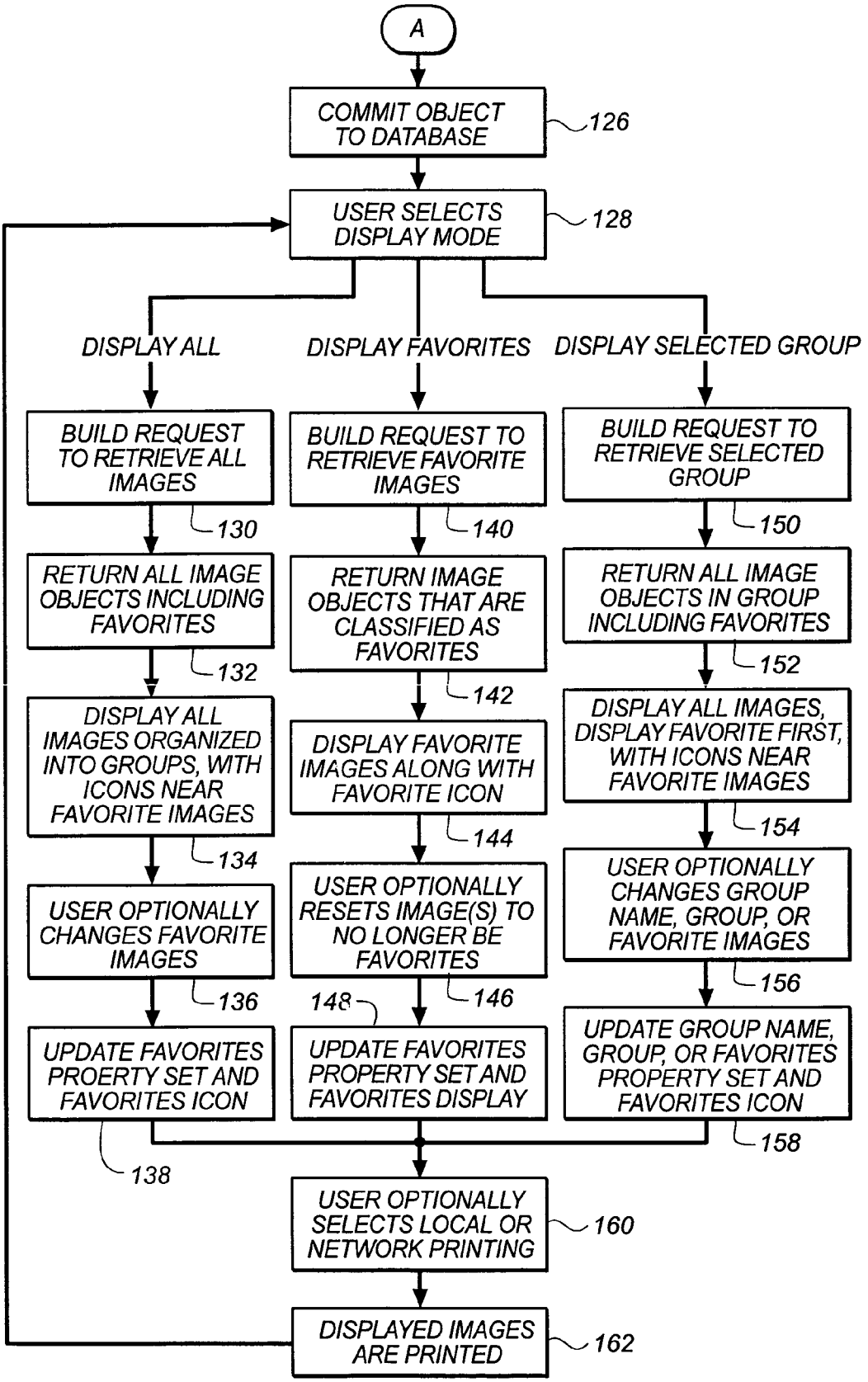

A
COMMIT OBJECT TO DATABASE
126
USER SELECTS DISPLAY MODE
128
DISPLAY ALL
DISPLAY FAVORITES
DISPLAY SELECTED GROUP
BUILD REQUEST TO RETRIEVE ALL IMAGES
130
RETURN ALL IMAGE OBJECTS INCLUDING FAVORITES
132
DISPLAY ALL IMAGES ORGANIZED INTO GROUPS, WITH ICONS NEAR FAVORITE IMAGES
134
USER OPTIONALLY CHANGES FAVORITE IMAGES
136
UPDATE FAVORITES PROERTY SET AND FAVORITES ICON
138
BUILD REQUEST TO RETRIEVE FAVORITE IMAGES
140
RETURN IMAGE OBJECTS THAT ARE CLASSIFIED AS FAVORITES
142
DISPLAY FAVORITE IMAGES ALONG WITH FAVORITE ICON
144
USER OPTIONALLY RESETS IMAGE(S) TO NO LONGER BE FAVORITES
146
148
UPDATE FAVORITES PROPERTY SET AND FAVORITES DISPLAY
BUILD REQUEST TO RETRIEVE SELECTED GROUP
150
RETURN ALL IMAGE OBJECTS IN GROUP INCLUDING FAVORITES
152
DISPLAY ALL IMAGES, DISPLAY FAVORITE FIRST, WITH ICONS NEAR FAVORITE IMAGES
154
USER OPTIONALLY CHANGES GROUP NAME, GROUP, OR FAVORITE IMAGES
156
UPDATE GROUP NAME, GROUP, OR FAVORITES PROPERTY SET AND FAVORITES ICON
158
USER OPTIONALLY SELECTS LOCAL OR NETWORK PRINTING
160
DISPLAYED IMAGES ARE PRINTED
162

FIG. 3B

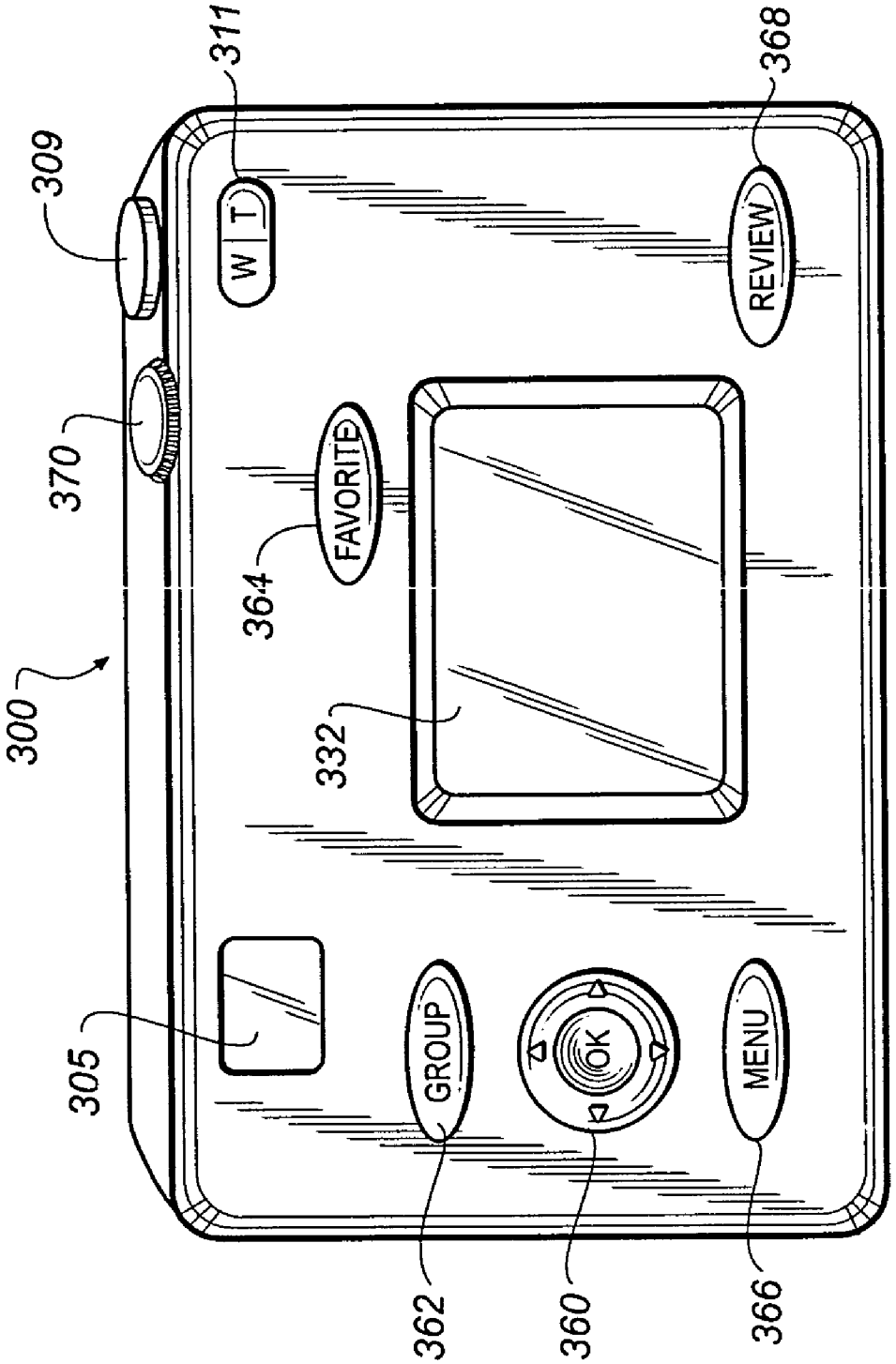

300
309
311
368
370
364
332
305
362
360
366
W
T
REVIEW
FAVORITE
GROUP
OK
MENU

FIG. 4

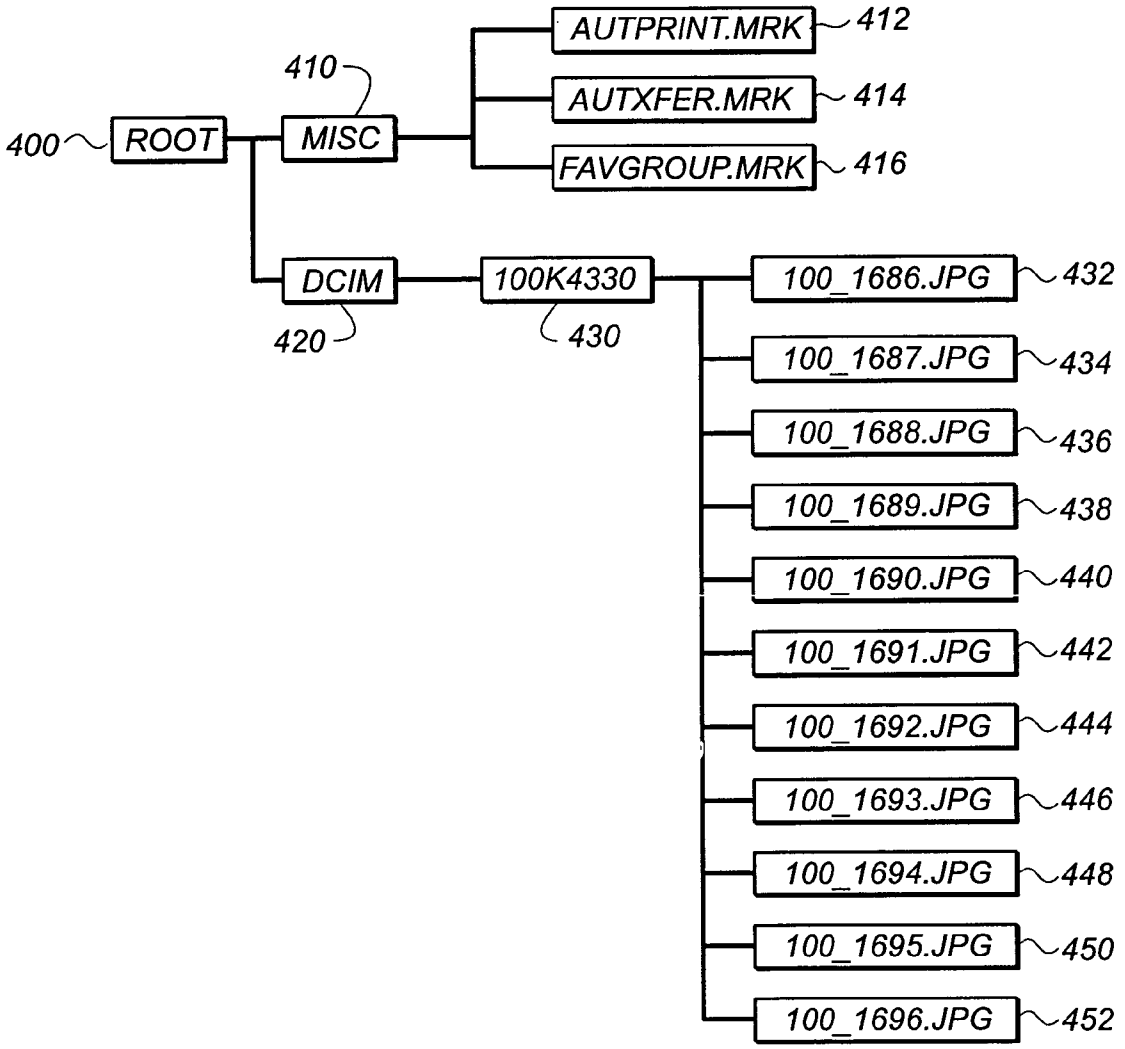

400
ROOT
410
MISC
AUTPRINT.MRK
412
AUTXFER.MRK
414
FAVGROUP.MRK
416
DCIM
420
100K4330
430
100_1686.JPG
432
100_1687.JPG
434
100_1688.JPG
436
100_1689.JPG
438
100_1690.JPG
440
100_1691.JPG
442
100_1692.JPG
444
100_1693.JPG
446
100_1694.JPG
448
100_1695.JPG
450
100_1696.JPG
452

FIG. 5

```
1   [HDR]
2   GEN CRT = "KODAK DX4330 DIGITAL CAMERA"
3   GEN SRN = 00100245
4   GEN DTM = 2002:10:12:12:44:41
5   [JOB]
6   GRP PID = 001
7   IMG FMT = EXIF2 -J
8   IMG SRC = "../DCIM/103K4330/100_1686.JPG"
9   [JOB]
10  GRP PID = 002
11  IMG FMT = EXIF2 -J
12  IMG SRC = "../DCIM/103K4330/100_1689.JPG"
13  [JOB]
14  GRP PID = 003
15  IMG FMT = EXIF2 -J
16  IMG SRC = "../DCIM/103K4330/100_1693.JPG"
17  [JOB]
18  FAV PID = 001
19  IMG FMT = EXIF2 -J
20  IMG SRC = "../DCIM/103K4330/100_1687.JPG"
21  [JOB]
22  FAV PID = 002
23  IMG FMT = EXIF2 -J
24  IMG SRC = "../DCIM/103K4330/100_1691.JPG"
25  [JOB]
26  FAV PID = 003
27  IMG FMT = EXIF2 -J
28  IMG SRC = "../DCIM/103K4330/100_1695.JPG"
```

FIG. 6

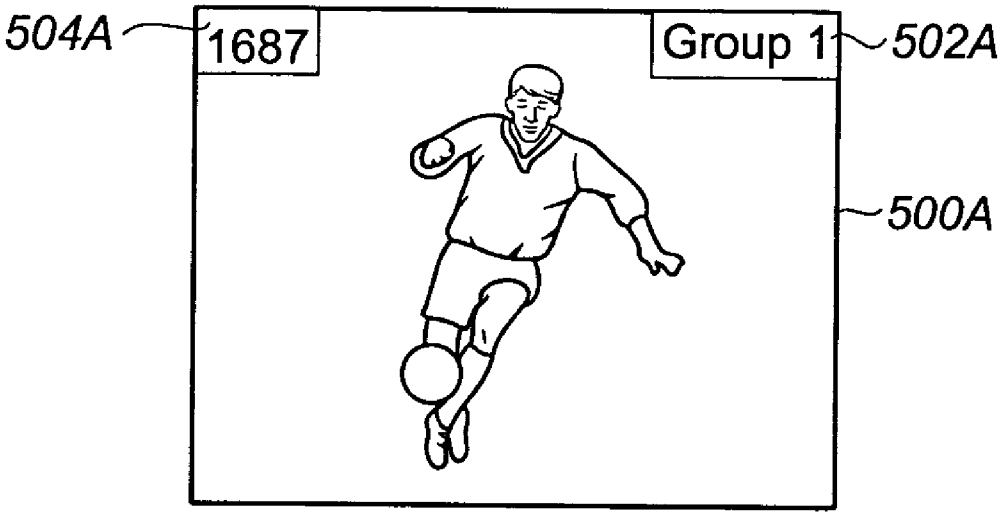


FIG. 7A

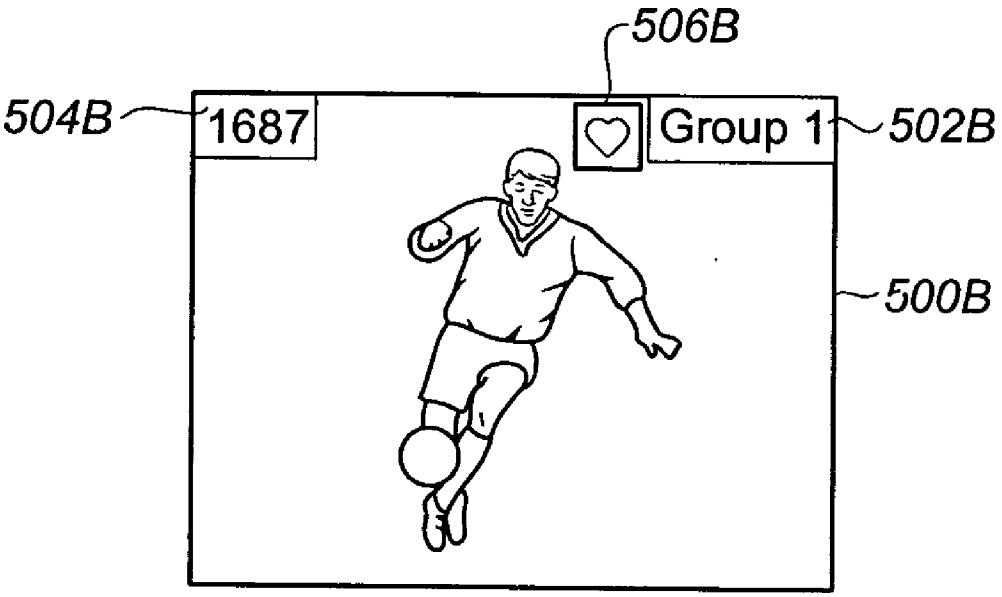


FIG. 7B

600

OBJECT 1 (100_1686)	632
OBJECT 2 (100_1687)	634
OBJECT 3 (100_1688)	636
OBJECT 4 (100_1689)	638
OBJECT 5 (100_1690)	640
OBJECT 6 (100_1691)	642
OBJECT 7 (100_1692)	644
OBJECT 8 (100_1693)	646
OBJECT 9 (100_1694)	648
OBJECT 10 (100_1695)	650
OBJECT 11 (100_1696)	652

610

FIELD (612)	TYPE (614)	EXPOSE (616)	
CAPDATE	DATE/TIME	YES	660
IMAGE CAPTION	STRING	YES	662
CLGDATE	DATE/TIME	YES	664
FAVLEVEL	INTEGER	YES	666
FILESIZE	INTEGER	YES	668
FORMAT	STRING	YES	670
GROUP NUMBER	INTEGER	YES	672
GROUP NAME	STRING	YES	674
IMGHEIGHT	INTEGER	NO	676
IMGWIDTH	INTEGER	NO	678
IMAGEPATH	STRING	NO	680
MODDATE	DATE/TIME	YES	682
IMAGENAME	STRING	YES	684
PROTECTED	INTEGER	YES	686
THMHEIGHT	INTEGER	NO	688
THMWIDTH	INTEGER	NO	690
THMNAIL	DB BLOB	NO	692

FIG. 8

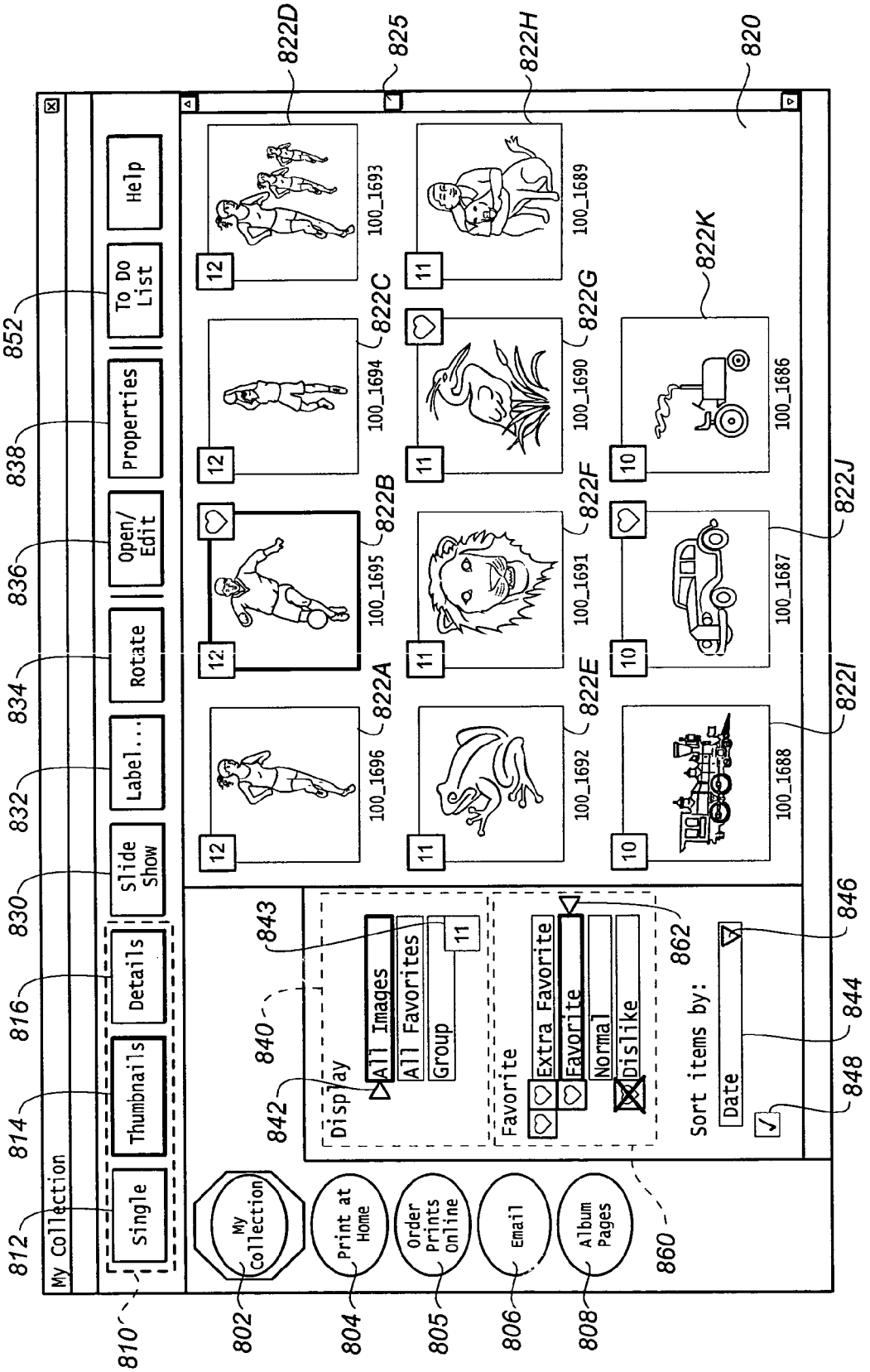

My Collection
Single
Thumbnails
Details
Slide Show
Label...
Rotate
Open/ Edit
Properties
To Do List
Help
My Collection
Print at Home
Order Prints Online
Email
Album Pages
Display
All Images
All Favorites
Group
Favorite
Extra Favorite
Favorite
Normal
Dislike
Sort items by:
Date
100_1696
100_1695
100_1694
100_1693
100_1692
100_1691
100_1690
100_1689
100_1688
100_1687
100_1686
810
812
814
816
830
832
834
836
838
852
802
804
805
806
808
860
840
842
843
844
846
848
862
820
822A
822B
822C
822D
822E
822F
822G
822H
822I
822J
822K
825

FIG. 9A

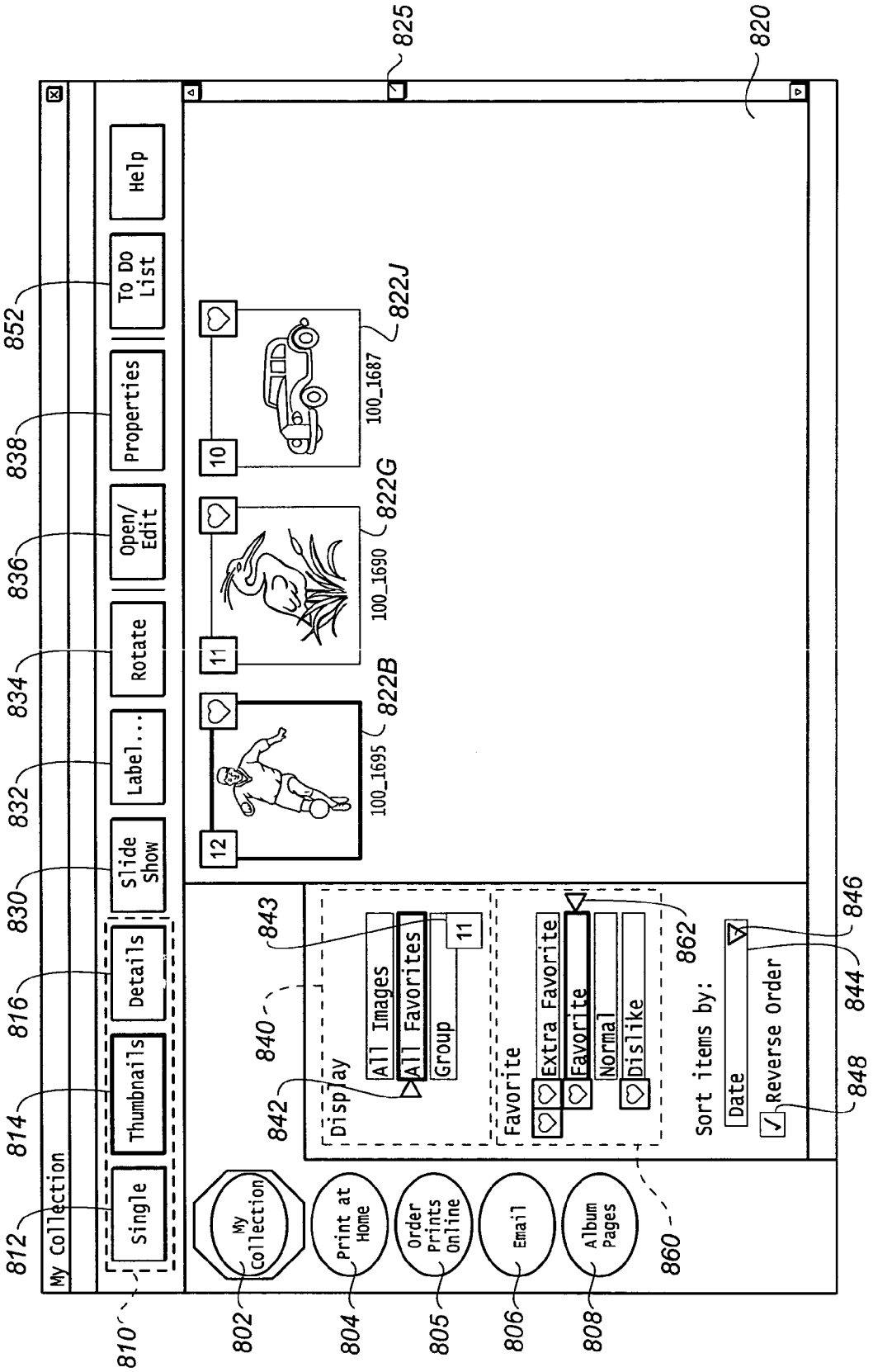

My Collection
Single
Thumbnails
Details
Slide Show
Label...
Rotate
Open/ Edit
Properties
To Do List
Help
My Collection
Print at Home
Order Prints Online
Email
Album Pages
Display
All Images
All Favorites
Group
11
Favorite
Extra Favorite
Favorite
Normal
Dislike
Sort items by:
Date
Reverse Order
12
11
10
100_1695
100_1690
100_1687
810
812
814
816
830
832
834
836
838
852
802
804
805
806
808
840
842
843
844
846
848
860
862
822B
822G
822J
820
825

FIG. 9B

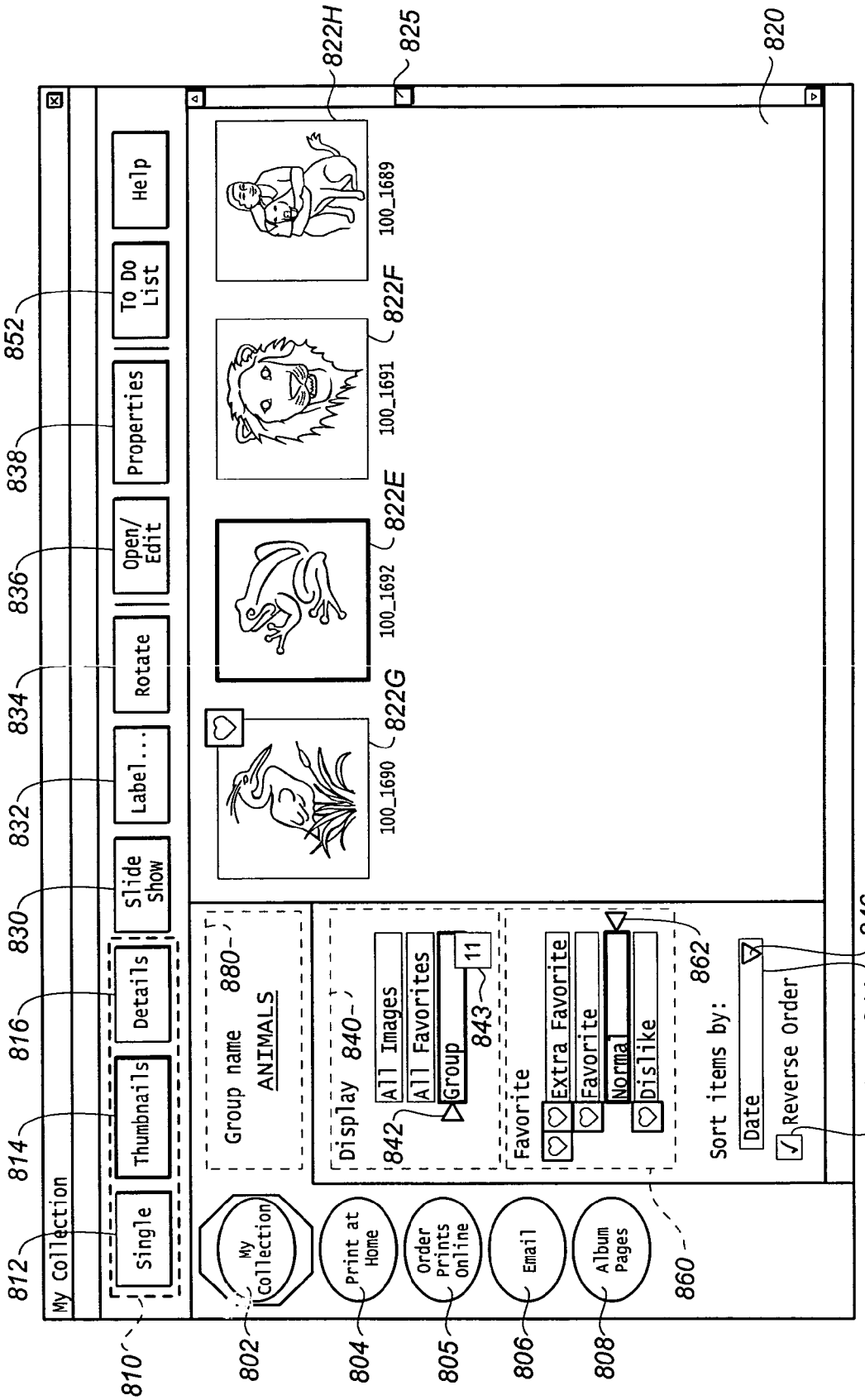

My Collection
Single
Thumbnails
Details
Slide Show
Label...
Rotate
Open/ Edit
Properties
To Do List
Help
Group name
ANIMALS
Display
All Images
All Favorites
Group
11
Favorite
Extra Favorite
Favorite
Normal
Dislike
Sort items by:
Date
Reverse Order
My Collection
Print at Home
Order Prints Online
Email
Album Pages
100_1690
100_1692
100_1691
100_1689
822G
822E
822F
822H
825
820
812
814
816
830
832
834
836
838
852
810
802
804
805
806
808
860
862
880
840
842
843
844
846
848

FIG. 9C

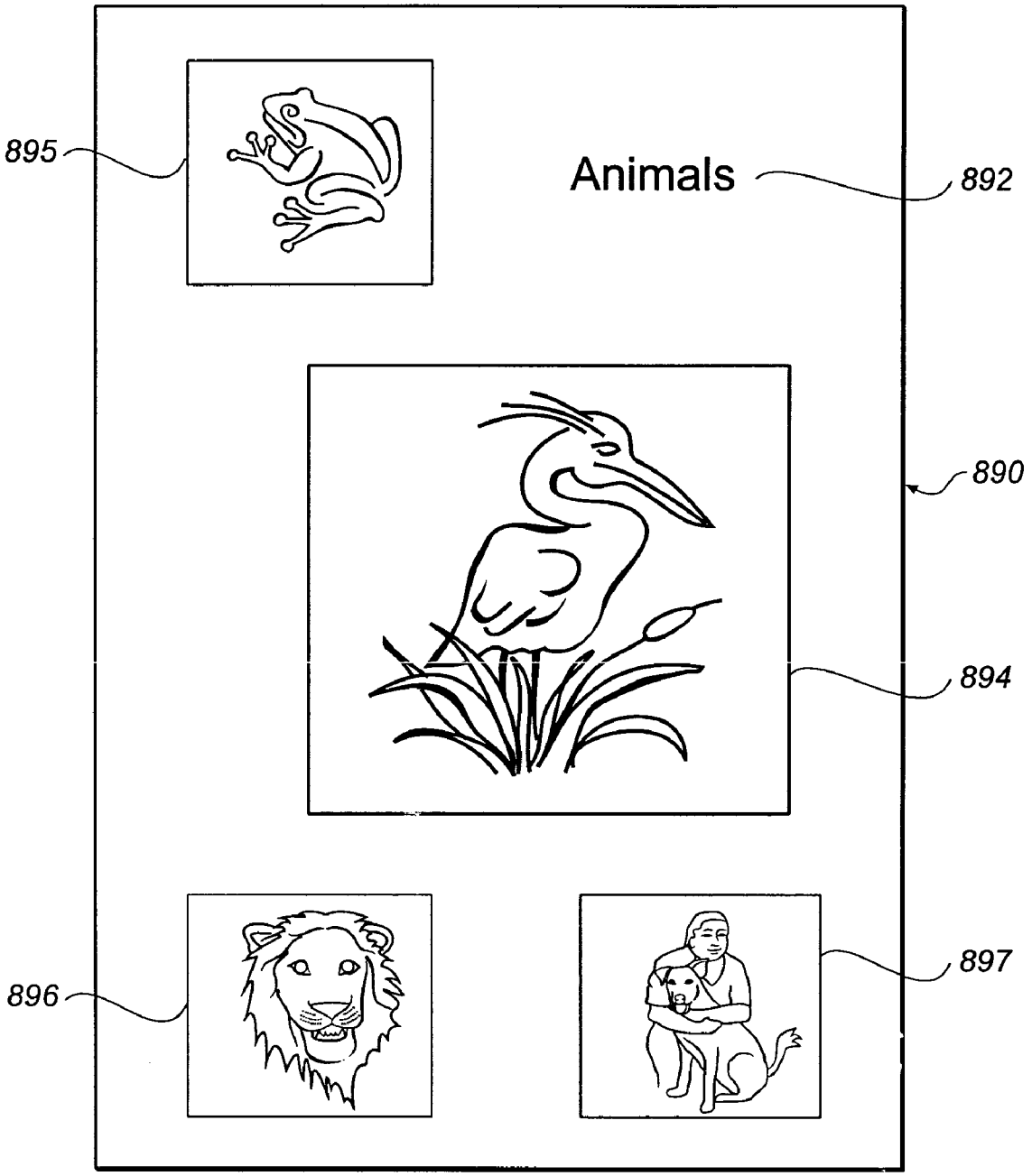


FIG. 10

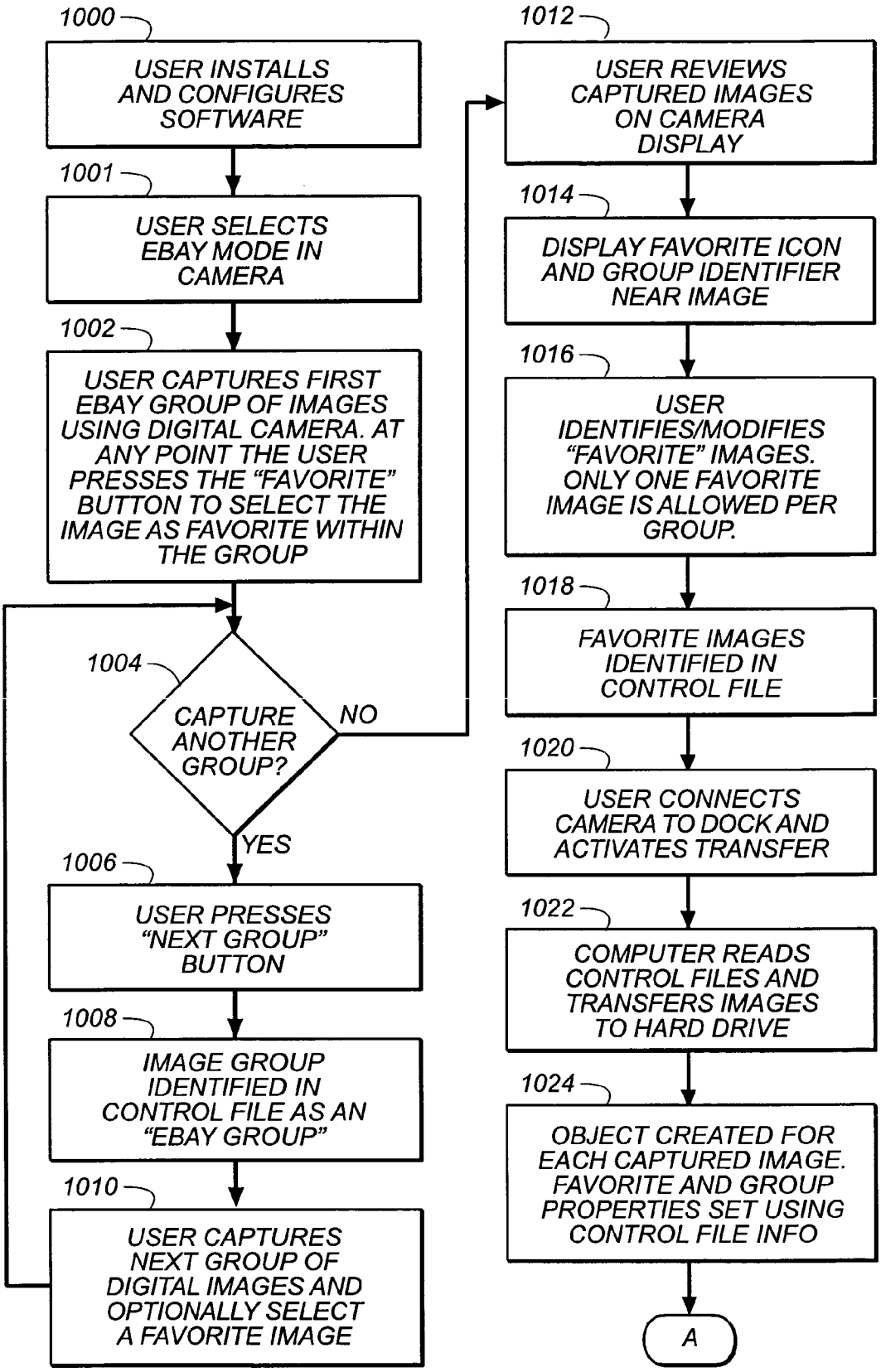

1000
USER INSTALLS AND CONFIGURES SOFTWARE
1001
USER SELECTS EBAY MODE IN CAMERA
1002
USER CAPTURES FIRST EBAY GROUP OF IMAGES USING DIGITAL CAMERA. AT ANY POINT THE USER PRESSES THE "FAVORITE" BUTTON TO SELECT THE IMAGE AS FAVORITE WITHIN THE GROUP
1004
CAPTURE ANOTHER GROUP?
NO
YES
1006
USER PRESSES "NEXT GROUP" BUTTON
1008
IMAGE GROUP IDENTIFIED IN CONTROL FILE AS AN "EBAY GROUP"
1010
USER CAPTURES NEXT GROUP OF DIGITAL IMAGES AND OPTIONALLY SELECT A FAVORITE IMAGE
1012
USER REVIEWS CAPTURED IMAGES ON CAMERA DISPLAY
1014
DISPLAY FAVORITE ICON AND GROUP IDENTIFIER NEAR IMAGE
1016
USER IDENTIFIES/MODIFIES "FAVORITE" IMAGES. ONLY ONE FAVORITE IMAGE IS ALLOWED PER GROUP.
1018
FAVORITE IMAGES IDENTIFIED IN CONTROL FILE
1020
USER CONNECTS CAMERA TO DOCK AND ACTIVATES TRANSFER
1022
COMPUTER READS CONTROL FILES AND TRANSFERS IMAGES TO HARD DRIVE
1024
OBJECT CREATED FOR EACH CAPTURED IMAGE. FAVORITE AND GROUP PROPERTIES SET USING CONTROL FILE INFO
A

FIG. 11A

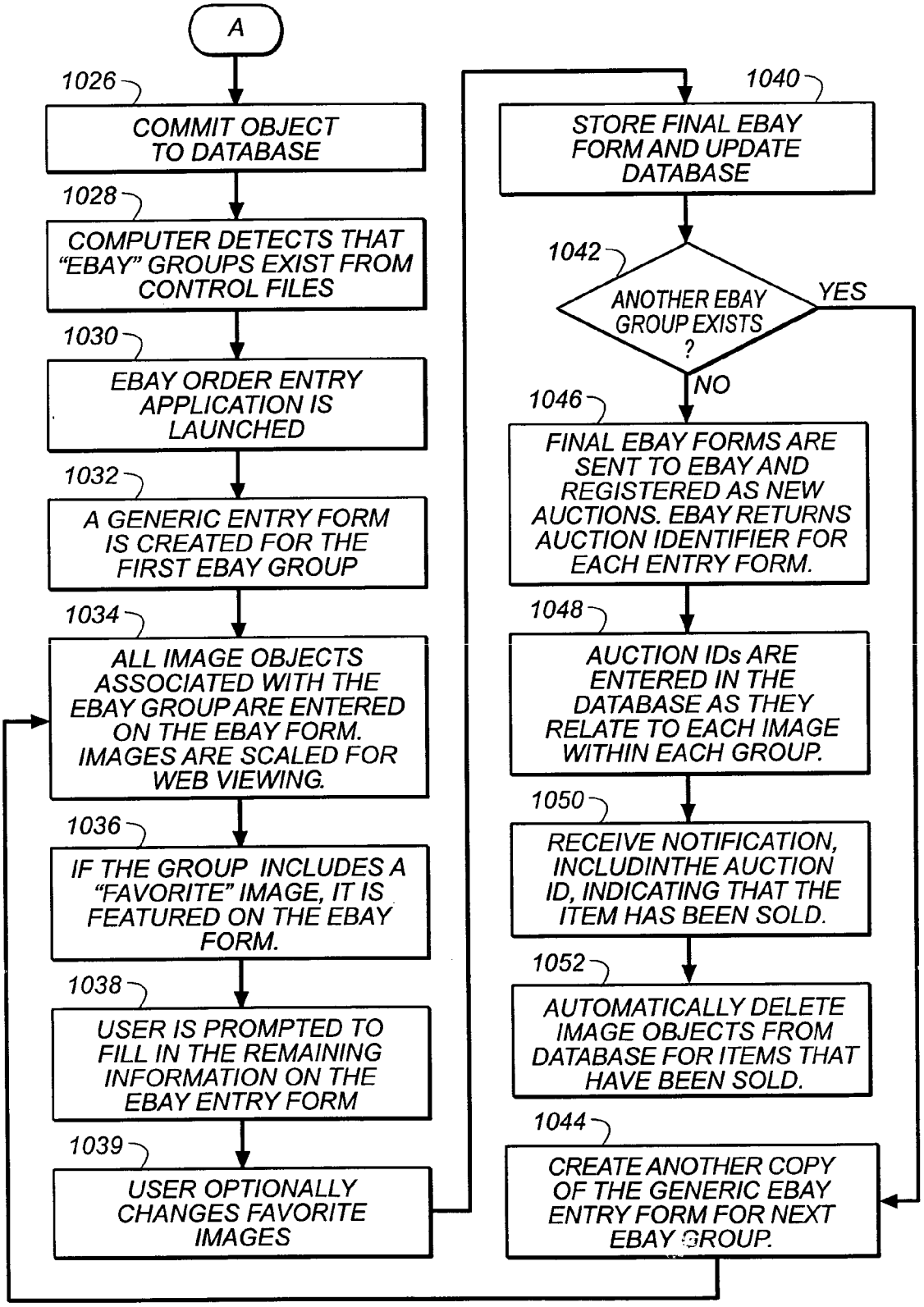

A
1026
COMMIT OBJECT TO DATABASE
1028
COMPUTER DETECTS THAT "EBAY" GROUPS EXIST FROM CONTROL FILES
1030
EBAY ORDER ENTRY APPLICATION IS LAUNCHED
1032
A GENERIC ENTRY FORM IS CREATED FOR THE FIRST EBAY GROUP
1034
ALL IMAGE OBJECTS ASSOCIATED WITH THE EBAY GROUP ARE ENTERED ON THE EBAY FORM. IMAGES ARE SCALED FOR WEB VIEWING.
1036
IF THE GROUP INCLUDES A "FAVORITE" IMAGE, IT IS FEATURED ON THE EBAY FORM.
1038
USER IS PROMPTED TO FILL IN THE REMAINING INFORMATION ON THE EBAY ENTRY FORM
1039
USER OPTIONALLY CHANGES FAVORITE IMAGES
1040
STORE FINAL EBAY FORM AND UPDATE DATABASE
1042
ANOTHER EBAY GROUP EXISTS ?
YES
NO
1046
FINAL EBAY FORMS ARE SENT TO EBAY AND REGISTERED AS NEW AUCTIONS. EBAY RETURNS AUCTION IDENTIFIER FOR EACH ENTRY FORM.
1048
AUCTION IDs ARE ENTERED IN THE DATABASE AS THEY RELATE TO EACH IMAGE WITHIN EACH GROUP.
1050
RECEIVE NOTIFICATION, INCLUDINTHE AUCTION ID, INDICATING THAT THE ITEM HAS BEEN SOLD.
1052
AUTOMATICALLY DELETE IMAGE OBJECTS FROM DATABASE FOR ITEMS THAT HAVE BEEN SOLD.
1044
CREATE ANOTHER COPY OF THE GENERIC EBAY ENTRY FORM FOR NEXT EBAY GROUP.

FIG. 11B

```
1   [HDR]
2   GEN CRT = "KODAK DX4330 DIGITAL CAMERA"
3   GEN SRN = 00100245
4   GEN DTM = 2002:10:12:12:44:41
5   [JOB]
6   EBY PID = 001
7   IMG FMT = EXIF2 -J
8   IMG SRC = "../DCIM/103K4330/100_1686.JPG"
9   [JOB]
10  FAV PID = 001
11  IMG FMT = EXIF2 -J
12  IMG SRC = "../DCIM/103K4330/100_1687.JPG"
13  [JOB]
14  EBY PID = 002
15  IMG FMT = EXIF2 -J
16  IMG SRC = "../DCIM/103K4330/100_1689.JPG"
17  [JOB]
18  FAV PID = 002
19  IMG FMT = EXIF2 -J
20  IMG SRC = "../DCIM/103K4330/100_1691.JPG"
21  [JOB]
22  EBY PID = 003
23  IMG FMT = EXIF2 -J
24  IMG SRC = "../DCIM/103K4330/100_1693.JPG"
25  [JOB]
26  FAV PID = 003
27  IMG FMT = EXIF2 -J
28  IMG SRC = "../DCIM/103K4330/100_1695.JPG"
```

FIG. 12

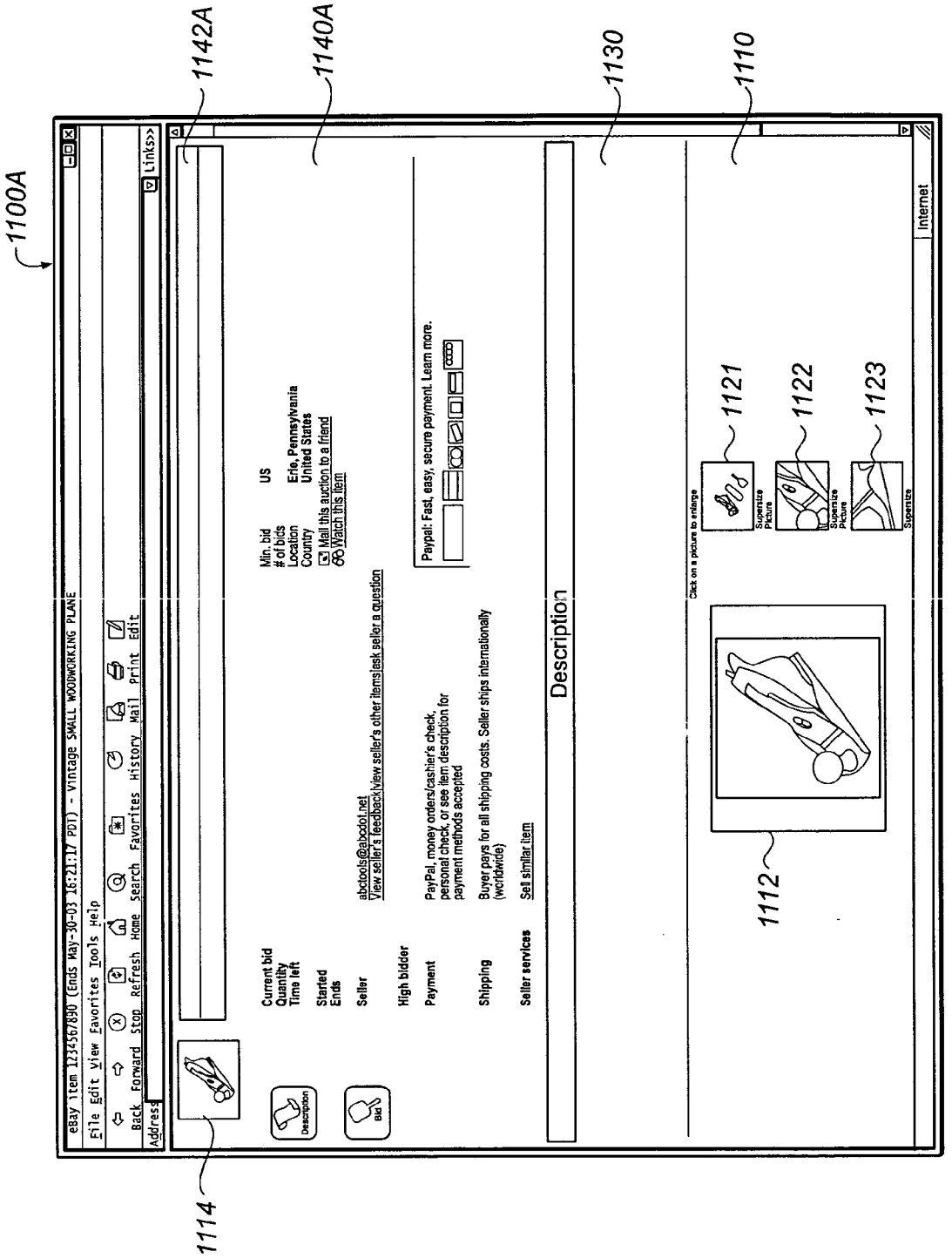

1100A
1142A
1140A
1130
1110
1114
1112
1121
1122
1123
eBay Item 1234567890 (Ends May-30-03 16:21:17 PDT) - Vintage SMALL WOODWORKING PLANE
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit
Address
Links>>
Description
Bid
Current bid
Quantity
Time left
Started
Ends
Seller
High bidder
Payment
Shipping
Seller services
abctools@abcdot.net
View seller's feedback/view seller's other items/ask seller a question
PayPal, money orders/cashier's check, personal check, or see item description for payment methods accepted
Buyer pays for all shipping costs. Seller ships internationally (worldwide)
Sell similar item
Min. bid
# of bids
Location
Country
US
Erie, Pennsylvania
United States
Mail this auction to a friend
Watch this item
Paypal: Fast, easy, secure payment. Learn more.
Description
Click on a picture to enlarge
Supersize Picture
Supersize Picture
Supersize
Internet

FIG. 13A

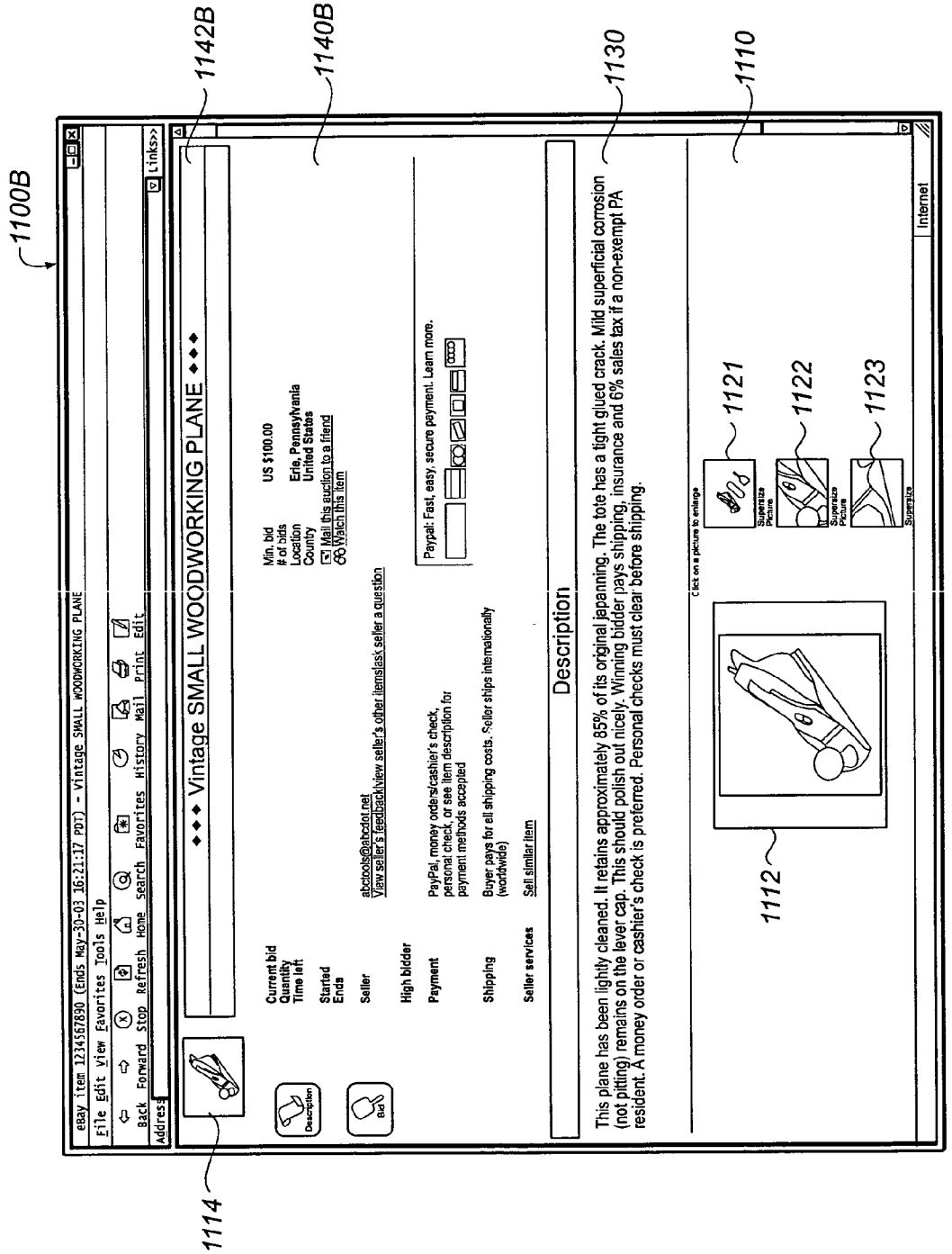

1100B
1142B
1140B
1130
1110
1114
1112
1121
1122
1123
eBay item 1234567890 (Ends May-30-03 16:21:17 PDT) - Vintage SMALL WOODWORKING PLANE
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit
Address
Links>>
Vintage SMALL WOODWORKING PLANE
Description
Bid
Current bid
Quantity
Time left
Started
Ends
Seller
High bidder
Payment
Shipping
Seller services
Min. bid
# of bids
Location
Country
US $100.00
Erie, Pennsylvania
United States
Mail this auction to a friend
Watch this item
abctools@ebcdot.net
View seller's feedback/view seller's other items/ask seller a question
PayPal, money orders/cashier's check, personal check, or see item description for payment methods accepted
Buyer pays for all shipping costs. Seller ships internationally (worldwide)
Sell similar item
Paypal: Fast, easy, secure payment. Learn more.
Description
This plane has been lightly cleaned. It retains approximately 85% of its original japanning. The tote has a tight glued crack. Mild superficial corrosion (not pitting) remains on the lever cap. This should polish out nicely. Winning bidder pays shipping, insurance and 6% sales tax if a non-exempt PA resident. A money order or cashier's check is preferred. Personal checks must clear before shipping.
Click on a picture to enlarge
Superszie Picture
Superszie Picture
Superszie
Internet

FIG. 13B

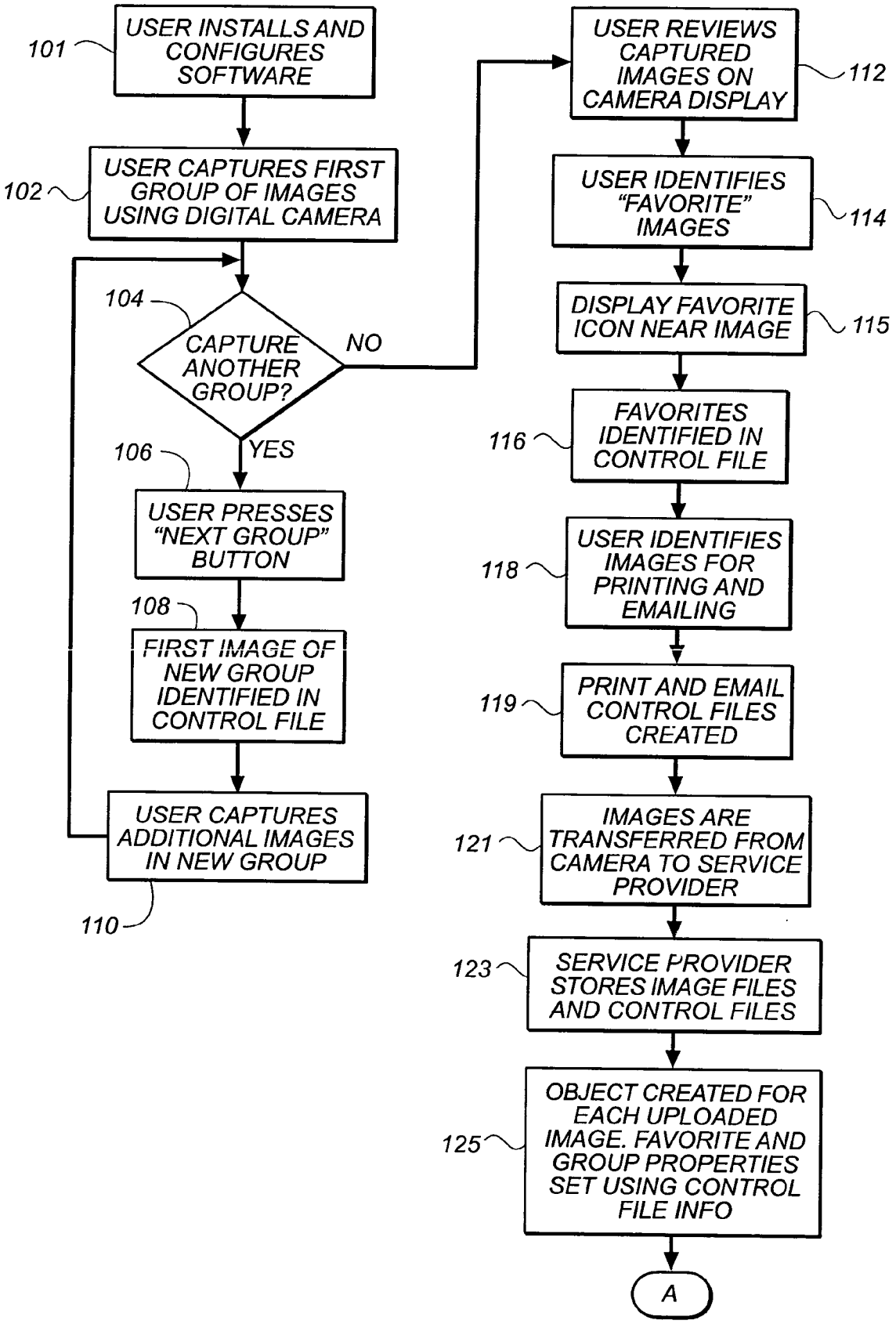

101
USER INSTALLS AND CONFIGURES SOFTWARE
102
USER CAPTURES FIRST GROUP OF IMAGES USING DIGITAL CAMERA
104
CAPTURE ANOTHER GROUP?
NO
YES
106
USER PRESSES "NEXT GROUP" BUTTON
108
FIRST IMAGE OF NEW GROUP IDENTIFIED IN CONTROL FILE
USER CAPTURES ADDITIONAL IMAGES IN NEW GROUP
110
USER REVIEWS CAPTURED IMAGES ON CAMERA DISPLAY
112
USER IDENTIFIES "FAVORITE" IMAGES
114
DISPLAY FAVORITE ICON NEAR IMAGE
115
116
FAVORITES IDENTIFIED IN CONTROL FILE
118
USER IDENTIFIES IMAGES FOR PRINTING AND EMAILING
119
PRINT AND EMAIL CONTROL FILES CREATED
121
IMAGES ARE TRANSFERRED FROM CAMERA TO SERVICE PROVIDER
123
SERVICE PROVIDER STORES IMAGE FILES AND CONTROL FILES
125
OBJECT CREATED FOR EACH UPLOADED IMAGE. FAVORITE AND GROUP PROPERTIES SET USING CONTROL FILE INFO
A

FIG. 14A

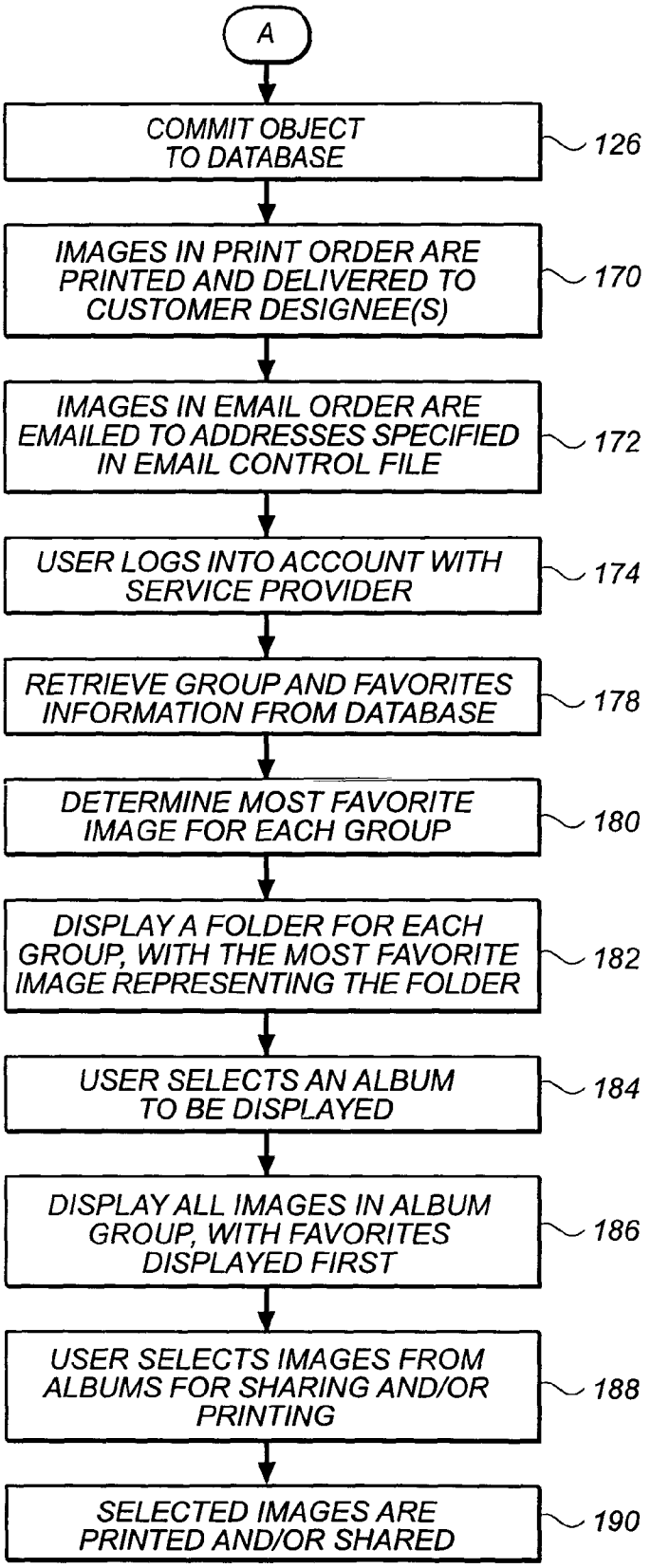

A
COMMIT OBJECT TO DATABASE
126
IMAGES IN PRINT ORDER ARE PRINTED AND DELIVERED TO CUSTOMER DESIGNEE(S)
170
IMAGES IN EMAIL ORDER ARE EMAILED TO ADDRESSES SPECIFIED IN EMAIL CONTROL FILE
172
USER LOGS INTO ACCOUNT WITH SERVICE PROVIDER
174
RETRIEVE GROUP AND FAVORITES INFORMATION FROM DATABASE
178
DETERMINE MOST FAVORITE IMAGE FOR EACH GROUP
180
DISPLAY A FOLDER FOR EACH GROUP, WITH THE MOST FAVORITE IMAGE REPRESENTING THE FOLDER
182
USER SELECTS AN ALBUM TO BE DISPLAYED
184
DISPLAY ALL IMAGES IN ALBUM GROUP, WITH FAVORITES DISPLAYED FIRST
186
USER SELECTS IMAGES FROM ALBUMS FOR SHARING AND/OR PRINTING
188
SELECTED IMAGES ARE PRINTED AND/OR SHARED
190

FIG. 14B

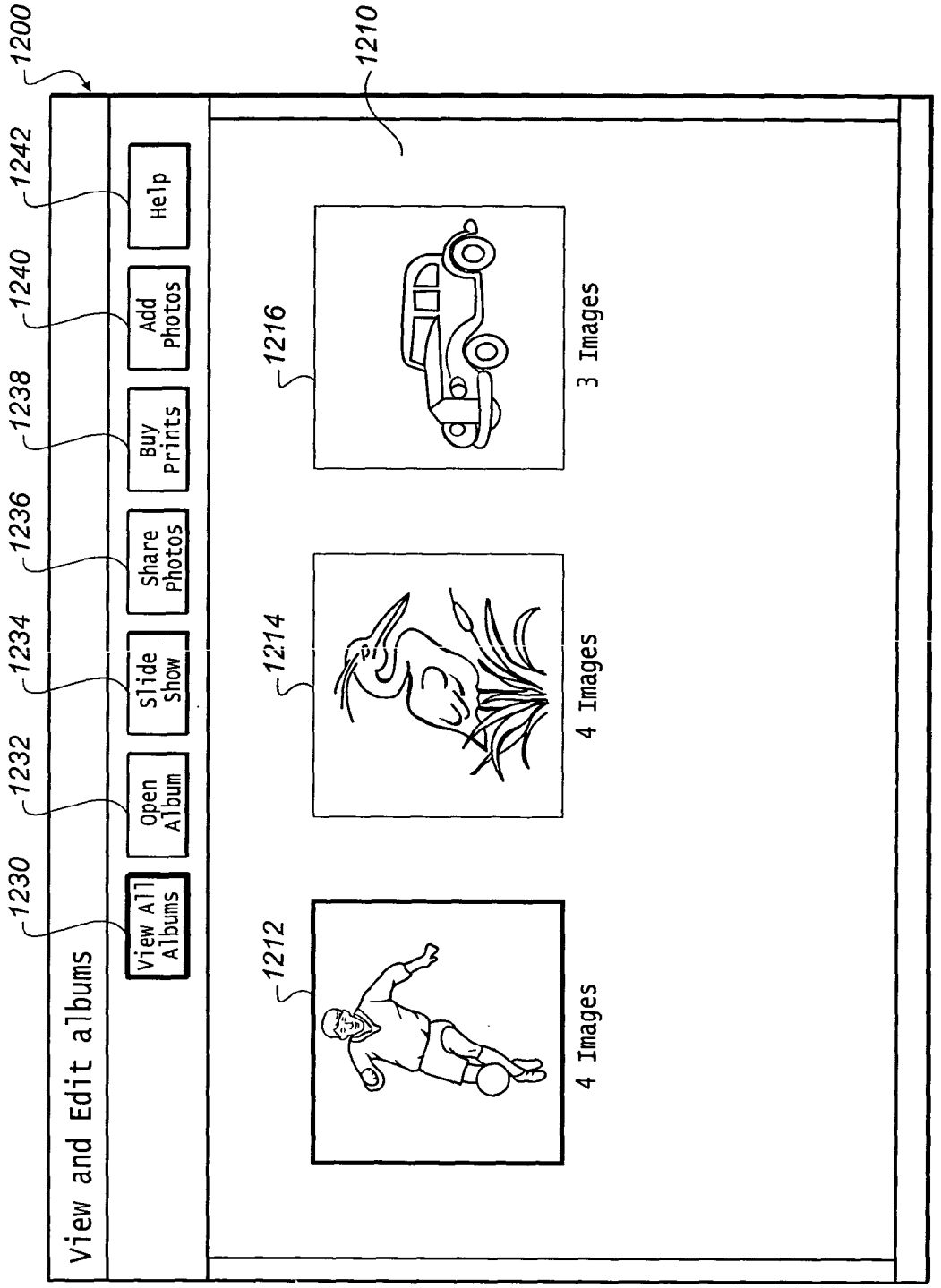

1200
View and Edit albums
1230
View All Albums
1232
Open Album
1234
Slide Show
1236
Share Photos
1238
Buy Prints
1240
Add Photos
1242
Help
1210
1212
4 Images
1214
4 Images
1216
3 Images

FIG. 15

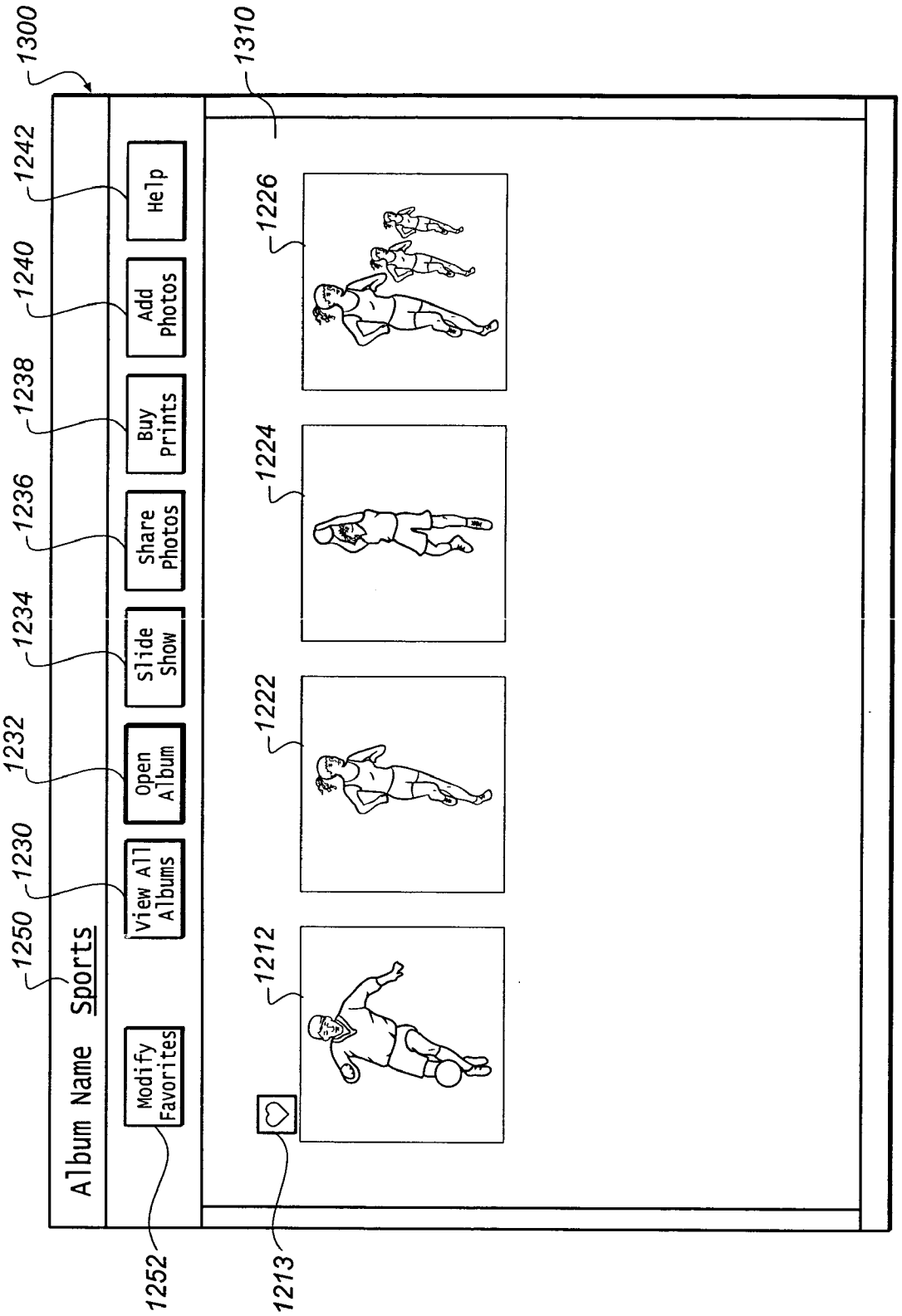

1300
1310
1242
Help
1240
Add Photos
1238
Buy Prints
1236
Share Photos
1234
Slide Show
1232
Open Album
1230
View All Albums
1250
Album Name Sports
Modify Favorites
1252
1213
1212
1222
1224
1226

FIG. 16

METHOD FOR PRODUCING ELECTRONIC JOB PAGES

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] Reference is made to commonly-assigned U.S. patent application Ser. No. _____, Docket (86,272) filed concurrently herewith by Kenneth A. Parulski et al., entitled "Classifying Digital Images as Favorite Images Using a Digital Camera"; reference is made to commonly-assigned U.S. patent application Ser. No. _____, (Docket 86,273) filed concurrently herewith by Steven M. Bryant et al., entitled "Grouping Digital Images Using a Digital Camera"; reference is made to commonly-assigned U.S. patent application Ser. No._____ (Docket 86,274) filed concurrently herewith by Steven M. Bryant, et al., entitled "A Digital Camera Including an On-Line Sales Mode"; reference is made to commonly-assigned U.S. patent application Ser. No._____ (Docket 86,276) filed concurrently herewith by Kenneth A. Parulski, et al., entitled "Using Favorite Digital Images to Organize and Identify Electronic Albums", the disclosures of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to digital cameras that capture digital images and, more particularly, to producing electronic job pages including groups of digital images captured by a digital camera.

BACKGROUND OF THE INVENTION

[0003] Digital cameras are used by a growing number of consumer and professional photographers. These cameras use one or more CCD or CMOS image sensors to capture images, and digitally process these captured images to produce digital image files, which are stored in a digital memory in the camera. The digital image files can then be viewed, stored, retrieved, and printed using a home computer, and can be uploaded to a web site for viewing.

[0004] The digital camera can include a user control for selecting one or more categories for images to be captured, as described in commonly-assigned U.S. Pat. No. 5,633,678 "Electronic Still Camera For Capturing And Categorizing Images" to Parulski et. al., the disclosure of which is herein incorporated by reference. Alternatively, the stored digital images can be organized later when they are transferred to the computer using appropriate software. For example, the software can enable images to be organized into categories according to the people, places, subjects or events depicted, as described in a paper entitled "FotoFile: A Consumer Multimedia Organization and Retrieval System" by Kuchinsky et al. The Kuchinsky et al. paper describes metadata attributes that are used to describe certain images, including a "favorite" attribute that is used to indicate the "best" images in a user's collection. However, in the Kuchinsky et al. paper, "favorites" can only be selected when the images are reviewed on the PC, not when they are captured using a camera.

[0005] Various types of metadata related to images have been standardized. For example, the International Organization for Standardization (ISO) group ISO/IEC JTC1/SC29/WG11, "Coding of Moving Pictures and Audio", has developed an "MPEG-7 Requirements Document" V.8, No. N2727, March 1999, which defines various types of metadata that can be stored with moving images. Also, the Digital Imaging Group (DIG) has developed the DIG35 metadata standard. However, neither of these specifications defines metadata which indicates that an image is a favorite image for a particular user.

SUMMARY OF THE INVENTION

[0006] It is an object of the present invention to produce electronic job pages which include groups of digital images captured by a digital camera.

[0007] This object is achieved by a method for producing a plurality of electronic job pages using a digital camera and a computer, comprising the steps of capturing and storing a first group of digital images using the digital camera; designating, in response to a user input, that subsequent captured digital images are to form a second group of digital images; capturing and storing a second group of digital images using the digital camera; storing data in a memory of the digital camera which identifies the first and second groups of digital images; transferring the first and second group of digital images, and the data identifying the first and second groups of digital images, from the digital camera to the computer; and using the transferred data identifying the first and second groups of digital images to produce a first electronic job page including the first group of digital images and a second electronic job page including the second group of digital images.

ADVANTAGES

[0008] It is an advantage of the present invention to enable a user to group and classify digital images as the images are captured using a digital camera.

[0009] It is an additional advantage of the present invention to provide a simple method of identifying favorite images as the images are captured using a digital camera.

[0010] It is a further advantage of the present invention to provide a simple method for grouping digital images into distinct sets of images as they are captured using a digital camera.

[0011] It is a further advantage of the present invention to provide a computer database that utilizes the classification and grouping information created in the digital camera to improve the retrieval and utilization of the digital images captured using the digital camera.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] **FIG. 1** depicts a block diagram of a digital photography system;

[0013] **FIG. 2** depicts a block diagram of a digital camera used in the digital photography system of **FIG. 1**;

[0014] **FIGS. 3A and 3B**, taken together, depict a flow diagram showing a first embodiment of a method for grouping images, identifying favorite images, and organizing the images in accordance with the present invention;

[0015] **FIG. 4** depicts a rear view of the digital camera of **FIG. 2**;

[0016] **FIG. 5** depicts a directory structure for images and control files stored by the digital camera of **FIG. 2**;

[0017] **FIG. 6** depicts a first utilization file for identifying groups of images and favorite images;

[0018] **FIGS. 7A-7B** depict digital camera graphical user interface screens for indicating groups of images and favorite images;

[0019] **FIG. 8** depicts information included in the local database;

[0020] **FIGS. 9A-9C** depict computer user interface screens for displaying transferred images;

[0021] **FIG. 10** depicts album pages;

[0022] **FIGS. 11A and 11B**, taken together, depict a flow diagram showing a second embodiment of a method for grouping images, identifying favorite images, and organizing the images in accordance with the present invention;

[0023] **FIG. 12** depicts a second utilization file for identifying groups of images corresponding to electronic job pages and favorite images;

[0024] **FIG. 13A** depicts an example of an initial electronic job page populated with images captured by a digital camera;

[0025] **FIG. 13B** depicts an example of a completed electronic job page;

[0026] **FIGS. 14A and 14B**, taken together, depict a flow diagram showing a third embodiment of a method for grouping images, identifying favorite images, and organizing the images in accordance with the present invention;

[0027] **FIG. 15** depicts a computer user interface screen for displaying uploaded image albums; and

[0028] **FIG. 16** depicts a computer user interface screen for displaying an image with an album.

DETAILED DESCRIPTION OF THE INVENTION

[0029] The present invention defines methods for grouping and classifying digital still images and digital motion images captured using a handheld digital camera. The grouping can be done manually by the camera user, by pressing a "new group" button on the digital camera before capturing a group of digital images. The classification can be done manually by the camera user, for example, by identifying a "favorite" image within each group of captured images, using a control button on the digital camera as the user reviews the group of captured digital images on the camera's image display. A user identifier can also be stored along with the classification data, in order to identify the particular camera user for whom the classification was made. In one embodiment of the present invention, the grouping and classification data is stored in a database on a host computer, and can later be used in retrieving digital images and in producing hardcopy output, such as album pages. In a second embodiment, the grouping and classification data is used to create "electronic job pages", where each group of images corresponds to one "job", such as an item offered for sale electronically. By grouping the images on the digital camera as they are captured, the process of later creating the "electronic job pages" on a computer is greatly simplified, since the images are already organized into the appropriate job groups. In a third embodiment, the digital camera includes a wireless modem which transmits some of the captured images to a service provider, and the grouping and classification information is used to simplify the process of selecting and organizing the images stored by a local host computer and by the service provider.

[0030] The classification provides "affective information," which is herein defined as information that relates to the feelings or emotions of a person toward images. This affective information usually describes or represents a person's subjective reaction to a given image. One very important type of affective information is the level of importance a user associates with an image, such as whether the image is a "favorite". For example, a user may take dozens of still photographs or video segments during an event, such as a wedding or Christmas celebration. Out of these many images, there are normally only a few that the user feels are particularly special, or "favorite" images.

[0031] Affective information can be stored using a "tag" or "flag", associated with an image, which indicates whether or not the image has been identified as a "favorite" or "important" image for the user. The absence of such a tag indicates that the image has not been identified as a favorite or important image for the user. Such tag represents a binary categorization, classifying images into "favorite" and "normal" categories. Alternatively, favorite images can be categorized into a range of levels. For example, images can be classified between a range of −10 to +10, where 0 is used for an unclassified image, +10 is used for the "most favorite" image or images, and −10 is used for the "least favorite" image or images.

[0032] Different users can have different emotional reactions to the same image. Therefore, to be most useful, affective information relating to images should be associated with a particular user, if the images are to be shared with various users. In some embodiments, this is accomplished by associating a user identifier with the affective information. The user identifier can be any type of information that helps enable a particular user to be identified. For example, the user identifier can be a personal identification code such as a globally unique ID (GUID), a user number, a social security number, a camera serial number, or the like. The user identifier can also be a complete legal name, a nickname, a computer user name, or the like. The user identifier can be stored along with the affective information at the time the image is classified using the digital camera, or can alternatively be added when the images are transferred from the digital camera to a host computer. In the latter case, an identification number such as a serial number associated with the camera can be stored within the image files, and a user identifier can later be associated with this serial number.

[0033] When the affective information is stored in association with a user identifier, it is known as "personal affective information". The affective information and user identifier are types of image "metadata", which is a term used for any information relating to an image. Examples of other types of image metadata include image capture time, capture device, capture location, date of capture, and image capture parameters (such as lens f-number, focus distance).

[0034] The affective information, such as whether an image is classified as a "favorite", can be associated with a digital image by storing the classification data within the image file, for example, using a TIFF IFD within an Exif

image file. Alternatively, the classification data can be stored in a separate file, such as a "Favorites" file, that provides a list of all of the stored images that are classified as favorites.

[0035] Affective information can be manually entered by a user, for example, using pushbuttons, a touch screen, or voice recognition, or can be collected automatically, as described in commonly assigned U.S. patent application Ser. No. _____, entitled "_____(Docket 84,897 RRS)" by Elena Fedorovskaya et al. the disclosure of which is incorporated herein by reference.

[0036] Referring to **FIG. 1**, there is illustrated a digital photography system in accordance with the present invention. As shown in **FIG. 1**, the system includes a digital camera **300** that captures and classifies still and motion video images, as will be described later with reference to **FIG. 2**. The digital camera **300** is one example of an imaging device that can be used in a digital photography system made in accordance with the present invention. Other examples of imaging devices include still-only or motion video-only cameras, and combination cell phone/digital cameras that can capture and transmit digital still and video images.

[0037] The digital photography system of **FIG. 1** also includes a home computer system **10**. The home computer **10** includes a CPU motherboard **12**, having for example, an Intel Pentium IV processor as well as RAM memory (not shown). The CPU motherboard **12** executes software stored on a hard drive **20**, for example, the well-known Windows XP operating system software and the Internet Explorer web browser software, both provided by Microsoft Corp. of Redmond, Wash. The hard drive **20** is also used to store application software that can be provided along with the digital camera **300** using any suitable software distribution media or method, such as a CD-ROM, floppy disc, or Internet download, as is well-known to those skilled in the art. As will be described later with reference to **FIG. 3**, the hard drive **20** is also used to store images downloaded from the digital camera **300** and to store a local database of information associated with these downloaded images. The hard drive **20** is one type of memory associated with the home computer **10**. Other types of memory could alternatively be used with the home computer **10** to store downloaded images, such as solid-state Flash EPROM memory and optical read/write discs, such as recordable and erasable DVD discs.

[0038] The CPU motherboard **12** is coupled to a display monitor **14** and a keyboard **16**. A mouse **18** permits the user to readily communicate with the CPU motherboard **12**. The home computer **10** also includes a dial-up modem **22** for communicating with an Internet Service Provider (ISP) **30** in order to connect to a channel **36**, such as the Internet, in order to email images to others, or to provide images to a service provider for storage and/or printing. The CPU motherboard **12** can communicate with the digital camera **300** when the digital camera **300** is placed in a dock **350**. The communication uses a suitable wired or wireless interface, such as the well-known Universal Serial Bus (USB) interface. The dock **350** can be used to transfer images and control files to the home computer **10**, to transfer images and information, such as camera settings and email addresses, from the home computer **10** to the digital camera **300**, and to recharge the batteries in the digital camera **300**.

[0039] The CPU motherboard **12** also communicates with a card reader **24**, which can read and write data on a removable flash memory card **330** (shown in **FIG. 2**) used in the digital camera **300**, which is an alternative way of transferring images and control files from the digital camera **300** to the home computer **10**. The home computer **10** also includes a printer **26**, which communicates with the CPU motherboard **12** over a suitable interface, such as the USB interface.

[0040] In alternative embodiments, other devices, such as a television set-top box or Internet appliance, could be used in place of the home computer **10**. Also, the connection between the digital camera **300** and the home computer **10** could be done directly, without using dock **350**.

[0041] The ISP **30**, for example, Earthlink Network, Inc. of Pasadena, Calif., includes banks of modems **32**, one of which is connected to communicate with the modem **22** of the home computer **10**. The modem **32** in turn communicates with computers/routers **34** in order to provide a connection to the channel **36**, which is preferably the Internet, using equipment and techniques well-known to those skilled in the art. The ISP **30** provides e-mail services using the channel **36**.

[0042] An electronic auction provider **80** communicates over the channel **36** in order to enable a member, using a home computer **10**, to upload information and images which describe and depict a product to be offered at an electronic auction, and for other members to bid on the product. An example of an electronic auction provider **80** is the well-known eBay "online marketplace", at www.ebay.com.

[0043] A photo service provider **40** communicates with a fulfillment system **50**, which is comprised of one or more computers and associated peripherals for producing photo products, such as hardcopy prints, album pages, photo mugs, PictureCD discs, and the like. The fulfillment system **50** includes a computer that serves as a production controller **52**, and controls one or more color printers **54**, which can produce photo products **66** such as album pages or standard hardcopy prints. The hardcopy prints can be of various sizes, and can be sold in frames. The production controller **52** is also connected to a disc writer **76**, which can produce CDs or DVDs, for example PictureCDs, having digital still and video images and application software for using the digital images. The production controller **52** can optionally be connected to devices (not shown) for producing other types of photo products **66**, for example, t-shirts or coffee mugs, incorporating one or more images uploaded by the user. The production controller **52** also controls a shipping system **70**, which controls a shipping label printer **72** to produce a shipping label **74**. The shipping label **74** is attached to a shipping container (e.g., a cardboard box containing packing material) that contains and protects the photo product **66** during shipment (e.g., via air express mail or ground carrier) to the user or the user's designee.

[0044] A service provider database **44** at the photo service provider **40** provides information describing numerous photo products that can be provided by the fulfillment system **50**, as described in commonly-assigned U.S. patent application Ser. No. 09/576,288, filed May 23, 2000, entitled "Method For Providing Customized Photo Products Over A Network" by Parulski et al., the disclosure of which is incorporated herein by reference. This includes information

describing photo product options, for example, album features such as providing various background colors or textures, page numbers, page captions, and image captions. The album pages can be bound in a cover, or can include holes to permit the pages to be inserted into a standard binder, such as a three-ring binder. These album feature options can be demonstrated via software programs, for example, JAVA applets, MPEG or QuickTime movies, or Shockwave files, which depict the functionality of features that the customer can choose.

[**0045**] The service provider database **44** includes information describing each customer account, including user billing information. The billing information can include a payment identifier for the user, such as a charge card number, expiration date, and user billing address. The service provider database **44** can optionally provide long-term storage of the uploaded images for each user. In this case, stored images are accessible (e.g., viewable) via the Internet by authorized users, as described, for example, in commonly-assigned U.S. Pat. No. 5,760,917, entitled "" to Sheridan, the disclosure of which is herein incorporated by reference. The service provider database **44** can be provided by the same computer as a network server **42**, or can utilize a separate computer, or can be distributed over several computers at the same physical site, or at different sites.

[**0046**] On a regular basis (e.g., monthly), or alternatively, whenever a photo product **66** is purchased by the user, the service provider database **44** communicates with a billing system **46** to verify that the payment identifier (e.g., credit card or debit card number) provided by the customer is valid, and to debit the account for the purchase or the monthly service fee for providing information to the user and storing user images. As shown in block **48**, the bill is issued. The customer's account that is debited can, of course, be located at a remote financial institution.

[**0047**] The digital camera **300** is shown in block diagram form in **FIG. 2**. The back of the digital camera **300**, which provides a camera user interface, is shown in **FIG. 4**. Preferably, the digital camera **300** is a portable battery operated device, small enough to be easily handheld by a user when capturing and reviewing images. The digital camera **300** can be, for example, a Kodak EasyShare DX4330 Zoom Digital Camera. The digital camera **300** produces digital images that are stored on the removable memory card **330**. The digital camera **300** includes a zoom lens **312** having zoom and focus motor drives **310** and an adjustable aperture and shutter (not shown). Referring to **FIG. 4**, the user composes the image using an optical viewfinder **305** and a zoom lens control **311**, and then depresses shutter button **309** to begin capture of a still image. Referring again to **FIG. 2**, zoom lens **312** focuses light from a scene (not shown) on an image sensor **314**, for example, a single-chip color CCD image sensor, using the well-known Bayer color filter pattern. The image sensor **314** is controlled by clock drivers **306**. The image sensor **314** can have, for example, 3.3 megapixels (2242×1473 pixels), of which the center 3.1 megapixels (2160×1400 pixels) are stored in the final image file after image processing. The zoom and focus motors **310** and the clock drivers **306** are controlled by control signals supplied by a control processor and timing generator circuit **304**. The control processor and timing generator **304** receives inputs from an image processor **320**, which provides calculations for focus and exposure determination, and controls a flash **302**. The analog output signal from the image sensor **314** is amplified and converted to digital data by the analog signal processing (ASP) and analog-to-digital (A/D) converter circuit **316**. The digital data is stored in a DRAM buffer memory **318** and subsequently processed by an image processor **320** controlled by the firmware stored in firmware memory **328**, which can be flash EPROM memory.

[**0048**] The processed digital image file is provided to a memory card interface **324**, which stores the digital image file on the removable memory card **330**. Removable memory cards **330** are one type of removable digital image storage medium, and are available in several different physical formats. For example, the removable memory card **330** can include memory cards adapted to the well-known PC card, Compact Flash, SmartMedia, MemoryStick, MMC or SD memory card formats. Other types of removable digital image storage media, such as magnetic hard drives, magnetic tape, or optical disks, can alternatively be used to store the digital images.

[**0049**] The processor **320** performs color interpolation followed by color and tone correction, in order to produce rendered sRGB image data. The processor **320** can also provide various image sizes selected by the user, for example, 3.1 megapixel (MP) "best quality" images, 2.2 MP "better quality" images, 0.8 MP "e-mail quality" images, and 0.4 MP "web quality" images. The rendered sRGB image data is then JPEG compressed and stored as a JPEG image file on the removable memory card **330**. The JPEG file uses the so-called "Exif" image format defined in "Digital Still Camera Image File Format (Exif)" version 2.1, July 1998 by the Japan Electronics Industries Development Association (JEIDA), Tokyo, Japan. This format includes an Exif application segment that stores particular image metadata, for example, the date and time the picture was captured, the lens f/number and other camera settings, and image captions or comments that can be selected or entered by the camera user. In some embodiments of the present invention, this metadata can include metadata identifying favorite images and groups of images. In other embodiments, the favorites and grouping metadata is provided in a separate control file. The control processor and timing generator **304** also provide a real-time clock value to the image processor **320**, which can stored this value as date/time metadata in each image file.

[**0050**] The processor **320** also creates a low-resolution "thumbnail" size image, which can be created as described in commonly-assigned U.S. Pat. No. 5,164,831, entitled "Electronic Still Camera Providing Multi-Format Storage Of Full And Reduced Resolution Images" to Kuchta, et al., the disclosure of which is herein incorporated by reference. In a preferred embodiment, this thumbnail image has 160×120 pixels, to conform to the DCF rules described later, and is stored in RAM memory **326** and supplied to a color LCD image display **332**. After images are captured, they can be quickly reviewed on the color LCD image display **332** by using the thumbnail image data. The digital camera **300** can also include a video output driver **390** for displaying the captured images and the graphical user interface on a separate TV monitor **392**.

[**0051**] The graphical user interface displayed on the color LCD image display **332** is controlled by user controls **303**.

In a preferred embodiment shown in **FIG. 4**, user controls **303** (see **FIG. 2**) include ajoystick controller **360** that includes 4-way control (up, down, left, right) and a push-button center "OK" switch. User controls **303** further include a "group" push button **362**, a "favorite" pushbutton **364**, a "menu" pushbutton **366** and a "review" pushbutton **368** which are used when grouping and categorizing images. User controls **303** further include the zoom lens control rocker switch **311**, the shutter button **309**, and the mode dial **370**, which sets various camera capture modes, such as auto mode, sports mode, night mode, landscape mode, close-up mode, and video capture mode. In alternative embodiments, many different types of user controls can be used.

[**0052**] As will be described later with reference to **FIG. 3A**, when the user presses the "review" button **368** (see **FIG. 4**), the last captured image is displayed on the color image display **332**. The user can display other images by pressing the left and right arrows of joystick controller **360**. The user can press the "favorite" button **364** to tag the displayed image as a favorite image. The user can press the "group" button **362** to indicate the beginning of a new group of images.

[**0053**] As shown in **FIG. 2**, an interface **342** can be used to connect between the host interface **322** in the digital camera **300** and the dock **350**, which connects to the home computer **10**. The interface **342** may conform to, for example, the well-know USB interface specification. Alternatively, the interface between the digital camera **300** and the home computer **10** can be a wireless interface, such as the well-known Bluetooth wireless interface or the well-know 802.1 lb wireless interface. The interface **342** can be used to download images from removable memory card **330** to the home computer **10**, instead of using card reader **24** (**FIG. 1**). The interface **342** can also be used to transfer data from the home computer **10** to the firmware memory **328** in the digital camera **300**. In particular, it can be used to transfer a user name and e-mail addresses from the home computer **10** to the firmware memory **328**, as described in commonly-assigned U.S. patent application Ser. No. 08/977,382, filed Oct. 18, 2002, the disclosure of which is herein incorporated by reference.

[**0054**] **FIG. 5** depicts an exemplary directory structure recorded on the removable memory card **330** by the digital camera **300**. The Exif image files, containing the JPEG compressed main image, thumbnail image, and the image metadata, are stored on the removable memory card **330** using a directory structure conforming to the so-called "DCF" rules defined in "Design Rule For Camera File System" version 1.0, December 1998 by the Japan Electronics Industries Development Association (JEIDA), Tokyo, Japan. Two directories are recorded under a root directory **400**. The first is a MISC directory **410** containing a control file **412** named AUTPRINT.MRK, a control file **414** named AUTXFER.MRK, and a control file **416** named FAVGROUP.MRK. Control files **412** and **414** are DPOF files which specify images to be printed and emailed, as described in commonly-assigned U.S. patent application Ser. No. 10/081,255, filed Feb. 22, 2002, entitled "Image Application Software Providing A List Of User Selectable Tasks" to Herbert, the disclosure of which is herein incorporated by reference.

[**0055**] The second directory recorded under root directory **400** is DCIM directory **420**, which contains a subdirectory **430**. The subdirectory **430** is named 100K4330, to conform to the DCF rules, and contains eleven JPEG compressed Exif image files, file **432** named **100_1686**.JPG, file **434** named **100_1687**.JPG, file **436** named **100_1688**.JPG, file **438** named **100_1689**.JPG, file **440** named **100_1690**.JPG, file **442** named **100_1691**.JPG, file **444** named **100_1692**.JPG, file **446** named **100_1693**.JPG, file **448** named **100_1694**.JPG, file **450** named **100_1695**.JPG, and file **452** named **100_1696**.JPG. Files **432** through **452** are Exif image files captured by the digital camera **300**.

[**0056**] **FIG. 6** is an example of the contents of FAVGROUP.MRK file **416**. The file includes a header section (lines **1-4**) having a header identifier ("HDR" in line **1**), which identifies the make and model of the digital camera that created the file (Kodak DX4330 zoom digital camera in line **2**), the serial number of the camera (GEN SRN= 00100245 in line **3**) and the time that the file was created (line **4**). The file also includes six "JOB" sections, each of which designates either an image which is the first sequential image of a "group" of images, or a "favorite" image.

[**0057**] Lines **5** through **8** define a group job. The group job is identified as the first group job (GRP PID=001 in line **6**). The next two lines indicate that the Exif format image (line **7**), which is named **100_1686**.JPG (image file **432** in **FIG. 5**) within subdirectory 100K4330 within directory DCIM (as indicated by line **8**), is the first image of a first group of images.

[**0058**] Similarly, lines **9** through **12** define another group job. The group job is identified as the second group job (GRP PID=002 in line **10**). The next two lines indicate that the Exif format image (line **11**), which is named **100_1689**.JPG (image file **438** in **FIG. 5**) within subdirectory 100K4330 within directory DCIM (as indicated by line **12**), is the first image of a second group of images. Therefore, all of the images since the last group job are included in the previous group. In other words, image files **432** through **436** in **FIG. 5** are included in the first group, and image file **438** is the first image of the second group.

[**0059**] Likewise, lines **13** through **16** define another group job. The group job is identified as the third group job (GRP PID=003 in line **14**). The next two lines indicate that the Exif format image (line **15**), which is named **100_1693**.JPG (image file **446** in **FIG. 5**) within subdirectory 100K4330 within directory DCIM (as indicated by line **16**), is the first image of the third group of images.

[**0060**] Thus, the three group jobs in lines **5** through **16** indicate that image files **432** through **436** in **FIG. 5** form a first group of images, image files **438** through **444** form a second group of images, and image files **446** through **452**, which is the last image, form a third group of images.

[**0061**] Lines **17** through **20** define a favorite image. The image is identified as the first favorite image (FAV PID=001 in line **18**). The next two lines indicate that the Exif format image (line **19**), which is named **100_1687**.JPG (image file **434** in **FIG. 5**) within subdirectory 100K4330 within directory DCIM (as indicated by line **20**), is the favorite image.

[**0062**] Lines **21** through **24** define another favorite image. The image is identified as the second favorite image (FAV PID=002 in line **22**). The next two lines indicate that the Exif format image (line **23**), which is named **100_1691**.JPG

(image file **442** in **FIG. 5**) within subdirectory 100K4330 within directory DCIM (as indicated by line **24**), is the favorite image.

[**0063**] Lines **25** through **28** define another favorite image. The image is identified as the third favorite image (FAV PID=001 in line **26**). The next two lines indicate that the Exif format image (line **27**), which is named **100_1695**.JPG (image file **450** in **FIG. 5**) within subdirectory 100K4330 within directory DCIM (as indicated by line **28**), is the favorite image.

[**0064**] It will be understood by those skilled in the art that the FAVGROUP.MRK file **416** in **FIG. 5** could have used alternative ways of indicating which images belong to different groups. For example, all of the images in a particular group could be listed, or the first and last images of a group could be listed.

[**0065**] In alternative embodiments, the data indicating favorite images and groups of images can be added within each image file, so that a separate control file is not necessary. In other alternative embodiments, the data identifying groups of images can be provided by storing each group of images within a separate subdirectory according to the DCF rules. In such embodiments, only the first group of images is stored in subdirectory **430**, named "100K4330" in **FIG. 5**, and the other groups of images are stored in other subdirectories (not shown) named "101K4330" for the second group, "102K4300" for the third group, and the like.

[**0066**] **FIG. 3A and 3B**, taken together, depict a flow diagram showing a first embodiment of a method in accordance with the present invention for grouping images, identifying favorite images, and organizing the images, implemented using the system described earlier in relation to **FIG. 1** and **FIG. 2**.

[**0067**] In block **100** of **FIG. 3A**, the user installs the software on the home computer **10**. The installation creates a local database structure on the hard drive **20** of the home computer **10**, as will be described later with reference to **FIG. 8**. This local database will later be populated with data which groups and classifies the images which are captured by the digital camera **300** and transferred to the home computer **10**.

[**0068**] In some embodiments of the present invention, the software on the home computer **10** can be used to customize on or more components of the firmware stored in the firmware memory **328** of the digital cameras **300**, as described in commonly-assigned U.S. patent application Ser. No. 09/549,356, filed Apr. 14, 2000, entitled "CUSTOMIZING A DIGITAL CAMERA" to Prabhu et. al., the disclosure of which is herein incorporated by reference.

[**0069**] In a preferred embodiment, when the software is initially installed on the home computer **10**, the user is prompted to answer a number of questions in order to produce a personalized database of metadata "labels", as described in commonly-assigned U.S. patent application Ser. No. 09/721,222, filed Nov. 22, 2000, entitled "Method For Adding Personalized Metadata To A Collection Of Digital Images" to Parulski et. al., the disclosure of which is herein incorporated by reference.

[**0070**] In a preferred embodiment, the software also enables the user to create an e-mail address book on the home computer **10** and to transfer the e-mail addresses to the digital camera **300**, as described in commonly-assigned U.S. patent application Ser. No. 10/081,255, filed Feb. 22, 2002, entitled "Image Application Software Providing A List Of User Selectable Tasks" to Herbert, the disclosure of which is herein incorporated by reference.

[**0071**] In block **102** of **FIG. 3A**, a group of digital images, which can be one or more images, is captured using the digital camera **300** and stored as digital image files on the removable memory card **330**, as was described earlier with reference to **FIG. 2**. The images are stored using the directory structure shown in **FIG. 5**. For example, when the user depresses the shutter button **309** (see **FIG.4**), a first digital image is captured and stored as an image file, such as image file **432** in **FIG. 5**. This first image file is the first image in a new group of images. Therefore, the image processor **320** in the digital camera **300** creates an initial FAVGROUP.MRK file (**416** in **FIG. 5**) containing a single group job that indicates that this first image file **432**, named **100_1686**.JPG, is the first image of a new group of images. This can be done by writing lines **1** through **8** of the FAVGROUP.MRK control file shown in **FIG. 6**. The user continues to capture additional images in the first group, corresponding to image files **434** through **436** in **FIG. 5**.

[**0072**] In block **104**, the user decides whether or not to capture another group of images. This next group can be of a different subject (e.g., a different person) than the first group or a different event, or can be taken for a different purpose. If yes to block **104**, in block **106** the user presses the "group" button **362** on the digital camera **300** (see **FIG. 4**) to indicate that next images to be captured should be organized into a second group. Providing a single button, or a similar easy to operate user control, enables the camera user to quickly and easily organize images into different groups while taking pictures with the digital camera **300**. These groups of images can later be assigned labels when they are transferred to the home computer **10**.

[**0073**] In block **108**, the image processor **320** in the digital camera **300** updates the initial FAVGROUP.MRK control file (**416** in **FIG. 5**) to identify a second group of images. This is done after the user presses the shutter button **309** (see **FIG. 4**) to capture and store the next digital image (e.g., image file **438** in **FIG. 5**), by appending a second group job indicating that this image is the first image of a second group of image files. In this example, this is done by writing lines **9** through **12** of the FAVGROUP.MRK file shown in **FIG. 6**. In block **110**, the user continues to capture additional images in the second group, corresponding to image files **440** through **444** in **FIG. 6**.

[**0074**] Returning to block **104**, the user again decides whether to capture another group of images. If yes to block **104**, block **106** through **110** are repeated, for example, to capture and store image files **446** through **452** in **FIG. 5** and to create the third group job indicated by lines **13** through **16** of the FAVGROUP.MRK file shown in **FIG. 6**.

[**0075**] In an alternative embodiment, the digital camera **300** includes a microphone, and the user records a single audio annotation for the group of images as the user presses and holds the "group" button **362** (see **FIG. 4**). This audio annotation is stored as a separate audio file, such as a wave file, on the removable memory card **330**. The audio annotation could describe the subject of the group of photos, or

other information common to the group of photos. The FAVGROUP.MRK control file could include the name of this separate audio file created for each group.

[0076] If in block **104** the user decides not to capture additional groups of images (no to block **104**), in block **112** the user can review captured images on the color image display **332** of the digital camera **300**. The review mode is initiated when the user presses the review button **368** (see **FIG. 4**). The last captured image file (e.g., file **452** in **FIG. 5**) is displayed. The user can navigate to review other image files (e.g., files **432** through **450**) using the joystick controller **360**. The images are initially displayed as shown in **FIG. 7A**, which shows the GUI screen **500**A which is displayed on the color LCD display **332** of the digital camera **300** (see **FIG. 2**). The GUI screen **500**A shows the image from the image file along with a display area **502**A that indicates the group (e.g., Group **1**) and a display window **504**A that gives the image file number (e.g., number **1687**).

[0077] In block **114** of **FIG. 3A**, the user identifies one or more images as "favorite" images. The user accomplishes this by pressing the "favorite" button **364** (see **FIG. 4**) while the favorite image is displayed. In block **115**, after the user presses the "favorite" button **364**, the image processor **320** in the digital camera **300** updates the GUI screen displayed on the color LCD display **332** to be as shown in **FIG. 7B**. The GUI screen **500**B in **FIG. 7B** includes a "favorite" indicator **506**B, for example, the heart shaped icon shown in **FIG. 7B**. In block **116**, the image processor **320** in the digital camera **300** updates the FAVGROUP.MRK control file shown in **FIG. 6** to indicate that the image has been identified as a favorite image. For example, lines **17-20** are appended to the file to indicate that image file **434** in **FIG. 5** named **100_1687**.JPG is a favorite image. The user can identify additional favorite images in blocks **112-116** of **FIG. 3A**, such as image files **442** and **450**, which are identified in lines **21** through **28** in **FIG. 6**.

[0078] In an alternative embodiment, the digital camera **300** includes a user interface which enables the user to identify images as being an "Extra Favorite" image, a "Favorite" image, a "Normal" image, or a "Dislike" image, and to change the classification of a previously classified image. In this case, an appropriate icon is used to indicate the image classification. In another alternative embodiment, the digital camera **300** includes a slide show mode which automatically cycles to sequentially display only images classified as "favorite" or "extra favorite".

[0079] In block **119**, the user can optionally select image for printing and e-mailing, as described in commonly-assigned U.S. patent application Ser. No. 10/081,255, filed Feb. 22, 2002, entitled "Image Application Software Providing A List Of User Selectable Tasks" to Herbert, the disclosure of which is herein incorporated by reference.

[0080] In block **120**, the user connects the digital camera **300** to the dock **350**, which is connected to the home computer **10** via an interface such as USB, and presses a "transfer" button (not shown) to initiate the image transfer. This transfer takes place using the commands defined in the industry standard PIMA 15740:2000 entitled "Photography—Electronic still picture imaging—Picture transfer protocol (PTP) for digital still photography devices", which is available from the International Imaging Industries Association (**13**A) in Harrison, N.Y. Alternatively, the user can remove the removable memory card **330** from the digital camera **300** and place the removable memory card **330** in the card reader **24**.

[0081] In block **122**, the home computer **10** reads the control files **412-416** and transfers the image files **432-452** (see **FIG. 5**) to the hard drive **20** of the home computer **10**. The image files are stored in a default directory, such as in a "my collection" directory, or in a directory selected by the user when the software was installed in block **100**. In block **124**, an object is created for each transferred image, and the favorite and group properties of each object are set to correspond to the information read from the control file in block **122**. In block **126** shown in **FIG. 3B**, the object created for each transferred image is committed to the local database stored on the hard drive **20** of the home computer **10**. It will be understood that while in a preferred embodiment, the local database stores objects in an object oriented database management system (OODBMS). In alternative embodiments, the local database can use many different types of more primitive data structures, including arrays, tables, lists, registries, and the like, to store the data identifying favorite images and groups of images.

[0082] **FIG. 8** depicts information included in the local database stored on the hard drive **20**. The database includes a general assets table **600** that includes an image data object **632-652** for each transferred image. In particular, there are **11** data objects which correspond to the **11** image files **432-452**, named **100_1686** through **100_1696** shown in **FIG. 5**.

[0083] Each image data object, for example "object **11** (**100_1696**) **652**, which corresponds to the image file **452** named **100_1696** in **FIG. 5**, includes the table of data fields **610**. Each row **660-692** of the table **610** includes a particular type of metadata describing the image. The metadata in the database is preferably stored using XML. Each row of the table **610** includes a field **612** in the first column which names the metadata item (e.g., capdate for image capture date), a type **614** in the second column which indicates the type of data (e.g., string for character string), and an "expose" value **616** in the third column which indicates **20** whether this particular metadata is exposed to the user of the software application.

[0084] The "capdate" metadata in row **660** provides the date/time that the image was captured using the digital camera **300**. The "image caption" metadata in row **662** provides user entered caption. This metadata is null until the caption is optionally entered by the user using the keyboard **16** (see **FIG. 1**). The "clgdate" metadata in row **664** provides the date/time that the image was cataloged, in other words, the date/time that the object was committed to the database in block **126** of **FIG. 3B**. The "favlevel" metadata in row **666** indicates whether or not the image was selected as a favorite in block **114** of **FIG. 3A**. As described earlier, images are classified using a scale ranging between −10 and +10. If the image was not selected as a favorite in block **114**, it is given a value of 0, and if it was selected as a favorite, it is given a value of +7. The other values can be used to enable images to later be reclassified as "more favorite" or "less favorite".

[0085] The "filesize" metadata in row **668** and "format" metadata in row **670** of **FIG. 8** indicate the size and type of image file (e.g., JPEG, TIFF, etc.). The "group number"

metadata in row **672** gives the number of the group of images (e.g. 1, 2, 3, etc.) that this particular image is part of. The group job information in the FAVGROUP.MRK file **416** is used to determine the group number. The "group name" metadata in row **672** gives an optional name for the group, as will be discussed later with reference to block **156**.

[**0086**] The "imgheight" and "imgwidth" metadata in rows **676-678** give the size of the image stored in the image file, and the "imagepath" metadata in row **680** provides the pathname to the image file which was stored on hard drive **20** when the images were transferred as part of block **122** of **FIG. 3A**. The "moddate" metadata in row **682** indicates the date/time that the image last modified, or the date that the image was captured, if it has never been modified. The "imagename"metadata in row **684** indicates the name of the image file (e.g. **100_1696** for image data object **652**). The "protected" metadata in row **686** indicates whether or not this image file has been protected by the user via the operating system.

[**0087**] The "thmheight" and "thmwidth" metadata in rows **688-690** give the size of the thumbnail image (e.g., 160×120 pixels) and the "thmnail" metadata in row **692** is a data blob which holds a copy of the compressed thumbnail image that was stored by the digital camera **300** in each Exif image file. Providing a copy of each thumbnail image in the general assets table **600** of **FIG. 8** allows all of the thumbnails to be quickly retrieved from the hard drive **20** for display on the display monitor **14** (see **FIG. 1**).

[**0088**] In block **128** of **FIG. 3**, the user selects a display mode, and the appropriate transferred images are displayed. The user can select a display of "all images", a display of "all favorite" images, or a display of a "selected group" of images. If the user selects the "display all" option, in block **130** the CPU motherboard **12** in the home computer **10** builds a request to retrieve all of the thumbnail images from the general assets table **600** in **FIG. 8**. In block **132** all of the image objects are retrieved, which includes the "favlevel" favorites level metadata **666**. In block **134** all of the images are displayed in a way that organizes them into groups, with icons indicating the favorite images in the collection of images.

[**0089**] **FIG. 9A** depicts an example of a computer user interface screen for displaying all of the transferred images. A GUI screen **800**A includes an area **820** for displaying the thumbnail images provided using the "thmnail" metadata **692** of each object in the general assets table **600** in **FIG. 8**. By moving a selector **842** within a display selection area **840**, the user can select a display of "All Images", a display of "All Favorites", or a display of a "Group" of images selected using a group number/name box **843**". In the example of **FIG. 9A**, the "All Images" display mode is selected.

[**0090**] The GUI screen **800**A also includes a display format selection area **810**, which provides three types of display formats. A "Thumbnails" display icon **814** displays an array of thumbnails in the image display area **820**, as shown in the example of **FIG. 9**. Alternatively, a "Single" display icon **812** can be selected by the user in order to display a single image at a time in the image display area **820**, or a "Details" display icon **816** can be selected by the user in order to display thumbnails and other information (including the capture date /time metadata indicating when the picture was taken, group number/name, and the like) in the image display area **820**. Since the "Thumbnails" display mode has been selected the example shown in **FIG.9A**, a group of thumbnail images **822**A -**822**K are displayed in the image display area **820**. A slider **825** is used for scrolling through the collection of thumbnail images. Beneath each thumbnail image **822**A-**822**K is the image name, provided using the "imagename" metadata **684** in **FIG. 8**.

[**0091**] Adjacent the top left of each thumbnail image **822**A-**822**K is a text box indicating the group to which the image belongs (e.g., group **12** for image **100_1696**). The group number is provided by the "group number" metadata **672** in **FIG. 8**. This number is incremented for each group of images identified in a FAVGROUP.MRK file **416**. Thus, the group containing the image named **100_1696** was the 12th group created by the digital camera **300** and transferred to the home computer **10**.

[**0092**] Adjacent the top right of thumbnail images **822**B, **822**G, and **822**J is an icon including an object indicating a favorite image, since these particular images have been identified as favorites by the user in block **114** of **FIG. 3** and therefore have a "favlevel" metadata **666** value of +7. In the example shown in **FIG. 9A**, the object in the icon which is used to identify thumbnail images **822**B, **822**G, and **822**J as favorite images is a heart. It would be understood to those skilled in the art that a different object, such as a smiley face, a checkmark, or a star, could be used to identify an image as a favorite image. As will be described later, a most favorite image can be indicated with an icon having multiple copies of the same object, for example, two hearts or two stars. Alternatively, the object could be larger for an extra favorite image, or could be bolded or represented in a different color.

[**0093**] The GUI screen **800**A also includes a "Slide Show" icon **830** for initiating a slide show of the images displayed in the image display window **820**. One or more images can be labeled with one or more key words using a "Label" icon **832**. The keywords can indicate the event or subject of the picture, for example. Selected images can be rotated by selecting a "Rotate" icon **834** or edited (e.g., by cropping, removing red-eye, changing the brightness, etc.) by selecting an "Open/Edit" icon **836**. Information contained in a selected Exif image file (such as the date/time, camera settings and the like), as well as the keywords, can be viewed by selecting a "Properties" icon **838**.

[**0094**] The GUI screen **800**A also includes sort options that are selected using a sort items text box **844** and a pull-down arrow icon **846** to select a desired sort option from a list, including sort by date, caption, or keyword. A reverse order checkbox **848** is used to reverse the display of the thumbnail images.

[**0095**] The GUI screen **800**A also includes tabs **802-810** for selecting other GUI screens. Tab **802** selects the "My Collection" (current) GUI screen, tab **804** selects a "Print at Home" GUI screen, tab **805** selects the "Order Prints Online" GUI screen, tab **806** selects the "Email" GUI screen, and tab **801** selects the "Album Pages" GUI screen.

[**0096**] In block **136** of **FIG. 3B**, the user optionally changes which images are favorites. This is done by using a favorites level selection area **860** shown in **FIG. 9A**. The user first selects one of the thumbnail images (e.g., thumbnail image **822**B), and the favorites level selection area **860**

then displays the current favorites level. If the user has not previously modified the level, the images are either "Normal" or "Favorite". Using the selector **862**, the user can change the level of the selected image to be an "Extra Favorite", a "Favorite", a "Normal" image, or a "Dislike" image.

[**0097**] In block **138** of **FIG. 3B**, the favorites metadata is updated in the general assets table **600** to be +10 if the image has been set to be an "Extra Favorite", +7 if the image has been set to be a "Favorite", 0 if the image has been set to "Normal", and −7 if the image has been set to be "Dislike". The icon displayed next to each thumbnail image is also updated to reflect the level selected by the user. For example, if an "Extra Favorite" level has been selected, a double heart icon is displayed, if a "Favorite" level has been selected, a single heart icon is displayed, if a "Normal" level has been selected, no icon is displayed, and if a "Dislike" icon has been selected, a crossed out heart icon is displayed.

[**0098**] If in block **128** the user selects the "Display Favorites" option, for example, by selecting the "All Favorites" option using selection window **840** in **FIG. 9A**, in block **140** the CPU motherboard **12** in the home computer **10** builds a request to retrieve only those thumbnail images which correspond to favorite and extra favorite images from the general assets table **600** in **FIG. 8**. In block **142**, all of the image objects classified as favorites are retrieved. In block **144**, all of the favorite image thumbnails are displayed, with icons indicating the favorite level.

[**0099**] **FIG. 9B** depicts an example of a computer user interface screen for displaying all of the favorite images. A GUI screen **800**B displays in area **820** the thumbnail images **822**B, **822**G and **822**J that correspond to favorite images.

[**0100**] In block **146** of **FIG. 3**, the user optionally resets images that are no longer considered favorites. This is accomplished using the favorites level selection area **860**. The user first selects one of the thumbnail images (e.g., thumbnail image **822**B), and the favorites level selection area **860** then displays the current favorites level. If the user has not previously modified the level, the images are either "Normal" or "Favorite". Using the selector **862**, the user can change the level of the selected image to be an "Extra Favorite", a "Favorite", a "Normal" image, or a "Dislike" image.

[**0101**] In block **148**, the favorites metadata is updated in the general assets table **600**, and the icon displayed next to each thumbnail image is also updated, as was described earlier in relation to block **138**.

[**0102**] If in block **128** the user selects the "Display Selected Group" option, for example by selecting the "Group" option using selection window **840** in **FIG. 9B**, in block **150** the CPU motherboard **12** in the home computer **10** builds a request to retrieve only those thumbnail images which correspond to the selected group (e.g., group number **11**) from the general assets table **600** in **FIG. 8**. In block **152**, all of the image objects belonging to the selected group are retrieved, along with the metadata indicating the favorites level. In block **154**, all of the image thumbnails in the group are displayed, with icons indicating the favorite level.

[**0103**] **FIG. 9C** depicts an example of a computer user interface screen for displaying all of the favorite images. A GUI screen **800**C displays in area **820** the thumbnail images **822**E, **822**F, **822**G and **822**H that belong to the selected group.

[**0104**] In block **156** of **FIG. 3**, the user optionally sets or changes the name of the group. This is done using naming window **880**, by typing in an appropriate name (e.g., "ANIMALS") in the underline area. The user can also change the favorites level of one or more images as was described earlier in relation to block **136**. In block **148**, the favlevel metadata **666** and group name metadata **674** are updated in the general assets table **600**, and the favorites level icon displayed next to each thumbnail image is also updated, as was described earlier in relation to block **138**.

[**0105**] In block **160**, the user optionally selects local or network printing, by selecting the "Print at Home" icon **804** or the "Order Prints Online" icon **805** shown in **FIG. 9C**. If network printing is selected, the displayed images are uploaded to the photo service provider **40** over the channel **36** (see **FIG. 1**). This uploading can use the methods described in commonly-assigned U.S. patent application Ser. No. 09/691,364, filed Oct. 18, 2000, entitled "Effective Transfer Of Images From A User To A Service Provider" to Berarducci et. al., the disclosure of which is incorporated herein by reference.

[**0106**] In block **162**, the displayed images are printed either as normal prints, or alternatively, as album pages, if the "Album Pages" icon **808** shown in **FIG. 9C** is selected. If album pages are selected, in block **162** either the CPU motherboard **12** (for local printing) or the production controller **52** (for on-line printing) automatically creates album pages from the selected images. In a preferred embodiment of the present invention, the images are automatically organized into album pages corresponding to the grouping information. In addition, favorite images are used as emphasis images, as described in commonly-assigned U.S. patent application Ser. No. 09/559,478, filed Apr. 27, 2000 by Simon, the disclosure of which is incorporated herein by reference. As described in the Simon et al. patent, the emphasis image is located in the center of the page and is larger than other images on the page. The emphasis image can also be surrounded by a border or other background designed to draw attention to the emphasis image. The album pages can be produced using the methods described in commonly-assigned U.S. Pat. No. 6,004,061 to Manico et al., the disclosure of which is herein incorporated by reference.

[**0107**] Referring to **FIG. 10**, there is shown an example of an album page **890**. Four images **894**, **895**, **896**, and **897** are formatted and put on the album page **890** by the home computer **10**, or by the fulfillment system **50** (see **FIG. 1**). When the system automatically creates the album page **890**, the favorite images are featured. This is accomplished by positioning the most favorite image **894**, corresponding to thumbnail image **822**G in **FIG. 9C**, in the center of the album page **890**. This is also accomplished by formatting the favorite image **894** so that it is larger in size than the other images on the album page **890**. This is further accomplished by providing a background frame that draws attention to the favorite images. The most favorite image(s) are automatically selected from the set of displayed images based on the "favlevel" metadata **666**. The album page **890** is automatically labeled with the title **892** that the user entered in the

naming window **880** (e.g., "ANIMALS" shown in **FIG. 9C**). While not shown in **FIG. 10**, the album page **890** can also include a page number, captions, a creative background, and holes for placing the album page **890** into an album binder.

[**0108**] **FIGS. 11A and 11B**, taken together, depict a flow diagram showing a second embodiment of a method for grouping images, identifying favorite images, and organizing the images in accordance with the present invention. In the method of **FIG. 11**, the grouping and classification data is used to create "electronic job pages", where each group of images corresponds to one "job", such as an item offered for sale electronically. By grouping the images on the digital camera **300** as they are captured, the process of later creating the "electronic job pages" on a computer is greatly simplified, since the images are already organized into the appropriate job groups.

[**0109**] In block **1000** of **FIG. 11A**, the user installs and configures the software on the home computer **10**, as was described earlier in relation to block **100** of **FIG. 3**. The installation creates a local database structure on the hard drive **20** of the home computer **10**. This local database will later be populated with data that groups and classifies the images which are captured by the digital camera **300** and transferred to the home computer **10**.

[**0110**] In some embodiments, the software on the home computer **10** is used to customize the digital camera **300** by storing firmware in the firmware memory **328** that enables a special on-line sales mode, such as an "eBay" mode, which is used to simplify the process of producing electronic job pages, where such pages may, for example, feature (e.g., depict and describe) items offered for sale electronically. The firmware can be added as described in commonly-assigned U.S. patent application Ser. No. 09/549,356, filed Apr. 14, 2000, entitled "Customizing A Digital Camera" to Prabhu et. al., the disclosure of which is herein incorporated by reference. Alternatively, the digital camera **300** can be sold with the "eBay" mode firmware already installed.

[**0111**] In block **1001**, the user of the digital camera **300** selects the eBay mode on the digital camera **300**. This is preferably done by selecting, from a menu displayed on the color image display **332** (see **FIG. 2**), the eBay mode using the joystick controller **360** (see **FIG. 4**). When this mode is selected, the eBay mode firmware stored in firmware memory **328** enables the digital camera **300** to operate most effectively when capturing and organizing images for electronic job pages, by modifying the operations which are performed when the "favorite" button **364** or the "group" button **362** are pressed, as will be described later.

[**0112**] In addition, the firmware can set the camera resolution level to a smaller image size (e.g., the 0.4 MP "web quality" setting), thus producing a smaller image file which is more appropriate for images that are intended to be uploaded and displayed on the Internet. Furthermore, in some embodiments, the firmware can provide, in the on-line sales mode, a lower contrast tone reproduction curve than is used in the normal mode. The lower contrast tone reproduction curve can modify the normal tone reproduction of the digital camera **300** in order to reduce the contrast of the images, and in order to increase the brightness of shadow areas of the image, to allow the details of the object being photographed to be more easily discerned.

[**0113**] In block **1002**, a group of digital images, which can be one or more images, is captured using the digital camera **300** and stored as digital image files on the removable memory card **330**, as was described earlier with reference to **FIG. 2**. The images are stored using the directory structure shown in **FIG. 5**. For example, when the user depresses the shutter button **309** (see **FIG. 4**) a first digital image is captured and stored as an image file, such as image file **432** in **FIG. 5**. This first image file is the first image which can be used in a new electronic job page. Therefore, the image processor **320** in the digital camera **300** creates an initial FAVGROUP.MRK file (**416** in **FIG. 5**) containing a single group job that indicates that this first image file **432**, named **100_1686**.JPG, is the first image of a new group of images. This can be done by writing lines **1** through **8** of the FAVGROUP.MRK control file shown in **FIG. 12**. The format of the FAVGROUP.MRK file in **FIG. 12** is similar to the format of **FIG. 6**, except that "EBY PID" parameter (lines **6**, **14**, **22** in **FIG. 12**) is used to indicate that the groups of images correspond to different electronic job pages.

[**0114**] The user continues to capture additional images for the first eBay electronic job page, corresponding to image files **434** through **436** in **FIG. 5**. At any time, the user can press the "favorite" button **364** (**FIG. 4**) to indicate that the picture that has just been captured, is a "favorite" image that should be featured on the electronic job page. For example, the user can select image file **434** (see **FIG. 5**) as a favorite image, and the processor **320** in the digital camera **300** in response writes lines **9-12** in **FIG. 12**. In the eBay mode, there is only one favorite per electronic job page, so if the user presses the favorite button again after capturing a subsequent image, this subsequent image becomes the favorite image, and the first image is automatically deselected as a favorite. This is done by modifying the image source indicated by the "IMG SRC" parameter in line **12** of **FIG. 12** to provide the pathname to the newly selected favorite image, instead of the original favorite image.

[**0115**] In block **1004**, the user decides whether or not to capture another group of images. This next group would be used to create a second eBay electronic job page, corresponding to a second item offered for sale. If yes to block **104**, in block **1006** the user presses the "group" button **362** on the digital camera **300** (see **FIG. 4**) to indicate that next images to be captured should be used to produce a second electronic job page. Providing a single button, or a similar easy to operate user control, enables the camera user to quickly and easily organize images into different groups corresponding to different items offered for sale, while taking pictures with the digital camera **300**. These groups of images can later be automatically organized in electronic job pages after they are transferred to the home computer **10**.

[**0116**] In block **1008**, the image processor **320** in the digital camera **300** updates the initial FAVGROUP.MRK control file (**416** in **FIG. 5**) to identify the images corresponding to a second electronic job page. This is done after the user presses the shutter button **309** (see **FIG. 4**) to capture and store the next digital image (e.g., image file **438** in **FIG. 5**), by appending another JOB including the EBY_PID parameter, indicating that this image is the first image of a second electronic job page. In this example, this is done by writing lines **13** through **16** of the FAVGROUP-.MRK file shown in **FIG. 12**. In block **1010**, the user continues to capture additional images in the second group,

corresponding to image files **440** through **444** in **FIG. 6**, and optionally designates one of the images as a favorite image.

[**0117**] Returning to block **1004**, the user again decides whether to capture another group of images. If yes to block **1004**, block **1006** through **1010** are repeated, for example, to capture and store image files **446** through **452** in **FIG. 5** and to create the third electronic job page image group indicated by lines **21** through **24** of the FAVGROUP.MRK file shown in **FIG. 12**.

[**0118**] In an alternative embodiment, the digital camera **300** includes a microphone (not shown), and the user records a single audio annotation for the group of images as the user presses and holds the "group" button **362**. This audio annotation is stored as a separate audio file, such as a wave file, on the removable memory card **330**. The audio annotation could describe the subject of the group of photos, or other information common to the group of photos. The FAVGROUP.MRK control file could include the name of this separate audio file created for each group.

[**0119**] If in block **1004** the user decides not to capture additional groups of images (no to block **1004**), in block **1012** the user optionally reviews captured images on the color image display **332** of the digital camera **300**. The review mode is initiated when the user presses the review button **368** (see **FIG. 4**). The last captured image file (e.g., file **452** in **FIG. 5**) is displayed. The user can navigate to review other image files (e.g., files **432** through **450**) using the joystick controller **360**.

[**0120**] In block **1014**, an electronic job page (e.g. eBay group) identifier is displayed near the displayed image. If the current image is the favorite image for that particular eBay group, a favorite icon is also displayed.

[**0121**] In block **1016**, the user can modify the "favorite" images by selecting a different image as the "favorite" for that eBay group. The user accomplishes this by pressing the "favorite" button **364** (see **FIG. 4**) while the new favorite image is displayed. In block **1018**, after the user presses the "favorite" button **364**, the image processor **320** in the digital camera **300** updates the FAVGROUP.MRK file shown in **FIG. 12** to identify the newly selected favorite images (rather than the original favorite images) in lines **12**, **20**, and/or **28**.

[**0122**] In block **1020**, the user connects the digital camera **300** to the dock **350**, which is connected to the home computer **10** via an interface such as USB, and presses the "transfer" button (not shown) to initiate the image transfer. Alternatively, the user can remove the removable memory card **330** from the digital camera **300** and place the removable memory card **330** in the card reader **24** (see **FIG. 1**).

[**0123**] In block **1022**, the home computer **10** reads the FAVGROUP.MRK file **416** and transfers the image files **432-452** (see **FIG. 5**) to the hard drive **20** of the home computer **10**. The image files are stored in a default directory for electronic job pages, such as in a "my eBay sales" directory, or in a directory selected by the user when the software was installed in block **100** (**FIG. 3A**). In block **1024**, an object is created for each transferred image, and the favorite and electronic job page properties of each object are set to correspond to the information read from the control file in block **122**. In block **1026** of **FIG. 11B**, the object created for each transferred image is committed to the local database stored on the hard drive **20** of the home computer **10**. The information stored in general assets table **600** of the local database on hard drive **20** is similar to that described with reference to **FIG. 8**, except that the group name is automatically populated with a string identifying this as a group of images for an electronic job page, such as the text "eBay Sale".

[**0124**] In block **1028**, the CPU motherboard **12** in the home computer **10** detects that at least one "eBay" group exists in the database, for example, by detecting that the database has just been populated with at least one group name string (line **674** in **FIG. 8**) with a text string of "eBay Sale". In response, in block **1030**, the eBay order entry application is launched. In some embodiments, this can be automatically when the transfer is completed.

[**0125**] In block **1032**, a generic entry form is created for the first electronic job page. This generic form includes general seller information including, for example, the seller's address, acceptable payment options, and shipping terms, that will be used for numerous electronic job pages associated with a particular seller. This information is entered by the user using the keyboard **16** (see **FIG. 1**), who is typically the seller. In an alternative embodiment, this information is entered when the user installs the software in block **1000** (**FIG. 11A**). It is an advantage of the present invention that the general seller information need be entered only one time, instead of having to enter the information separately for each electronic job page.

[**0126**] In block **1034**, all objects associated with the first eBay group are automatically populated into the eBay form, and the images are scaled for web viewing if necessary. If the digital camera **300** was automatically set to "web quality" in block **1001**, additional image size scaling is not necessary. **FIG. 13A** depicts an example of such a form, which provides an initial electronic job page.

[**0127**] In block **1036**, if there is a "favorite" image, it is featured on an initial eBay form **1100**A. In the example of **FIG. 13A**, the initial eBay form **1100**A includes an image display area **1110** which is populated with four images that correspond to one of the eBay groups (e.g., the 3rd eBay group including image files **446-452** in **FIG. 5**). The image that was identified as the "favorite" for that eBay group (e.g., image file **450**) is displayed as a larger image **1112**. The others are displayed as smaller images **1121-1123**. The "favorite" image is also displayed as an index image **1114** near the top of the initial eBay form **1100**A.

[**0128**] The initial eBay form **1100**A also includes a partially completed information window **1140**A, which displays the information entered by the user during block **1032** of **FIG. 11B**. Examples of this information include the seller's email address, location, and country, and the acceptable payment methods and shipping terms. Some of the information is not yet filled out however, such as the minimum bid, or the starting or ending date of the sale. The initial eBay form **1100**A also includes a blank sale item name area **1442**A and a blank description area **1130**.

[**0129**] In block **1038**, the user is prompted to fill in the remaining information on the eBay form **1100**A. The result is the final eBay form **1100**B depicted in **FIG. 13B**. The remaining information is specific to the item offered for sale, and includes the sale item name **1142**B, the description **1130** of the item, and the minimum bid and starting/ending date entered in window **1140**B.

[0130] In block **1039**, the user optionally changes the favorite image, for example, by dragging and dropping one of the small images **1121**, **1122**, or **1123** into the area which displays the larger favorite image **1112**. In response, the selected smaller image now becomes the favorite image, and is displayed as the larger image **1112** (and as index image **1114**) while the initial favorite image is displayed as a smaller image.

[0131] In block **1040**, the final eBay form **1100**B is stored on the hard drive **20** of the home computer **10**, and the database (e.g., the general assets table **600**) is updated to indicate that an electronic job page has been created using the first eBay group.

[0132] In block **1042**, the database is checked to determine if there is another eBay group that has not yet been entered into an eBay form. If yes to block **1042**, in block **1044** a copy of the generic entry form is created for the next eBay group, and blocks **1034** through **1042** are repeated.

[0133] If another eBay group does not exist (no to block **1042**), in block **1046** all of the final eBay forms are sent to eBay and registered as new auctions. This can be accomplished by the host computer **10** communicating with the electronic auction provider **80** (e.g., eBay) via the Internet Service Provider **30** and the channel **36**, as shown in **FIG. 1**. This communication includes transferring the images used in each form from the hard drive **20** to the electronic auction provider **80**. In response, the electronic auction provider **80** returns an auction identifier for each entry form. The auction identifier can be a serial number assigned to the each electronic job form by the electronic auction provider **80**.

[0134] In block **1048**, the auction identifiers are entered into the local database. In one embodiment, the auction identifiers are appended to each image used in one of the electronic job pages uploaded in block **1046**.

[0135] In block **1050**, the home computer **10** receives from the electronic auction provider **80** a notification indicating that one or more of the items has been sold.

[0136] In block **1052**, the image files and image database objects corresponding to the items that have been sold are automatically deleted from the hard drive **20** of the home computer **10**.

[0137] **FIG. 14A and 14B**, taken together, depict a flow diagram showing a third embodiment of a method for grouping images, identifying favorite images, and organizing the images in accordance with the present invention. In this embodiment, the digital camera **300** includes a modem (not shown) which transmits some or all of the captured images to a service provider, and the grouping and classification information is used to simplify the process of organizing the images stored by the service provider into albums which can be easily selected by the user or by others authorized to view the uploaded images.

[0138] In block **101**, the user installs and configures their digital camera **300** and service account so that the digital camera **300** can communicate with the service provider in way that enables the captured images to be stored in the proper service account. This can include providing a configuration file as described in commonly-assigned U.S. patent application Ser. No. 09/004,046, filed Jan. 7, 1998, entitled "Network Configuration File For Automatically Transmitting Images From An Electronic Still Camera" to Ward et. al., the disclosure of which is incorporated herein by reference. It can also include establishing a service user account which specifies user selected photo product options, such as customized album pages, as well as delivery and billing information, as described in commonly-assigned U.S. patent application Ser. No. 09/576,288, filed May 23, 2000, entitled "Method For Providing Customized Photo Products Over A Network" to Parulski, the disclosure of which is incorporated herein by reference. In a preferred embodiment, the digital camera **300** stores the service account identifier in the firmware memory **328** of the digital camera **300** (see **FIG. 3**).

[0139] Blocks **102** through **119** of **FIG. 14** are the same as the corresponding blocks in **FIG. 3A**.

[0140] In block **121** of **FIG. 14**, the captured images (e.g., image files **432-452** in **FIG. 5**) and the control files (e.g., files **412-426**) are transferred from the digital camera **300** to the service provider via the modem (not shown). The modem is preferably a wireless modem, such as a cellular phone modem or an **802.11** type modem. Alternatively, the modem can be a wired modem which connects to a telephone jack.

[0141] In block **123**, the photo service provider **40** (see **FIG. 1**) stores the image files and control files in the service provider database **44**.

[0142] In block **125**, the photo service provider **40** creates an object for each uploaded image in a database, which can be, for example, the general assets table **600** described earlier with reference to **FIG. 8**. In this case, there is a general assets table **600** for each user account. The favorite and group properties in the database are set using the information in the FAVGROUP.MRK file **416** (see **FIG. 5**) as described earlier.

[0143] In block **126** of **FIG. 14B**, the object is committed to the database as described earlier with reference to block **126** of **FIG. 3B**.

[0144] In block **170**, the images specified in the AUTPRINT.MRK print order control file **412** are printed and delivered to the address(es) provided in step **101** of **FIG. 14A**.

[0145] In block **172**, the images specified in the AUTXFER.MRK email order control file **414** are emailed to the email addresses specified in the file.

[0146] In block **174**, the user (or another person authorized by the user to view one or more of their on-line image albums) logs into their account with the service provider.

[0147] In block **178**, the photo service provider **40** retrieves the group and favorites information from the service provider database (e.g., from the user's general assets table **600**).

[0148] In block **180**, the photo service provider determines the most favorite image for each group. If there is no favorite image specified for a group, the first (or alternatively, the last) image of the group is used. If the group includes more than one favorite image, the first (or alternatively, the last) favorite image is used.

[0149] In block **182**, the photo service provider **40** provides, via the Internet server **42**, images and information to the home computer **10** which is displayed on the display monitor **14** as a computer user interface screen (GUI screen). **FIG. 15** is an illustrative example of a GUI screen **1200**. The GUI screen **1200** includes a display window **1210** which displays three images **1212**, **1214**, and **1216** representing three different electronic albums. The images **1212**, **1214**, **1216** are provided using the thumbnail image data **616** from the user's general assets table **600** (see **FIG. 8**). The particular images displayed correspond to the images identified as favorite images for each group in block **114** of **FIG. 14A**.

[0150] The GUI screen **1200** also includes a number of icons **1230-1242** that can be selected by the user. These icons include the "View all Albums" icon **1230**, which is automatically selected when the user logs on in block **176**, so that the GUI screen **1200** is automatically displayed. These icons also include an "Open album" icon **1232** that can be used to display the images within one of the albums (e.g., the images within the album corresponding to image **1212**, which is highlighted as being currently selected by the user). The icons also include a "Slide show" icon **1234** which can be used to automatically display in sequence all of the images in the selected album as a slide show, a "Share Photos" icon **1236** that can be used to enable another GUI screen (not shown) to allow images in a icon **1238** that can be used to enable another GUI screen (not shown) to allow prints of selected images to be purchased, an "Add Photos" icon **1240** that can be used to enable another GUI screen (not shown) to allow the user to upload additional images, and a "Help" icon **1242** that can be used to enable another GUI screen (not shown) to assist the user in using the services provided by the photo service provider **40**.

[0151] In block **184** of **FIG. 14B**, the user selects an album to be displayed by selecting the "favorite" image that serves to identify one of the albums (e.g., image **1212** in **FIG. 15**) and then selecting the "Open album" icon **1232**, or alternatively, by "double-clicking" on the image (e.g., double-clicking on image **1212**).

[0152] In block **186**, the thumbnails of all of the images are displayed, with the favorite(s) first, since there are likely to be of most interest to the user. **FIG. 16** is an illustrative example of a GUI screen **1300**. The GUI screen **1300** includes a display window **1310**, which displays the four images **1212**, **1222**, **1224**, and **1226** (corresponding to image files **446-452** in **FIG. 5**) which are included in the album. The images **1212**, **1222**, **1224**, and **1226** are provided using the thumbnail image data **616** from the user's general assets table **600** (see **FIG. 8**). A favorites icon **1213** is displayed near image **1212**, since this image is currently a favorite image. The user can modify the favorite selection by selecting the "Modify Favorites" icon **1252**. This brings up another GUI screen (not shown) enabling the user to modify the favorite images, similar to as was described earlier with reference to blocks **136-138** of **FIG. 3**. The user can also name the album by typing in a name in an "Album Name" area **1250**.

[0153] In block **188**, the user can select images from the album for sharing and/or printing. In block **190**, the selected images are printed and/or shared.

[0154] Alternatively, it would be understood to those skilled in the art that the images captured using the digital camera **300** can be transferred to the home computer **10** and stored on the hard drive **20**, and data identifying the first and second groups of digital images and the identified favorite images can be read from the control file **416** (see **FIG. 5**) and added to the local database described earlier with reference to **FIG. 8**. Each group of digital images is then organized as an electronic album, using the data in the local database, and is displayed on the display monitor **14**. A user then selects an electronic album by selecting the associated favorite image in a manner similar to that described earlier with reference to **FIG. 15**. The group of digital images associated with each electronic album can be viewed (for example, as a slide show or as was described with reference to **FIG. 16**), or can be shared or printed as was previously described. Prints can be made locally using printer **26** (**FIG. 1**), or the digital images to be printed can be transferred via the channel **36** to the photo service provider **40** which can provide the digital images to the fulfillment system **50** for printing using the color printer **54**.

[0155] A computer program product in accordance with the present invention can include one or more storage medium, for example; magnetic storage media such as magnetic disk (such as a floppy disk) or magnetic tape; optical storage media such as optical disk, optical tape, or machine readable bar code; solid-state electronic storage devices such as random access memory (RAM), or read-only memory (ROM); or any other physical device or media employed to store a computer program having instructions for practicing a method according to the present invention.

[0156] The invention has been described in detail with particular reference to certain preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention. For example, instead of allowing only two "favorite" levels (e.g., normal and favorite) to be selected, the user interface of the digital camera **300** could enable more levels (e.g., extra favorite, non-favorite) to be selected. In addition, in some embodiments only certain images (such as favorites) could be uploaded to the photo service provider **40** via the modem, while all of the images (including normal and non-favorite images) could be transferred to the hard drive **20** of the home computer **10**.

PARTS LIST

[0157] **10** home computer

[0158] **12** CPU motherboard

[0159] **14** monitor

[0160] **16** keyboard

[0161] **18** pointing device

[0162] **20** hard drive

[0163] **22** modem

[0164] **24** card reader

[0165] **26** printer

[0166] **30** Internet service provider

[0167] **32** modems

[0168] **34** computers/routers

[0169] **36** channel

[0170] **40** photo service provider

[0171] **42** Internet server

[0172] **44** service provider database

[0173] **46** billing system

[0174] **48** bill issuing

[0175] **52** production controller

[0176] **54** color printer

[0177] **66** photo product

PARTS LIST

[0178] **70** shipping system

[0179] **72** shipping label printer

[0180] **74** shipping label

[0181] **76** disc writer

[0182] **300** digital camera

[0183] **302** flash

[0184] **303** user controls

[0185] **304** control processor and timing generator circuit

[0186] **305** optical viewfinder

[0187] **306** clock drivers

[0188] **309** shutter button

[0189] **310** zoom and focus motors

[0190] **311** zoom lens control rocker switch

[0191] **312** zoom lens

[0192] **314** image sensor

[0193] **316** ASP & A/D converter circuit

[0194] **318** DRAM buffer memory

[0195] **320** image processor

[0196] **322** host interface

[0197] **324** memory card interface

[0198] **326** RAM memory

[0199] **328** firmware memory

[0200] **330** removable memory card

[0201] **332** color LCD image display

[0202] **342** interface cable

[0203] **350** dock

[0204] **360** joystick

[0205] **362** group button

[0206] **364** favorite button

[0207] **366** menu button

[0208] **368** review button

[0209] **370** mode dial

[0210] **390** video driver

[0211] **392** TV monitor

[0212] **400** root directory

[0213] **410** MISC directory

[0214] **412** control file

[0215] **414** control file

[0216] **416** control file

[0217] **420** DCIM directory

[0218] **430** subdirectory

[0219] **432-452** image files

[0220] **500**A GUI screen

[0221] **500**B GUI screen

[0222] **502**A display area

[0223] **502**B display area

[0224] **504**A display window

[0225] **504**B display window

[0226] **506**B "favorite" indicator

[0227] **600** general assets table

[0228] **610** table of data fields

[0229] **612** metadata field

[0230] **614** data type

[0231] **616** expose value

[0232] **632-652** image data object

[0233] **660-692** metadata

[0234] **660-692** GUI screen

[0235] **800**A GUI screen

[0236] **800**B GUI screen

[0237] **802**"My Collection" tab

[0238] **804**"Print at Home" tab

[0239] **805**"Order Prints Online" tab

[0240] **806**"Email" tab

[0241] **808**"Album Pages" tab

[0242] **810** display format selection area

[0243] **812**"Single" display icon

[0244] **814**"Thumbnails" display icon

[0245] **816**"Details" display icon

[0246] **820** image display area

[0247] **822**A-**822**K thumbnail images

[0248] **825** slider

[0249] **830**"Slide Show" icon

[0250] **832**"Label" icon

[0251] **834**"Rotate" icon

[0252] **836**"Open/Edit" icon

[0253] **838**"Properties" icon

[0254] **840** display selection area

[0255] **842** selector

[0256] **843** group number/name box

[0257] **844** sort items text box

[0258] **846** pull-down arrow icon

[0259] **848** reserve order checkbox

[0260] **852**"To Do List" icon

[0261] **860** favorites level selection area

[0262] **862** selector

[0263] **890** album page

[0264] **892** album page name

[0265] **894** most favorite image

[0266] **895** favorite image

[0267] **896** favorite image

[0268] **897** favorite image

[0269] **1100**A initial eBay form

[0270] **1100**B final eBay form

[0271] **1110** image display area

[0272] **1112** favorite eBay image

[0273] **1114** index image

[0274] **1121** eBay image

[0275] **1122** eBay image

[0276] **1123** eBay image

[0277] **1130** description area

[0278] **1140**A information window

[0279] **1140**B information window

[0280] **1142**A blank sale item name area

[0281] **1142**B sale item name

[0282] **1200** GUI screen

[0283] **1210** display window

[0284] **1212** electronic album image

[0285] **1213** favorites icon

[0286] **1214** electronic album image

[0287] **1216** electronic album image

[0288] **1230**"View all Albums" icon

[0289] **1232**"Open album" icon

[0290] **1234**"Slide show" icon

[0291] **1236**"Share Photos" icon

[0292] **1238**"Buy Prints" icon

[0293] **1240**"Add Photos" icon

[0294] **1242**"Help" icon

[0295] **1250**"Album Name" area

[0296] **1252**"Modify Favorites" icon

[0297] **1300** GUI screen

[0298] **1310** display area

What is claimed is:

1. A method for producing a plurality of electronic job pages using a digital camera and a computer, comprising the steps of:

a) capturing and storing a first group of digital images using the digital camera;

b) designating, in response to a user input, that subsequent captured digital images are to form a second group of digital images;

c) capturing and storing a second group of digital images using the digital camera;

d) storing data in a memory of the digital camera which identifies the first and second groups of digital images;

e) transferring the first and second group of digital images, and the data identifying the first and second groups of digital images, from the digital camera to the computer; and

f) using the transferred data identifying the first and second groups of digital images to produce a first electronic job page including the first group of digital images and a second electronic job page including the second group of digital images.

2. The method of claim 1 wherein the first and second electronic job pages respectively describe first and second items offered for sale electronically.

3. The method of claim 2 further including the step of transferring the first and second electronic job pages to an electronic auction provider via the Internet.

4. The method of claim 3 further including the step of receiving from the electronic auction provider, a notification that at least one of the first and second items offered for sale electronically has been sold.

5. The method of claim 4 further including the step of automatically deleting from the computer, the first group of digital images when notification has been received that the first item offered for sale electronically has been sold.

6. The method of claim 3 wherein the electronic auction provider is eBay.

7. The method of claim 2 further including the step of a user entering general seller information for inclusion in both the first and second electronic job pages.

8. The method of claim 7 wherein the general seller information includes an email address for a seller of the item offered for sale electronically.

9. The method of claim 7 wherein the general seller information includes payment and shipping terms for the item offered for sale electronically.

10. The method of claim 1 wherein the data identifying the first and second groups of digital images is stored in a single control file.

11. The method of claim 1 further including the step of identifying one digital image from each of the first and second groups of digital images as favorite images.

12. The method of claim 11 wherein the favorite images are featured on the corresponding electronic job page.

13. The method of claim 12 wherein the favorite images are larger in size than the other images in the first and second groups of digital images.

14. The method of claim 12 wherein the favorite images are displayed as index images for the corresponding electronic job page.

15. The method of claim 11 wherein the data identifying the first and second groups of digital images, and the data identifying the favorite images is stored in a single control file.

16. The method of claim 15 further including the steps of a user subsequently identifying a different digital image from the first group of digital images as a favorite image, and automatically updating the single control file to replace the data indicating the previously identified favorite image from the first group of digital images with data indicating the newly identified favorite image.

17. The method of claim 1 wherein the data identifying the first and second groups of digital images is stored in a database on the computer.

18. The method of claim 17 further including the step of using the data in the database to identify the first and second electronic job pages.

19. The method of claim 1 further including the step of using the digital camera to identify at least one image in one of the first or second groups of digital images as a favorite image, and displaying an icon in association with the favorite image on the digital camera to indicate that the identified image is a favorite image.

20. The method of claim 1 wherein the first and second groups of digital images are stored as JPEG files in separate subdirectories using the DCF directory structure.

21. A method for producing a plurality of electronic job pages featuring items offered for sale electronically, comprising the steps of:

a) providing first and second groups of digital images to a computer which respectively correspond to first and second items offered for sale electronically;

b) a user entering general seller information for inclusion in the first and second electronic job pages;

c) automatically populating the first electronic job page with the first group of digital images and the general seller information; and

d) automatically populating the second electronic job page with the second group of digital images and the general seller information.

22. The method of claim 21 further including the step of transferring the first and second electronic job pages to an electronic auction provider via the Internet.

23. The method of claim 22 further including the step of receiving from the electronic auction provider, a notification that at least one of the first and second items offered for sale electronically has been sold.

24. The method of claim 23 further including the step of automatically deleting from the computer, the first group of digital images when notification has been received that the first item offered for sale electronically has been sold.

25. The method of claim 22 wherein the electronic auction provider is eBay.

26. The method of claim 21 wherein the general seller information includes an email address for a seller of the item offered for sale electronically.

27. The method of claim 26 wherein the general seller information includes payment and shipping terms for the item offered for sale electronically.

28. The method of claim 21 further including the step of identifying one digital image from each of the first and second groups of digital images as favorite images.

29. The method of claim 28 wherein the favorite images are featured on the corresponding electronic job page.

30. The method of claim 29 wherein the favorite images are larger in size than the other images in the first and second groups of digital images.

31. The method of claim 29 wherein the favorite images are displayed as index images for the corresponding electronic job page.

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