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(57) Abstract

A method and structure for transmitting digital picture data between a digital camera having a modem capability and a remote device, either over the Internet or over one or more secure communications links, is presented. A digital camera is modified to include a modem or other communications element, firmware, and a user interface for communication between the user and the firmware of the digital camera.

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A SYSTEM AND METHOD FOR TRANSMITTING AND RECEIVING DIGITAL PICTURE IMAGES FROM A DIGITAL CAMERA TO ONE OR MORE REMOTE LOCATIONS

FIELD OF THE INVENTION

This invention relates generally to digital camera technology, and more particularly to a system and method that may be used with improved digital camera technology to easily transmit digital picture images to and from a digital camera.

BACKGROUND OF THE INVENTION

The advent of digital cameras has been a welcome development to many users of camera technology. Digital cameras offer a number of advantages, including the ability to take and then immediately review a digital picture or image on a display of the digital camera, there is no requirement for film, and the ability to easily manipulate and transfer digital picture images. Pictures are taken with digital cameras and stored in local memory the digital camera, typically local flash memory. Once the user has filled its memory subsequent pictures must be transferred found a digital camera to suitable storage device, such as a personal computer (PC) or a printer, before more pictures may be taken with the digital camera.

Some digital cameras have addressed the limited storage capability of digital cameras by storing picture images onto a floppy disk drive located inside the camera. While this disk drive is capable of storing many more pictures then the digital cameras local memory, use of disk drive technology presents its own problems. When the user wishes to transfer a digital picture to disk the user must wait until the transfer is complete before another picture can be taken. When a disk becomes full, the user must place a new disc in the camera before continuing to take pictures, and the time necessary for the user to change discs is not insignificant. Additionally, the floppy disk drive itself tends to significantly increase the size and weight of the digital camera, as well as to significantly drain the battery of the digital camera.

In light of the foregoing, it is clear that there exists a need in the art for an alternative to disk drive technology as a solution to address the limited picture storage capabilities of current digital cameras. Such an alternate solution should allow the user of a digital camera to easily and readily free up local picture memory of the digital camera while not adversely affecting ease-of-use, weight, and size of the digital camera.

SUMMARY OF THE INVENTION

It is accordingly an object of the invention to compensate for the limited picture memory size of digital cameras in a manner that allows the user of a digital camera to readily transfer digital images from local picture memory so that new digital pictures may be taken.

It is another object of the invention to allow the digital camera user to easily transmit digital picture images stored in a digital camera to a remote location or to receive digital picture images from a remote location.

It is yet another object of the invention that such transmission of digital picture images between the digital camera and a remote location be accomplished with a minimum amount of required supporting hardware.

A further object of the invention is that transmission of digital picture images between the digital camera and a remote location be accomplished in a secure manner, if so desired or necessary.

According to the present invention, a method and structure provides for digital picture images to be transmitted to or from a digital camera, thereby enabling a user of the digital camera to readily clear out picture memory of the digital camera to make room for more digital pictures if so desired. According to a first embodiment of the present invention, a user of the digital camera is able to send digital picture images as an attachment to an e-mail directly from the digital camera to a remote device via a server and the In the ternet e-mail system. Conversely, the user is also able to receive digital picture images from a remote device and stories images to local picture memory of the digital camera. The digital camera differs from existing digital camera design in that it contains firmware, a communications element such as a modem, and a user interface through which the user is able to communicate required information concerning the server and the remote device to the digital camera. The server may bean Internet service provider or an e-mail server. According to a second embodiment of the present invention, a user of the digital camera is similarly able to transmit and receive digital picture images between a digital camera and a remote, destination device. The second embodiment, however, does not utilize the e-mail capabilities of the Internet and instead uses one or more secure communications links to transmit digital images.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the claims. The invention itself, however, as well as the preferred mode of use, and further objects and advantages thereof, will best be understood by reference to the following

detailed description of an illustrative embodiment when read in conjunction with the accompanying drawing(s), wherein:

Figure 1 illustrates a digital camera, according to the present invention;

Figure 2 illustrates a generic system capable of transmitting digital picture images to and from a digital camera using e-mail over the Internet, according to a first embodiment of the present invention;

Figure 3 illustrates a system capable of transmitting digital picture images to and from a digital camera using e-mail over the Internet via an Internet service provider, according to the first embodiment of the present invention;

Figure 4 illustrates a system capable of transmitting digital picture images to and from a digital camera using mail over the Internet via an e-mail server, according to the first embodiment of the present invention;

Figure 5 illustrates a flowchart for transmitting digital pictures from a digital camera to a remote device using e-mail capability over the Internet, according to the first embodiment of the present invention;

Figure 6 illustrates a flowchart for receiving digital pictures sent by a remote device to digital camera using e-mail capability over the Internet, according to the second embodiment of the present invention;

Figure 7 illustrates a representative application of the first embodiment of the present invention in a home e-mail environment;

Figure 8 illustrates a system capable of transmitting digital picture images between a digital camera and a destination device over a secure communications link, according to a second embodiment of the present invention;

Figure 9 illustrates a system capable of transmitting digital picture images between a digital camera and a destination device over secure communications links via the server, according to the second embodiment of the present invention;

Figure 10 illustrates a flowchart for transmitting digital picture images from a digital camera to the destination device, according to the second embodiment of the present invention; and

Figure 11 illustrates a flowchart for receiving digital picture images sent by a destination device to digital camera, according to the second embodiment of the present invention.

DESCRIPTION OF THE INVENTION

The present invention provides a method and structure for transmitting digital picture data between a digital camera having a modem capability and a remote device,

either over the Internet or over one or more secure communications links. A digital camera that is capable of utilizing the present invention is modified over the prior art digital camera to include a modem or other communications capability, firmware, and a user interface. Such a digital camera is illustrated in **Figure 1**. The digital camera 10 of **Figure 1** includes the following elements: picture memory 12, typically a nonvolatile memory such as flash memory, capacitance coupling discharge (see CCD) lens 14 used to take digital pictures, central processing unit (CPU) 16, firmware 18 used to provide an appropriate interface to a user of digital camera 10, such as a graphical user interface (GUI) on a display screen of the digital camera, and modem 20 or other communications element suitable for transmitting and receiving text and digital picture image data. Digital camera 10 differs from existing digital camera design in that it additionally has interface 32, firmware 18, and modem 20.

Digital picture data is transmitted to and from digital camera 10 by modem 20, as controlled by firmware 18, over communications link 24. Phone jack 22 is shown as a means to connect digital camera 10 to communications link 24. Phone jack 22suggests that communications link 24 is some type of telephone communications link, such as a land line or a wireless link. It is understood, however, the digital camera 10may be connected to communications link 24 through any variety of means, including long distance radio, and thus 6ne should not construe phone jack 22 as a required element. Digital camera 10, through modem 20, is therefore capable of sending and/or receiving digital picture data to or from a remote device (not shown here). As will be discussed below, the digital camera of the present invention is capable of transmitting and receiving digital picture images two or from a remote device over either a secure communications link or a link that utilizes the Internet.

The ability of digital camera 10 to easily and readily transfer or receive digital picture data provides important advantages over the prior art. First, digital camera 10 of the present invention overcomes the limited picture memory capability of current digital cameras. A user of digital camera 10 is no longer constrained to the limited number of digital pictures that digital camera 10 is capable of storing; the user can, at any time, download pictures that have been taken with digital camera 10 to a remote device for storage, delete the picture memory 12, and continue to take digital pictures unfettered by the restricted size of picture memory 12. Second, this disability to easily and readily download digital picture data to a remote storage location for later recovery if desired obviates the need for the user to utilize a floppy disk drive inside the camera to obtain enhanced storage capability. As previously discussed, floppy disk drives significantly

increase the size and weight of a digital camera; they also require a significant amount of time to replace once full with image data. Third, the use of the floppy disk drive inside the digital camera also significantly contributes to depleting a battery source of the digital camera and thus the present invention greatly prolongs battery power of the digital camera.

According to a first embodiment of the present invention, picture images may be transmitted between a digital camera and a remote device such as a computer, laptop server, etc., by sending and receiving electronic mail containing the digital images over the Internet. Referring now to **Figure 2**, a system 30 that demonstrates the first embodiment of the present invention is shown. Digital camera 10 is modified over prior art digital cameras and contains modem 20, firmware 18, and interface 32. A user of digital camera 10 is able to provide remote device address information 31 over interface32 to digital camera 10. Remote device address information 31 provides the digital camera 10 and server 36 with required information necessary to transmit digital images from digital camera 10 to remote device 42 that itself has a modem 44, CPU 46 and a memory or other storage element 48. Transmission of data between digital camera 10and server 36 is accomplished over a first communications link 34, while transmission of data between server 36 and remote device 42 is accomplished over a second communications link 38 via the Internet 40. Second communications link 38 describes the transmission of data between server 36 and remote device 42 via the Internet 40.

The specific type of remote device address information 31 that the user provides to interface 32 of digital camera 10 is determined by the configuration of server 36 that is utilized in system 30 to send electronic mail, or e-mail, between digital camera 10 and remote device 42. If the server 36 is configured as an Internet service provider (ISP), then remote device address information 31 provided by the user will include information needed by the ISP, such as the user password, login information, e-mail address and phone number. If, however, the server 36 is configured as a server having mail capability, then remote device address information 31 will simply include the e-mail address of remote device 42. It is understood that remote device address information31 provided by the user may be representative of multiple e-mail addresses to which picture images from digital camera 10 are to be transmitted.

In addition to remote device address information 31 provided over interface 32 to digital camera 10, digital camera 10 differs from existing digital camera design in that it has firmware 18 and modem 20. modem 20 is an interface to digital camera 10 and while modem 20 is represented as a block within digital camera 10, it is understood that the

modem itself may physically reside within or without digital camera 10. The firmware 18interfaces with CPU 16 and operates to allow remote device address information 31,such as ISP and e-mail address information, to control modem 20. For instance, assuming that server 36 is configured as an ISP, the code of firmware 18 would control modem 20 to connect to the ISP, generate a dummy e-mail memo, attach the camera pictures to the e-mail, transfer the e-mail and picture attachment(s) to server 36, wait for acknowledgement that the transfer of the e-mail with attachment(s) over the Internet to remote device 42 has been completed, and then prompt the user to clear the transmitted pictures from picture memory 12 to free up memory for more pictures.

Figures 3 and 4 illustrate more clearly the possible configurations of server 36 in Figure2. Referring first to **Figure 3**, the server configuration in system 50 provides for an ISP54. As is known in the art, ISP 54 operates to transmit electronic mail provided to it by modem 20 from digital camera 10 to remote device 42 over communications link 38 via the Internet, or ISP 54 can operate to transmit electronic mail provided to it by remote device 42 over communications link 38 via Internet 40 to modem 20 of digital camera10. When a user of digital camera 10 desires to send digital picture images from the camera via modem 20 over communications link 34 to ISP 54 and thus ultimately to remote device 42 via Internet 40, the user must provide certain ISP information 52 via user interface 32 to digital camera 10. In this environment, ISP information may be expected to include the phone number of the ISP, password information, login information, and the e-mail address, or e-mail addresses, to which the digital picture information is to be transmitted.

In an ISP environment in which it is desired to transmit digital picture images stored in picture memory 12 to a remote device 42, digital camera 10 must include electronic mail capability, typically in the form of an electronic mail program that resides within firmware 18, that will generate electronic mail having selected digital picture images as an attachment upon receipt of ISP information 52 from the digital camera user. Thus in the case where an ISP 54 is utilized, the electronic mail program will reside within digital camera 10.

Figure 4 illustrates an exampl6 in which server 36 of Figure 2 functions as a server providing both ISP and e-mail functionality. In contrast to Figure 3, server 64 contains electronic mail capability sense it operates to generate e-mail once it receives a transmission from digital camera 10 over communications link 34. Thus in this case, the user is only required to provide e-mail address information 62 over interface 32 to digital camera 10. Modem 18 will simply transmit the digital picture images plus the e-mail

address 62 entered by the user over communications link 34 to server 64. Because Figure 4 only requires that the user provide digital camera 10 with one or more e-mail addresses to which digital picture information is to be transmitted, a digital camera that employs the system of Figure 4 is more easily implemented than one that employs the system of Figure 3. The user is not required to enter ISP information 52and e-mail capability need not reside within digital camera 10. Server 64 will write the electronic mail and attach the digital picture images that it has received from modem 18and send this e-mail over communications link 38 via Internet 40 to remote device 42where it will be received and stored.

Figures 5 and 6 illustrate flowcharts 70 and 90, respectively, for transmitting digital camera picture images between digital camera 10 and remote device 42 using electronic mail capability over the Internet 40. Referring first to Figure 5, flowchart 70illustrates the various steps involved with transmitting digital picture images from digital camera 10 to remote device 42 via a server over the Internet. First, at block 72 the user connects the first modem of digital camera 10 to a first communications link 34.

As previously discussed, the first modem may be attached to communications link 34by plugging digital camera 10 into phone jack 22. Once a connection has been established to the first communications link 34, the user must select which digital pictures stored in the memory 12 digital camera 10 are to be transmitted from the data from digital camera 10 to remote device 42 as shown in Block 74; the selected pictures will be attached as a file to the electronic mail message that will be sent to and received by remote device 42. This selection process is accomplished by the user interfacing with digital camera 10 via user interface 32. After the user has selected which digital pictures to send, the selected digital pictures must be converted to a digital format that is suitable for transmission and stored within temporary memory of digital camera 10 as shown in Block 76. Examples of suitable formats include, but are not limited to, GIF,JPEG, or CMP formats. It should be noted that as part of the conversion step of Block76, the pictures could be converted to an encrypted format that would require password entry when the digital pictures are received at remote device 42. At Block 78, the user must provide remote device address information 31, here called electronic mail information, that will allow the firmware 18 of digital camera 10 to control modem 20.As noted in conjunction with figures 3 and 4, the type of electronic mail information that the user will enter via interface 32 depends upon whether an ISP server 54 or a server having e-mail capability 64 is used. If ISP server 54 is used, then ISP information 52must be entered by the user via user interface 32. If, however, server 64 is used then the user need only enter

one or more e-mail addresses representative of remote device 42 via user interface 32. Moreover, the step of Block 78 need not be performed after Block 76, but may instead be provided by the user prior to selecting and converting the selected digital pictures.

Next the selected digital pictures in the converted format are transmitted from the modem 20 of digital camera 10 to modem 44 of remote device 42. This transmission step, shown in Block 80, is accomplished by firmware 18 controlling modem 20 of digital camera 10 to transmit the selected pictures stored in picture memory 12 to server 36over the first communications link 34, and server 36 in turn transmitting the resulting e-mail with picture images as an attachment to modem 44 of remote device 42 via Internet 40 over second communications link 38. As previously discussed, whether thee-mail is generated by a mail program within digital camera 10 or server 36 is dependent upon the functionality of server 36.

After the digital camera 10 has successfully transmitted selected visual images to remote device 42, the user may elect to delete the transmitted pictures from picture memory 12 of digital camera 10, as shown at Blocks 82 and 84. Deletion of transmitted pictures selected by the user to be deleted is controlled by firmware 18. Finally, at Block 86 the user disconnects digital camera IO from first communications link 34.

One skilled in the art will recognize that the functionality performed at Blocks 74, 76, 80and Blocks 82, 84 may be performed discreetly chronologically for each digital picture. For instance, a single digital picture stored in memory may be selected at Block 74, that selected digital picture convert6d at Block 76, and that selected picture transmitted by itself as an attachment to an e-mail to remote device 42 prior to repeating this process for another digital picture. Similarly, transmitted pictures could be selected and deleted one by one at Blocks 82 and 84.

In addition to transmitting digital picture images from the digital camera 10 to a remote device 42, the present invention also provides for receipt of digital picture images by digital camera 10 from remote device 42. Referring now to Figure 6, flowchart 90illustrates a methodology for receiving digital picture information from a remote device42. First, at Block 92, modem 20 a digital camera 10 must be connected to communications link 34. Next at Decision Block 94, it must be determined whether remote device 42 sent an e-mail for receipt by digital camera 10. This is typically accomplished by the user selecting a check mail feature of the electronic mail program contained within digital camera 10. At Block 96, digital camera 10 must establish a connection to the server over communications link 34. The user will enter the required remote device address information 31 over user interface 32. The server will have thee-

mail sent by remote device 42 and at Block 98 the e-mail is downloaded from the server to modem 20 of digital camera 10. The digital picture images attached to the e-mail must be converted to format suitable for use by digital camera 10, as shown at Block 100. The converted pictures are downloaded to temporary memory of digital camera 10 at Block 102; the temporary memory is represented by picture memory 12which is interpreted to be representative of both a temporary and permanent digital camera memory.

Once digital images attached to the e-mail have been downloaded to digital camera 10,the images are displayed to the user at Block 104. Viewing the images allows the user to select which pictures are to be saved and which pictures are not to be saved to picture memory 12 of the digital camera 10, as shown at Block 106. After the desired pictures have been saved to picture memory 12 the downloaded pictures that were temporarily stored in temporary memory may be deleted at Block 108 to make room in memory 12 for more pictures. Or, the flow 78 of Figure 5 may be followed to store the images received to remote device 42. In this regard, it will be understood that while only one remote device 42 is shown it is envisioned that digital picture images may be transmitted to multiple remote devices 42 by the user entering the appropriate remote device address information 31 at interface 32. Finally, the modem 20 of digital camera10 is disconnected from the first communications link 34.

The use of the e-mail Internet capabilities by the first embodiment of the present invention provides flexibility and ease-of-use to the user of the digital camera. So long as the user of the digital camera has access to a phone line or other communications link to the Internet, digital pictures may be transmitted or received from any number of remote devices that are capable of receiving e-mail on the Internet. For instance, the system 120 of Figure 7 illustrates a particular example of how the present invention may be utilized to transmit digital picture images between a digital camera 10 and home e-mail 124. The user could fill up the digital camera with pictures, connect the digital camera to a phone jack in his hotel room, for instance, send the pictures to a home e-mail, clear the picture memory, and continue taking pictures. In this example, a user would enter home e-mail address information 122 to interface 32 of digital camera 10prior to transmitting digital picture images via Internet 40 to home e-mail 124. Whether the user is on vacation, a photojournalist on location, an insurance agent taking pictures at the scene of an accident, or a realtor taking pictures of homes, the ability to quickly transmit digital pictures from digital camera 10 to home e-mail 124 and then delete the transmitted pictures to free up picture memory 12 for more pictures provides a real improvement over the prior art.

According to a second embodiment of the present invention, shown in Figures 8-1 1,digital picture images may be transmitted between a digital camera 10 and a destination device over one or more secure communication links that are not susceptible to interception by third parties. The second embodiment may be used if there's no e-mail capability, no Internet service provider, or in those environments in which protecting the confidentiality of information to be transmitted or received is paramount.

Referring now to **Figure 8**, the simplest form of communication between a digital camera in a destination device is illustrated. System 130 simply has digital camera 10, destination device 136, and a secure communications link 134 connecting them. Digital camera 10 is similar to the digital cameras of the first embodiment in that it has been modified to include a user inter-face 32, firmware 18, and modem 20. The destination device information 132 provided to digital camera 10, however, is not an e-mail address since the e-mail capabilities of the Internet are not being used. Rather destination device information 132 simply provides information use by firmware 18 to control modem 20 to send or receive digital picture images to or from destination device 136 over secure communications link 134. Destination device or devices 136 can be any device or system capable of sending receiving and storing digital picture information. For instance, destination device or devices 136 may be a computer, laptop, or storage device.

System 130 of Figure 8 offers the advantage of not requiring an additional server to communicate between digital camera 10 and destination device 136. There are many possible applications characterized by a desire of the user to minimize the amount of equipment that is required to send or receive digital picture information from digital camera 10. For instance, a person taking pictures with a digital camera on vacation would not want to carry a server, even a laptop, in order to be able to download pictures from picture memory 12 to a destination location.

System 150 of Figure 9 illustrates the use of a server 154 to facilitate the transmission of digital picture images between digital camera 10 and destination device 136. Server154 may typically be a computer or a device having computing capabilities. Firmware 18 of digital camera 10 controls modem 20 to transmit digital picture images along with destination device information 132 to server 154 over secure communications link 152, and server 154 in turn transmits the digital picture images to modem 142 of destination device 136 over second secure communications link 156.

Figures 10 and 11 illustrate potential flows for transmitting digital picture images from digital camera 10 to destination device 136. Referring now to Figure 10, a flowchart 160 for transmitting digital picture images from digital camera 10 to destination device

136 is shown. Block 162 indicates that a temporary memory within memory 12 stores one or more digital pictures, typically pictures that have been taken by the digital camera 10. At Block 164 the modem 20 of digital camera 10 must be connected to a secure communications link; this is shown as secure communications link 134 in Figure 8 and secure communications link 152 in Figure 9. This might involve the user connecting the digital camera to a phone jack. Next, at Block 166 the digital pictures stored in the temporary memory that are to be transmitted to the destination device are selected. Selection of the digital pictures is performed by the user via user interface 32.The selected digital pictures are converted to a format suitable for transmission, as discussed in the above text, at Block 168. At Block 170, the selected digital pictures are transmitted in the converted format from the digital camera modem 20 to the destination device modem 142. Of course, the digital pictures to be selected, converted, and transmitted to destination device 136 may be selected, converted, and transmitted one in a time, as illustrated at Blocks 186,188, and 190 of the flowchart 180 of **Figure 11.**

The user may next choose to delete pictures that have been transmitted to destination device 136 to make room in memory to take new pictures. Decision Block 172 inquires which pictures the user would like to delete; the chosen pictures are actually deleted at Block 174. Finally, the digital camera is disconnected from the secure communications link at Block 176.

The methodology of the present invention for receiving digital picture images on one or more secure or communication links is similar to flowchart 90 of Figure 6. A significant difference however is that the methodology of the second embodiment of the present invention would have no reference to e-mail technology since e-mail is not available in this embodiment. Thus at Block 94, for instance, the inquiry would not be whether an e-mail has been sent to digital camera 10, but whether destination device 136 is transmitting digital picture information to digital camera 10. Similarly, Block 100 would not be expressed in terms of pictures attached to e-mail.

The present invention may be used in a variety of applications where the limited size of local picture memory of the digital camera is a concern. The following are some examples of applications in which the present invention would be particularly useful. The user of the digital camera could use the present invention to send digital picture images directly to a digital photo printing service company for printing, thereby allowing pictures that have been recently taken to be developed right away. A vacationer could take as many pictures as wanted, stopping only to send digital pictures to home e-mail when the digital camera memory becomes full. The present invention may be used to send an e-

mail postcard or to send an e-mail birthday card with a digital picture image as an attachment. A photojournalist could use the present invention on assignment to transmit photos that have been taken to the newsroom directly from the scene of a story. A realtor could use the present invention to take and then transmit pictures of houses to an out-of-town potential buyer, or to download pictures of other houses to show to a potential buyer who is currently viewing a particular property. Insurance agents could use the present invention to take pictures of an automobile involved in a crash at the crash site and then upload these pictures to the insurance computer when the digital camera memory becomes full in order to enable taking new pictures. Those users concerned with security or unable to access an Internet e-mail connection may use the secure communications link of the second embodiment to send or receive digital picture images. All that is required of a user in these examples is for the user to connect the digital camera to a communications link suitable for transmitting or receiving digital picture images and then interact with the user interface of the digital camera to complete the desired task.

While the invention has been particularly shown and described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. A system capable of the transmission of digital image data between a digital camera and a device having storage, said system comprising:

a digital camera, comprising:

a central processing unit;

a user interface, coupled to the central processing unit, that receives a electronic mail information from a user of the digital camera and by which the digital camera communicates with the user;

a lens element, coupled to the central processing unit, that takes digital pictures when control to do so by the user of the digital camera;

a first storage element of the digital camera, coupled to the central processing unit, that stores digital pictures taken by the lens element;

a first communications element, coupled to the central processing unit; and

a programming element, coupled to the central processing unit, that contains code that controls the first communications element in accordance with the destination device address information provided by the user to the digital camera.

wherein the program element uses the destination device address information provided by the user to control the first communications element to selectively transmit or receive digital image information.

an electronic mail program capable of writing and sending electronic mail containing digital image data;

a server element having a second communications element and a second storage element that is capable of receiving and transmitting electronic mail containing digital image data;

a remote device having a third communications element and a third storage element;

a first communications link from the first communications element of the digital camera to the second communications element of the server element;

a second communications link from the second communications element of the server element to the third communications element of the remote device over the Internet;

wherein upon receipt of the electronic mail information provided to the user interface of the digital camera by the user of the system, the electronic mail program and the server element transmit over the first and second communications links via the

Internet one or more selected digital images stored in the first storage element of the digital camera that have been selected by the user to the remote device that stores the one or more selected digital images in the third storage element of the remote device.

2. The system of claim 1, wherein one or more remote digital images transmitted from the third storage element of the remote device over the first and second communications links via the Internet by the electronic mail program and the server element are received by the first communications element and stored in the first storage element of the digital camera upon receipt of an electronic mail generated by the electronic mail program having the one or more remote digital images as an attachment by the first communications element of the digital camera.

3. The system of claim 1, wherein the programming element is firmware.

4. The system of claim 1, wherein the digital image data is an attachment to the electronic mail.

5. The system of claim 1, wherein the electronic mail program is contained within the digital camera, the server element is an Internet service provider, and the electronic mail information comprises an electronic mail address of the remote device and login information required to log onto the Internet service provider.

6. The system of claim 1, wherein the electronic mail program is contained within the server element, the server element operates as a mail server and as an Internet service provider, and the electronic mail information comprises an electronic mail address of the remote device.

7. The system of claim 6, wherein the server element writes an electronic mail with the one or more selected digital images as an attachment upon receiving the electronic mail address from the first modem of the digital camera.

8. A method for transmitting digital image data from a digital camera to a remote device via a server element over the Internet, comprising the steps of:

a) connecting a first modem of the digital camera to a first communications link;

b) selecting one or more selected images stored in a memory element of the

digital camera to transmit from the digital camera to the remote device as an electronic mail generated by an electronic mail program;

c) converting the one or more selected images to a digital image data format

suitable for transmission as electronic mail;

d) providing an electronic mail information to a user interface of a digital

camera that contains an electronic mail address of the remote device by a user of the digital camera;

e) transmitting the one or more selected images in the digital image data format

over the first communications link from the first modem of the digital camera to a second modem of the server element that in turn transmits the one or more selected images over a second communications link from the second modem to a third modem of the remote device via the Internet according to the electronic mail address of the remote device.

9. The method of claim 8, wherein the one or more selected images are an attachment

to the electronic mail.

10. The method of claim 8, further comprising the step of:

g) disconnecting the first modem of the digital camera from the first communications link.

11. The method of claim 8, after transmitting the one or more selected images to the remote device further comprising the step of:

(g) deleting one or more of the one or more selected images from the first storage

element of the digital camera.

12. The method of claim 8, wherein the electronic mail program is contained within the digital camera, the server element is an Internet service provider, and the electronic mail information comprises an electronic mail address of the remote device and login information required to log onto the Internet service provider.

13. The method of claim 8, wherein the electronic mail program is contained within the

server element, the server element operates as a mail server and as an Internet service provider, and the electronic mail information comprises an electronic mail address of the remote device.

14. The method of claim 13, wherein the server element writes an electronic mail with

the one or more selected images as an attachment upon receiving the electronic mail address from the first modem of the digital camera.

15. A method for a digital camera to receive digital image data from a remote device over the Internet via a server element, comprising the steps of:

connecting a first modem of the digital camera to a first communications link;

determining whether the remote device has sent an electronic mail message addressed to the digital camera over the Internet via a second communications link between a second modem of the server element and a third modem of the remote device;

if the remote device has sent an electronic mail message addressed to the digital camera, downloading the electronic mail message from the second modem of the server element to the first modem of the digital camera over the first communications link;

converting the electronic mail message to one or more digital images having a digital image data format suitable for use by the digital camera;

temporarily storing the one or more digital images to a temporary memory of the digital camera;

displaying the one or more digital images to a user of the digital camera;

selecting one or more selected digital images of the one or more digital images to save, and

saving the one or more selected digital images to a image memory of the digital camera.

16. The method of claim 15, wherein determining whether an electronic mail message addressed to the digital camera has been sent is determined by a user of the digital camera interfacing with an electronic mail program of the digital camera.

17. The method of claim 16, wherein the user of the digital camera checks for the electronic mail message according to the following steps:

selecting a check-mail feature of the electronic mail program;

providing the electronic mail program with a login information if required by the electronic mail program;

the electronic mail program establishing a connection from the first modem to the server element over the first communications link; and

checking for the electronic mail message addressed to the digital camera.

18. The method of claim 16, wherein after saving the one or more selected digital images further comprising the step of:

deleting the one or more digital images from the temporary memory of the digital camera.

19. The method of claim 16, further comprising the step of:

g) disconnecting the first modem of the digital camera from the first

communications link.

20. The method of claim 16, wherein the server element is an Internet service provider and comprising the further step of:

requesting an electronic mail address of the server element from the user of the digital camera.

21. A system capable of the transmission of digital image data between a digital camera and a device having storage, said system comprising:

a digital camera, comprising:

a central processing unit-,

a user interface, coupled to the central processing unit, that receives a destination device address information from a user of the digital camera and by which the digital camera communicates with the user;

a lens element, coupled to the central processing unit, that takes digital pictures when control to do so by the user of the digital camera;

a first storage element of the digital camera, coupled to the central processing unit, that stores digital pictures taken by the lens element;

a first communications element, coupled to the central processing unit; and

a programming element, coupled to the central processing unit, that contains code that controls the first communications element in accordance with the destination device address information provided by the user to the digital camera, wherein the program element uses the destination device address information provided by the user to control the first communications element to selectively transmit or receive digital image information.

a destination device having a second communications element and a second storage element; and

a secure communications link over which digital image information is exchanged between the first communications element of the digital camera and the second communications element of the destination device;

wherein the program element controls the first communications element to selectively transmit or receive digital image information between the digital camera and the second communications element of the destination device in accordance with the destination device address information provided by the user to the user interface.

22. The system of claim 21, wherein a first digital image data stored in the first storage element that is transmitted from the first communications element of the digital camera to the second communications element of the destination device over the secure

communications link is stored in the second storage element of the device and a wherein a second digital image data stored in the second storage element that is transmitted from the second communications element of the destination device to the first communications element of the digital camera over the secure communications link is stored in the first storage element of the digital camera.

23. The system of claim 21, wherein the programming element is firmware.

24. A system capable of the transmission of digital image data between a digital camera and a device having storage, said system comprising:

a digital camera, comprising:

a central processing unit;

a user interface, coupled to the central processing unit, that receives a

destination device address information from a user of the digital camera and by which the digital camera communicates with the user;

a lens element, coupled to the central processing unit, that takes digital pictures when control to do so by the user of the digital camera;

a first storage element of the digital camera, coupled to the central processing unit, that stores digital pictures taken by the lens element;

a first communications element, coupled to the central processing unit; and

a programming element, coupled to the central processing unit, that contains code that controls the first communications element in accordance with the destination device address information provided by the user to the digital camera,

wherein the program element uses the destination device address information provided by the user to control the first communications element to selectively transmit or receive digital image information.

a destination device having a second communications element and a second storage element;

a server element capable of receiving data and transmitting digital image information;

a first secure communications link between the digital camera and the server element over which digital image information is transmitted to and from the first communications element of the digital camera; and

a second secure communications link between the destination device and the server element over which digital image information is transmitted to and from the second communications element of the device;

wherein the program element controls the first communications element to selectively transmit or receive digital image information between the digital camera and the second communications element of the destination device by way of the server element over the first secure communications link and the second secure communications link in accordance with the destination device address information provided by the user to the user interface.

25. The system of claim 24, wherein the a first digital image data stored in the first storage element that is transmitted from the first communications element of the digital camera to the second communications element of the destination device by way of the server element over the first and second secure communications links is stored in the second storage element of the device and wherein a second digital image data stored in the second storage element that is transmitted from the second communications element of the destination device to the first communications element of the digital camera by way of the server element over the first and second secure communications links is stored in the first storage element of the digital camera.

26. The system of claim 24, wherein the programming element is firmware.

27. A method for transmitting digital image data from a digital camera to a destination

device having storage, comprising the steps of:

a) storing at least temporarily in a storage element of the digital camera one or more digital images;

b) connecting a first communications element of the digital camera to a secure communications link;

c) selecting each digital image of the one or more digital images to be transmitted from the digital camera to the destination device, thereby defining one or more selected digital images;

d) converting the one or more selected digital images to a digital image data format suitable for transmission over the secure communications link; and

e) transmitting the one or more selected digital images in the digital image data format from the first communications element of the digital camera to a second communications element of the destination device over the secure communications link.

28. The method of claim 27, further comprising the step of:

f) disconnecting the first communications element of the digital camera from

the secure communications link.

29. The method of claim 27, wherein after transmitting the one or more selected digital images from the digital camera to the destination device further comprising the step of:

g) deleting one or more of the one or more digital images from the storage element of the digital camera.

30. The method of claim 27, wherein steps c) - e) are further implemented according to the following steps:

c) selecting a digital image of the one or more digital images to transmit from the digital camera to the destination device;

d) converting the digital image to a digital image data format suitable for transmission over the secure communications link;

e) transmitting the digital image in the digital image data format from the first communications element of the digital camera to a second communications element of the destination device over the secure communications link;

f) repeating steps c) to e) for each digital image of the one or more digital images to be transmitted from the digital camera to the destination device.

31. A method for transmitting digital image data from a digital camera to a destination device having storage via a server element, comprising the steps of:

a) storing at least temporarily in a storage element of the digital camera one or more digital images;

b) connecting a first communications element of the digital camera to a first secure communications link;

c) selecting each digital image of the one or more digital images to be transmitted from the digital camera to the destination device, thereby defining one or more selected digital images;

d) converting the one or more selected digital images to a digital image data format suitable for transmission; and

e) transmitting the one or more selected digital images in the digital image data

format over the first secure communications link from the first communications element of the digital camera to a second communications element of the server element that in turn transmits the one or more selected digital images over a second secure communications link from the second communications element to a third communications element of the destination device.

32. The method of claim 31, wherein prior to step e) providing an identification information to the server element suitable that identifies the destination device.

33. The method of claim 32, wherein the identification information is an identification name or number of the destination device.

34. The method of claim 31, further comprising the step of:

f) disconnecting the first communications element of the digital camera from the

first secure communications link.

35. The method of claim 31, wherein after transmitting the one or more selected digital images from the digital camera to the destination device further comprising the step of:

f) deleting one or more of the one or more digital images from the storage

element of the digital camera.

36. The method of claim 31, wherein steps c) - e) are further implemented according to the following steps:

c) selecting a digital image of the one or more digital images to transmit from the

digital camera to the destination device;

d) converting the digital image to a digital image data format suitable for transmission;

e) transmitting the digital image in the digital image data format over the first

secure communications link from the first communications element of the digital camera

to a second communications element of the server element that in turn transmits the digital image over a second secure communications link from the second communications element to a third communications element of the destination device;

g) repeating steps c) to e) for each digital image of the one or more digital

images to be transmitted from the digital camera to the destination device.

37. A digital camera, comprising:

a central processing unit;

a user interface, coupled to the central processing unit, that receives a remote device address information from a user of the digital camera and by which the digital camera communicates with the user;

a lens element, coupled to the central processing unit, that takes digital pictures when control to do so by the user of the digital camera;

a picture memory of the digital camera, coupled to the central processing unit, that stores digital pictures taken by the lens element;

a communications device, coupled to the central processing unit; and

a programming element, coupled to the central processing unit, that contains code that controls the communications device in accordance with input information provided by the user of the digital camera,

wherein the program element uses the remote device address information provided by the user to control the communications device to selectively transmit or receive digital image information.

38. The camera of claim 37, wherein the programming element is firmware.

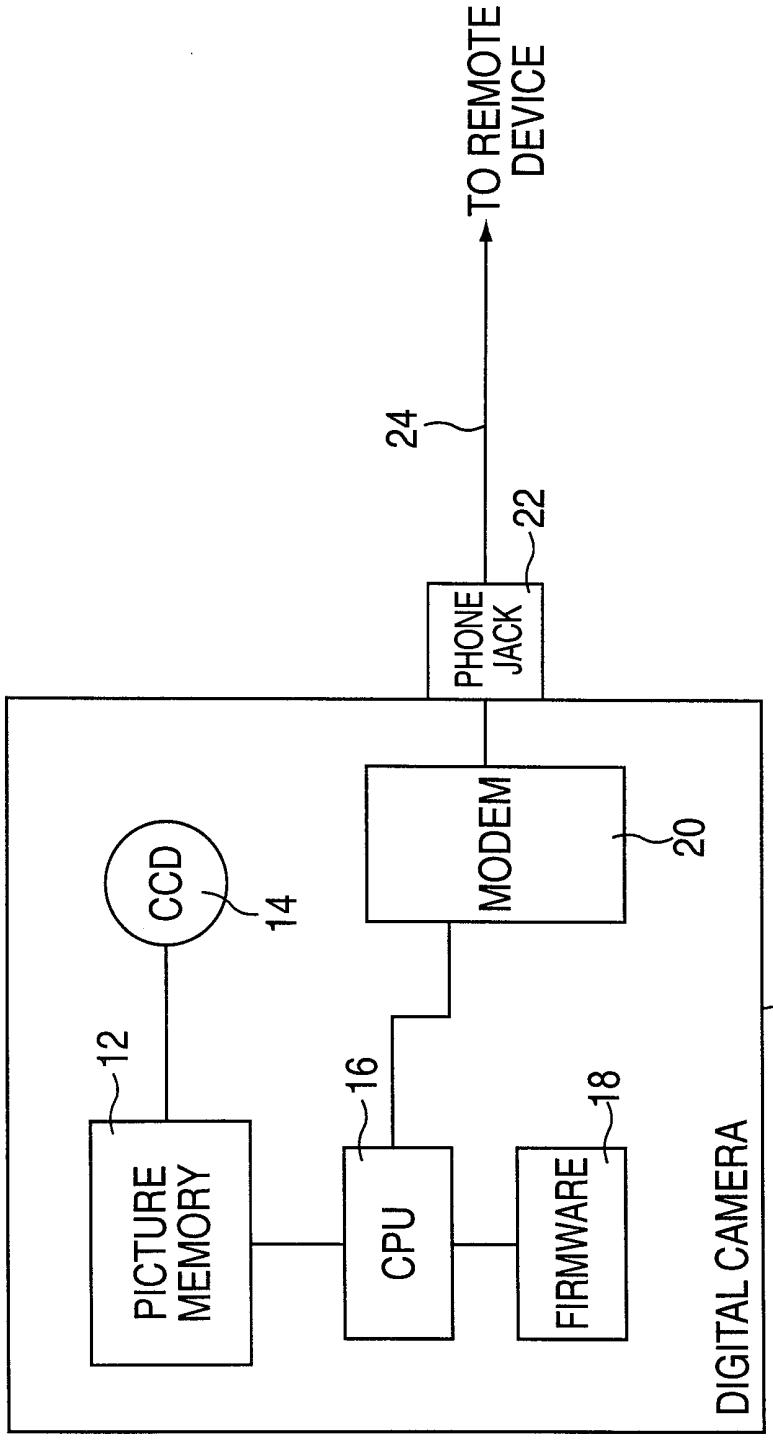
TO REMOTE DEVICE
24
22
PHONE JACK
MODEM
20
CCD
14
12
16
18
PICTURE MEMORY
CPU
FIRMWARE
DIGITAL CAMERA
10

FIG. 1

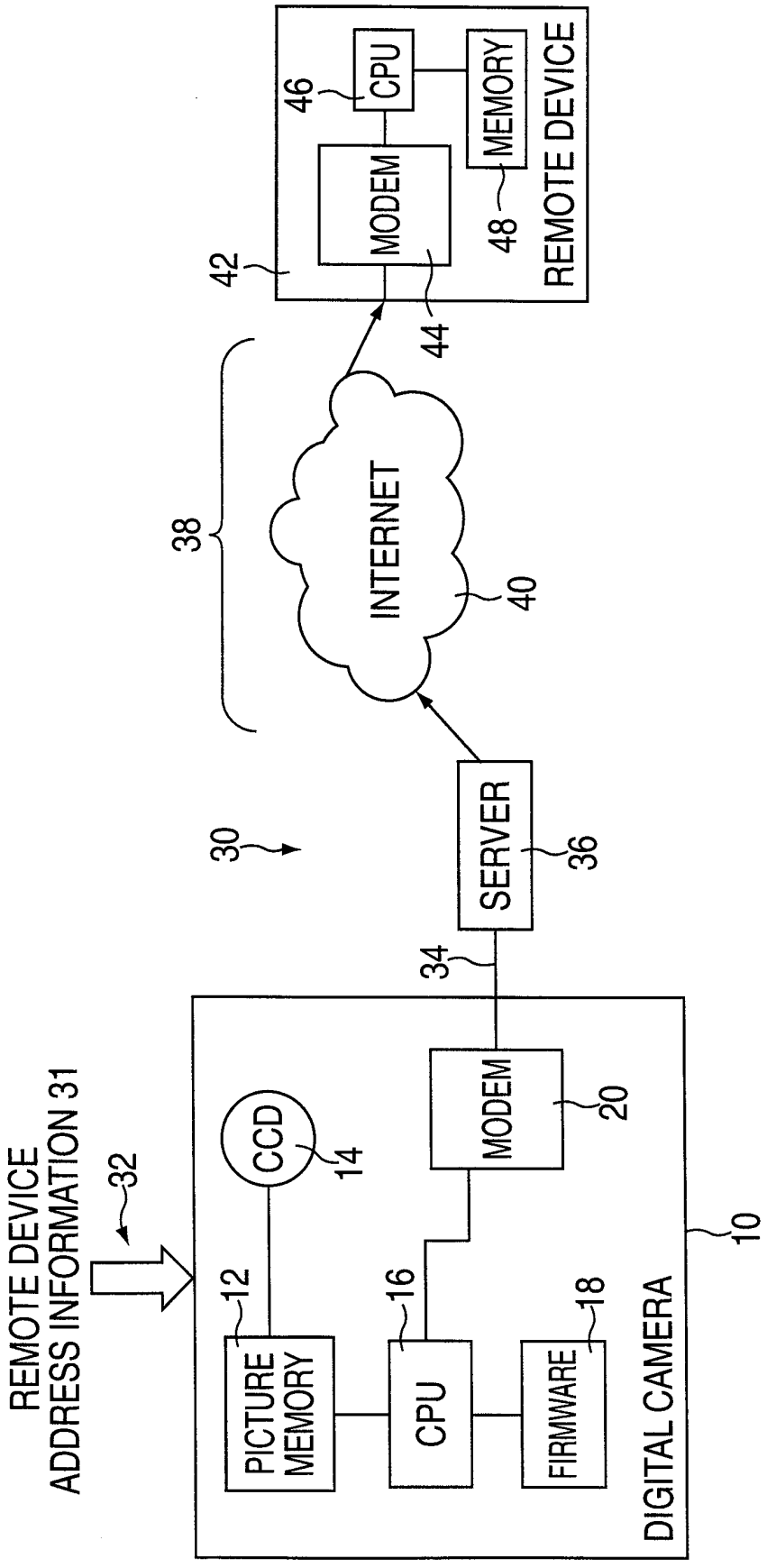
REMOTE DEVICE ADDRESS INFORMATION 31
32
CCD
14
PICTURE MEMORY
12
CPU
16
FIRMWARE
18
MODEM
20
DIGITAL CAMERA
10
34
SERVER
36
30
38
INTERNET
40
42
MODEM
44
46
CPU
MEMORY
48
REMOTE DEVICE

FIG. 2

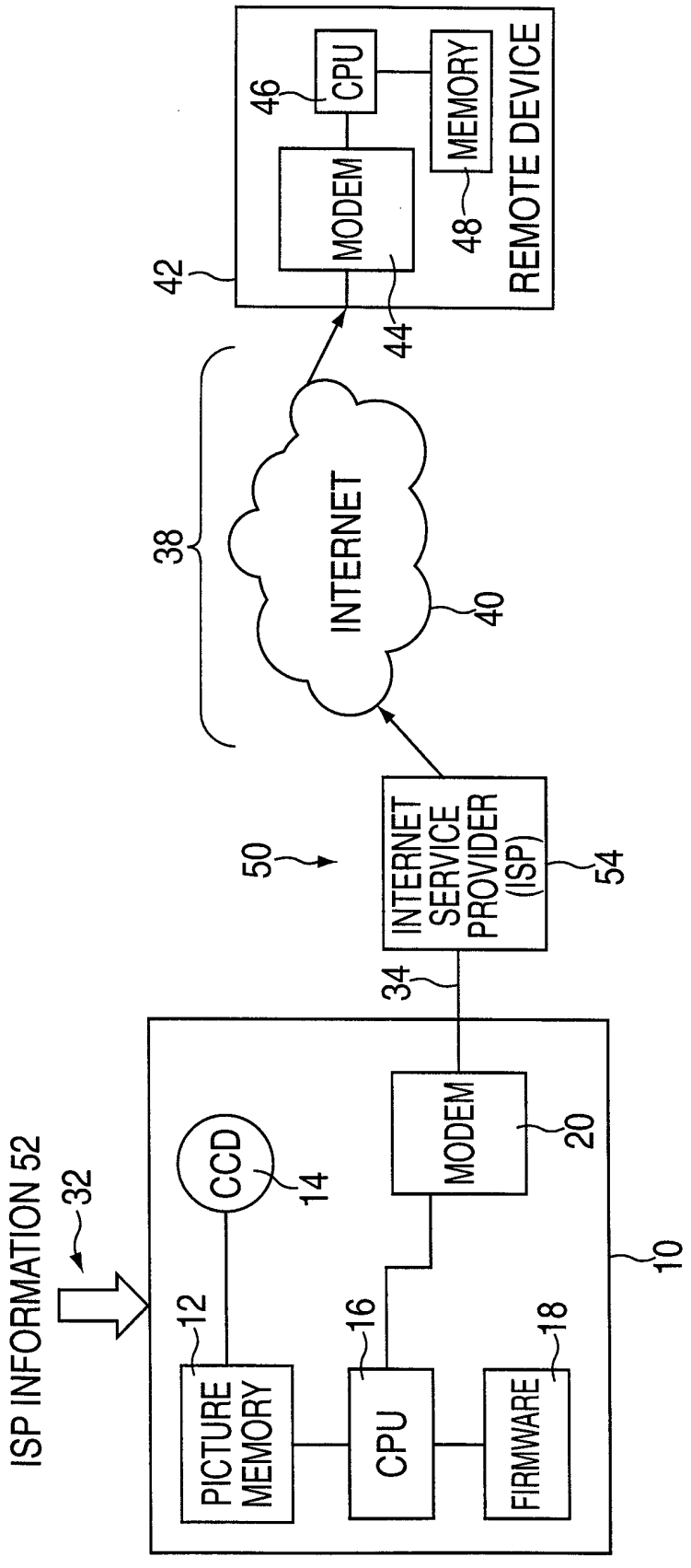
ISP INFORMATION 52
32
PICTURE MEMORY
12
CCD
14
CPU
16
FIRMWARE
18
MODEM
20
10
34
INTERNET SERVICE PROVIDER (ISP)
54
50
38
INTERNET
40
42
MODEM
44
CPU
46
MEMORY
48
REMOTE DEVICE

FIG. 3

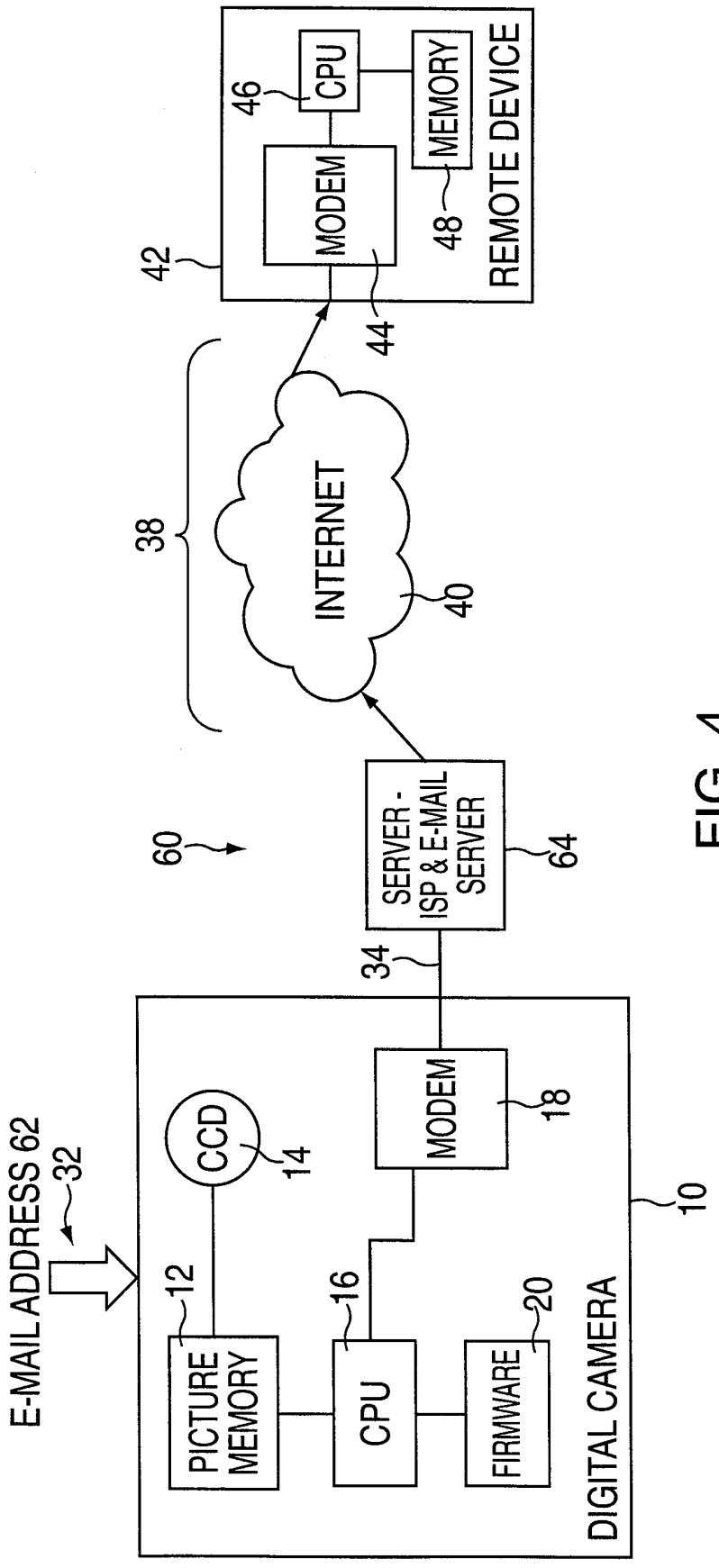
E-MAIL ADDRESS 62
32
PICTURE MEMORY
12
CCD
14
CPU
16
MODEM
18
FIRMWARE
20
DIGITAL CAMERA
10
34
SERVER - ISP & E-MAIL SERVER
64
60
38
INTERNET
40
42
MODEM
44
CPU
46
MEMORY
48
REMOTE DEVICE

FIG. 4

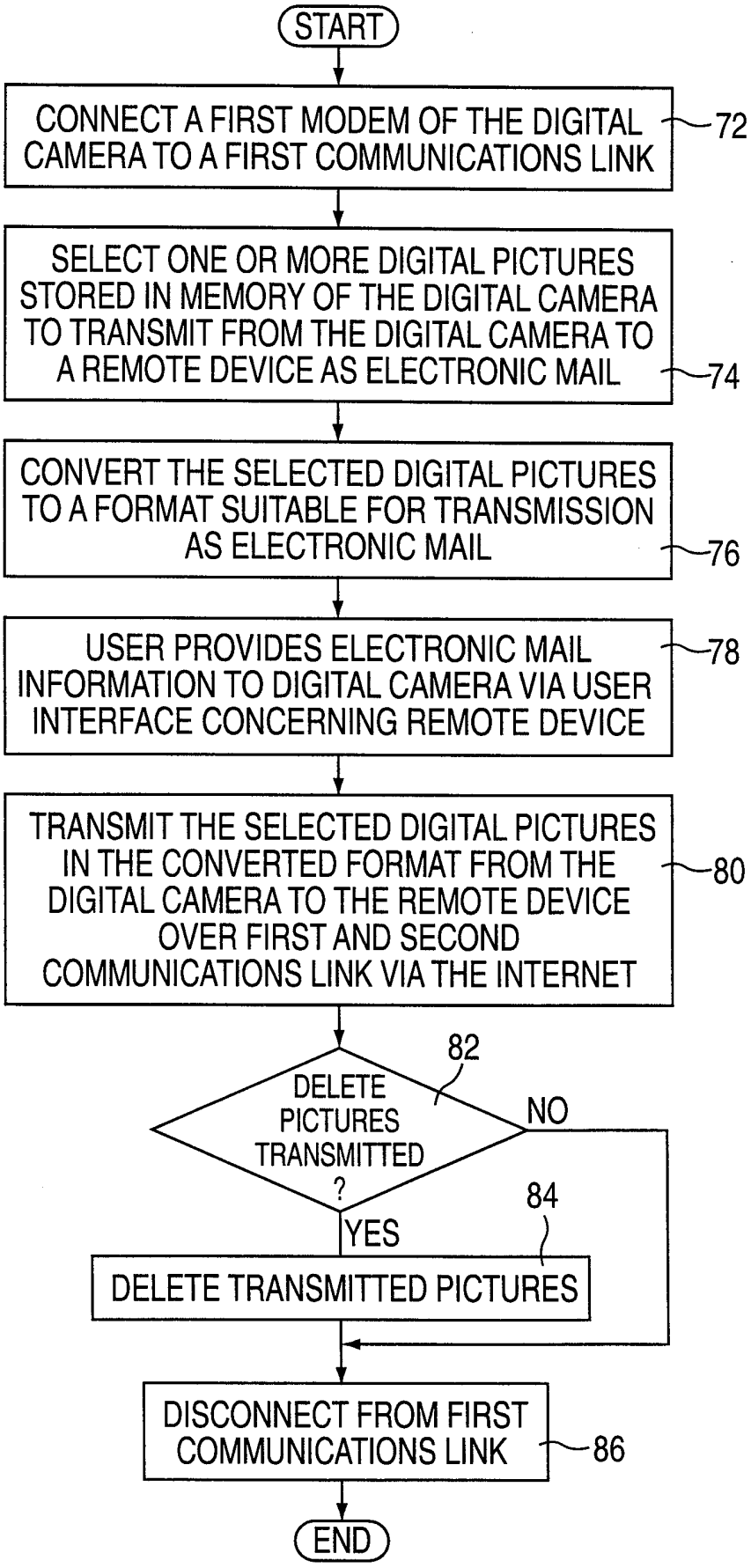
START
CONNECT A FIRST MODEM OF THE DIGITAL CAMERA TO A FIRST COMMUNICATIONS LINK
72
SELECT ONE OR MORE DIGITAL PICTURES STORED IN MEMORY OF THE DIGITAL CAMERA TO TRANSMIT FROM THE DIGITAL CAMERA TO A REMOTE DEVICE AS ELECTRONIC MAIL
74
CONVERT THE SELECTED DIGITAL PICTURES TO A FORMAT SUITABLE FOR TRANSMISSION AS ELECTRONIC MAIL
76
USER PROVIDES ELECTRONIC MAIL INFORMATION TO DIGITAL CAMERA VIA USER INTERFACE CONCERNING REMOTE DEVICE
78
TRANSMIT THE SELECTED DIGITAL PICTURES IN THE CONVERTED FORMAT FROM THE DIGITAL CAMERA TO THE REMOTE DEVICE OVER FIRST AND SECOND COMMUNICATIONS LINK VIA THE INTERNET
80
82
DELETE PICTURES TRANSMITTED ?
NO
YES
84
DELETE TRANSMITTED PICTURES
DISCONNECT FROM FIRST COMMUNICATIONS LINK
86
END

FIG. 5

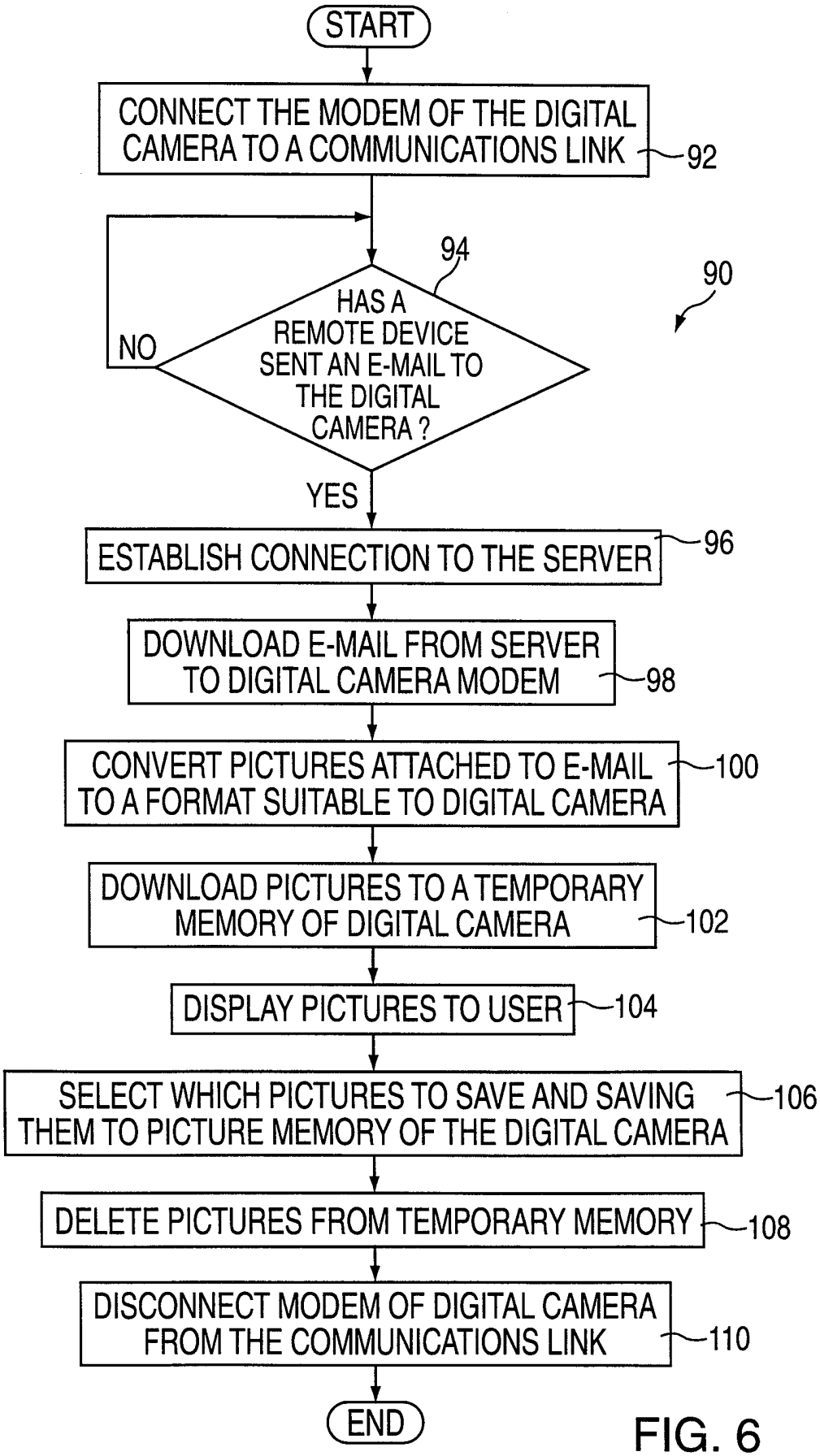
START
CONNECT THE MODEM OF THE DIGITAL CAMERA TO A COMMUNICATIONS LINK
92
94
90
HAS A REMOTE DEVICE SENT AN E-MAIL TO THE DIGITAL CAMERA ?
NO
YES
ESTABLISH CONNECTION TO THE SERVER
96
DOWNLOAD E-MAIL FROM SERVER TO DIGITAL CAMERA MODEM
98
CONVERT PICTURES ATTACHED TO E-MAIL TO A FORMAT SUITABLE TO DIGITAL CAMERA
100
DOWNLOAD PICTURES TO A TEMPORARY MEMORY OF DIGITAL CAMERA
102
DISPLAY PICTURES TO USER
104
SELECT WHICH PICTURES TO SAVE AND SAVING THEM TO PICTURE MEMORY OF THE DIGITAL CAMERA
106
DELETE PICTURES FROM TEMPORARY MEMORY
108
DISCONNECT MODEM OF DIGITAL CAMERA FROM THE COMMUNICATIONS LINK
110
END

FIG. 6

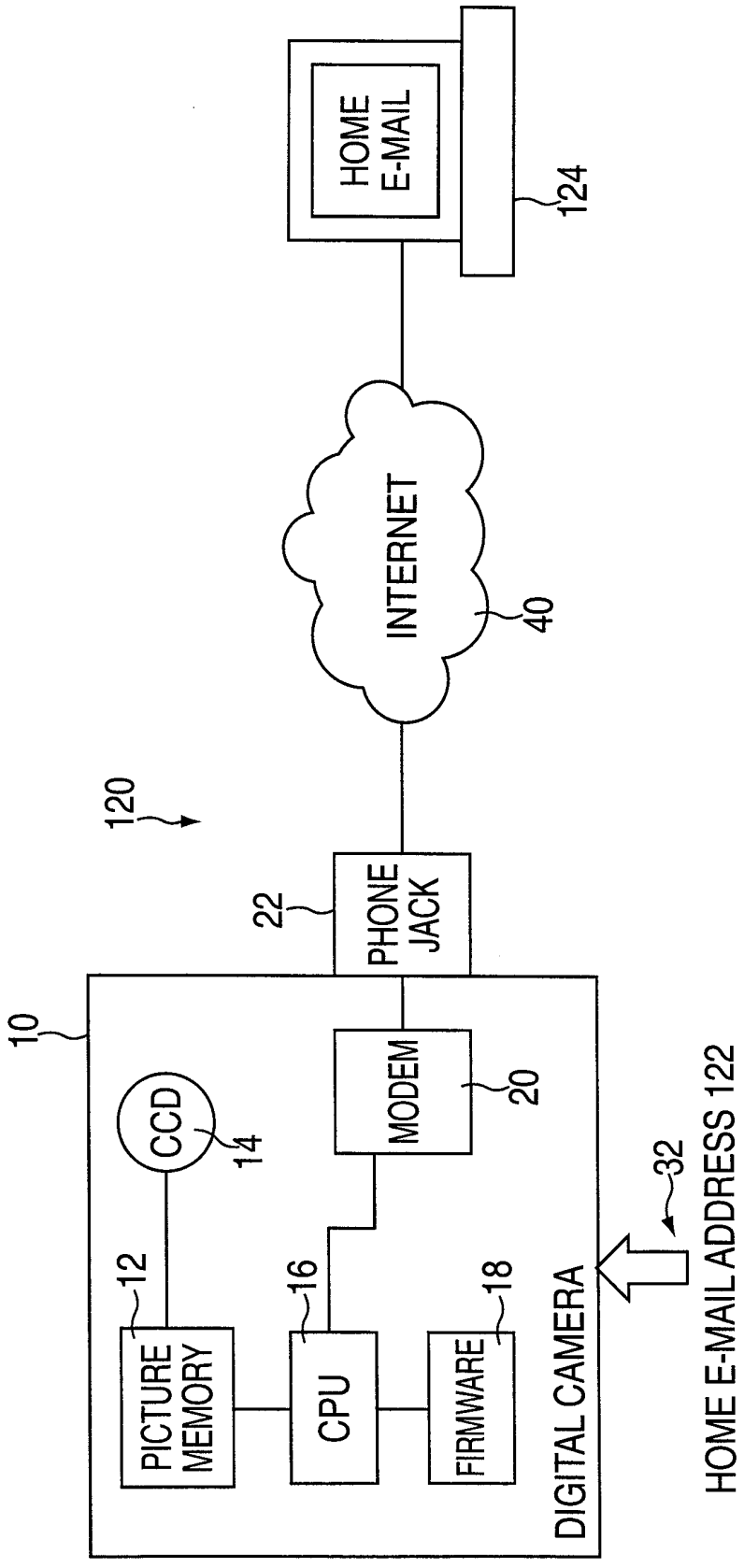
HOME E-MAIL
124
INTERNET
40
120
22
PHONE JACK
10
MODEM
20
CCD
14
32
12
16
18
PICTURE MEMORY
CPU
FIRMWARE
DIGITAL CAMERA
HOME E-MAIL ADDRESS 122

FIG. 7

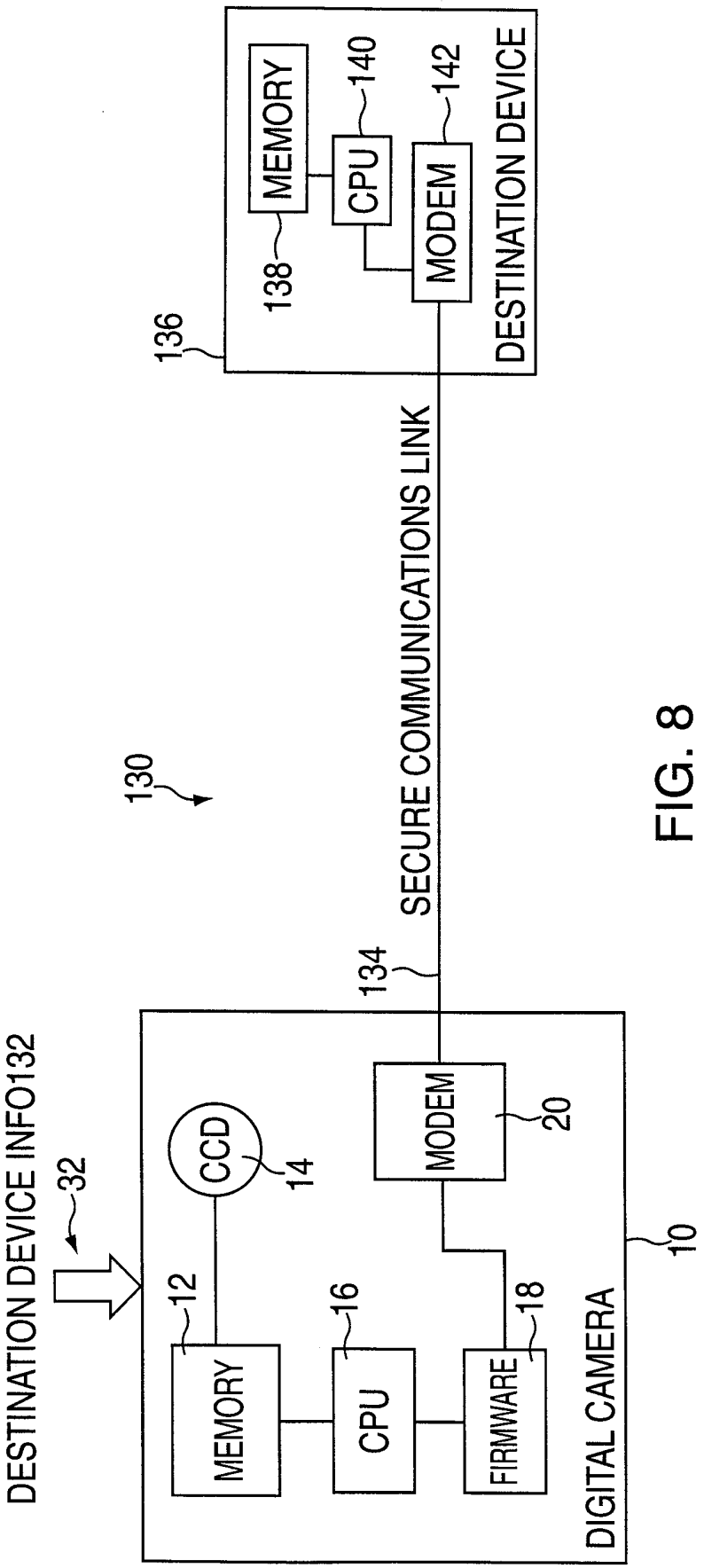
DESTINATION DEVICE INFO132
32
DIGITAL CAMERA
10
MEMORY
12
CPU
16
FIRMWARE
18
CCD
14
MODEM
20
134
SECURE COMMUNICATIONS LINK
130
136
DESTINATION DEVICE
MEMORY
138
CPU
140
MODEM
142

FIG. 8

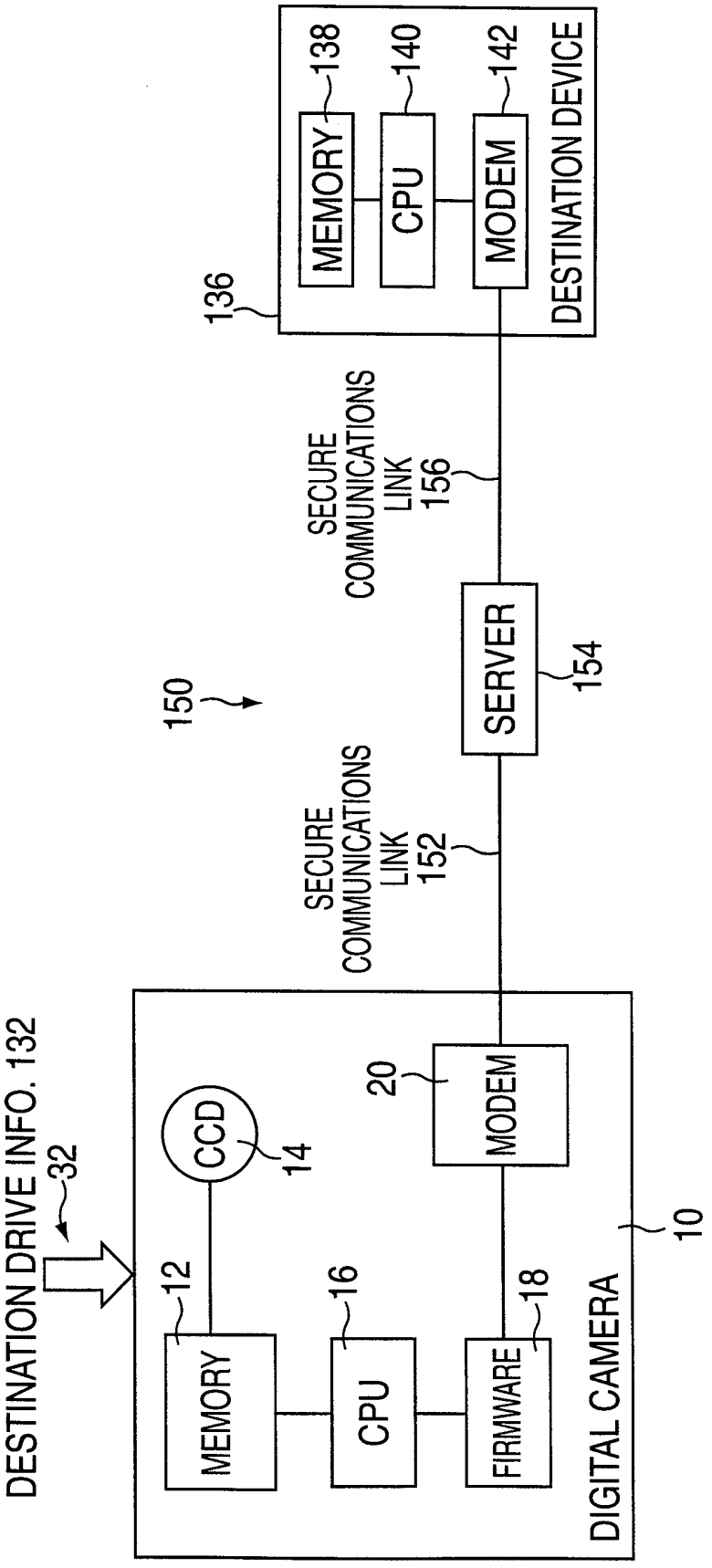
DESTINATION DRIVE INFO. 132
32
DIGITAL CAMERA
10
MEMORY
12
CPU
16
FIRMWARE
18
CCD
14
MODEM
20
SECURE COMMUNICATIONS LINK 152
150
SERVER
154
SECURE COMMUNICATIONS LINK 156
136
DESTINATION DEVICE
MEMORY
138
CPU
140
MODEM
142

FIG. 9

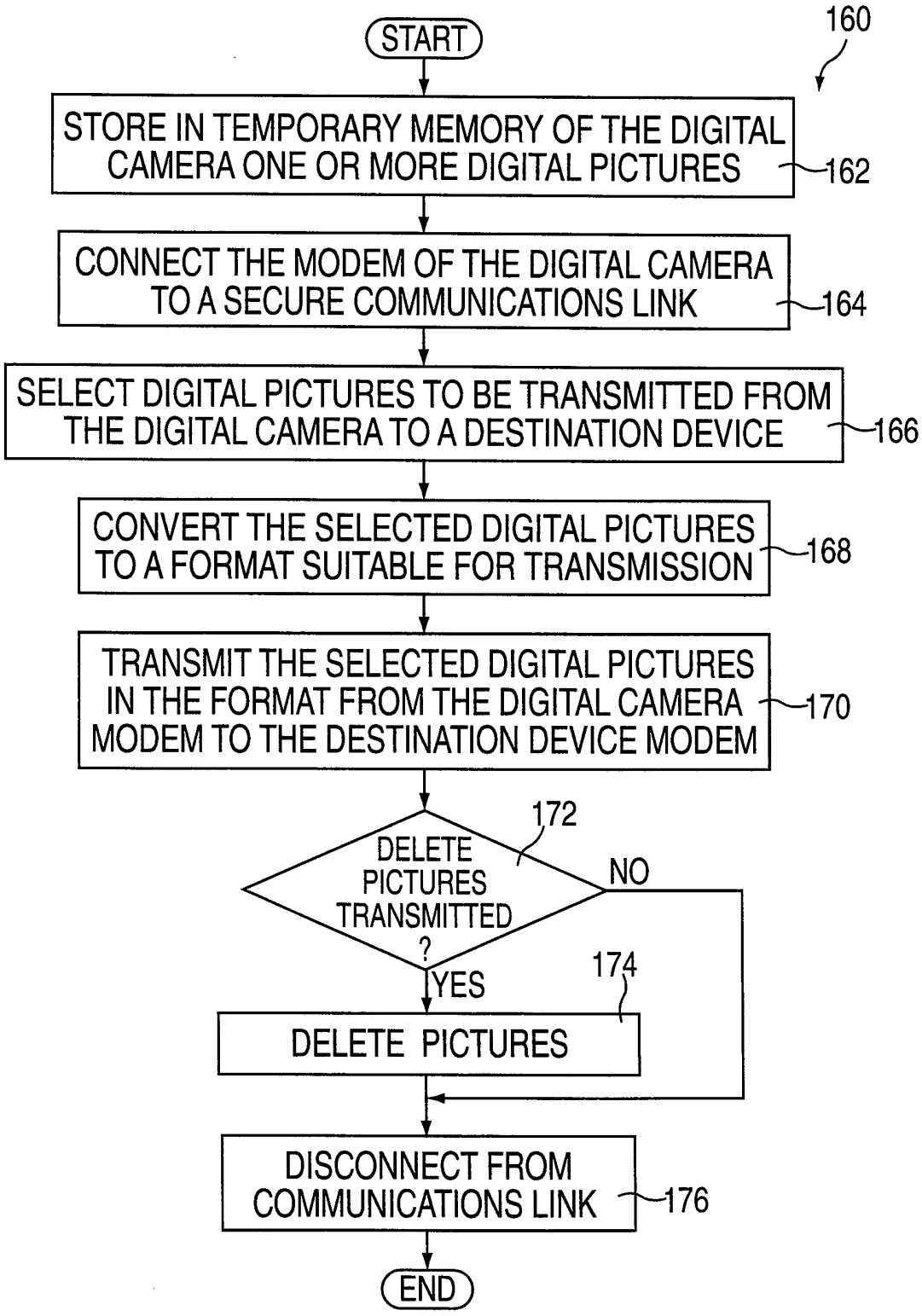
START
160
STORE IN TEMPORARY MEMORY OF THE DIGITAL CAMERA ONE OR MORE DIGITAL PICTURES
162
CONNECT THE MODEM OF THE DIGITAL CAMERA TO A SECURE COMMUNICATIONS LINK
164
SELECT DIGITAL PICTURES TO BE TRANSMITTED FROM THE DIGITAL CAMERA TO A DESTINATION DEVICE
166
CONVERT THE SELECTED DIGITAL PICTURES TO A FORMAT SUITABLE FOR TRANSMISSION
168
TRANSMIT THE SELECTED DIGITAL PICTURES IN THE FORMAT FROM THE DIGITAL CAMERA MODEM TO THE DESTINATION DEVICE MODEM
170
172
DELETE PICTURES TRANSMITTED ?
NO
YES
174
DELETE PICTURES
DISCONNECT FROM COMMUNICATIONS LINK
176
END

FIG. 10

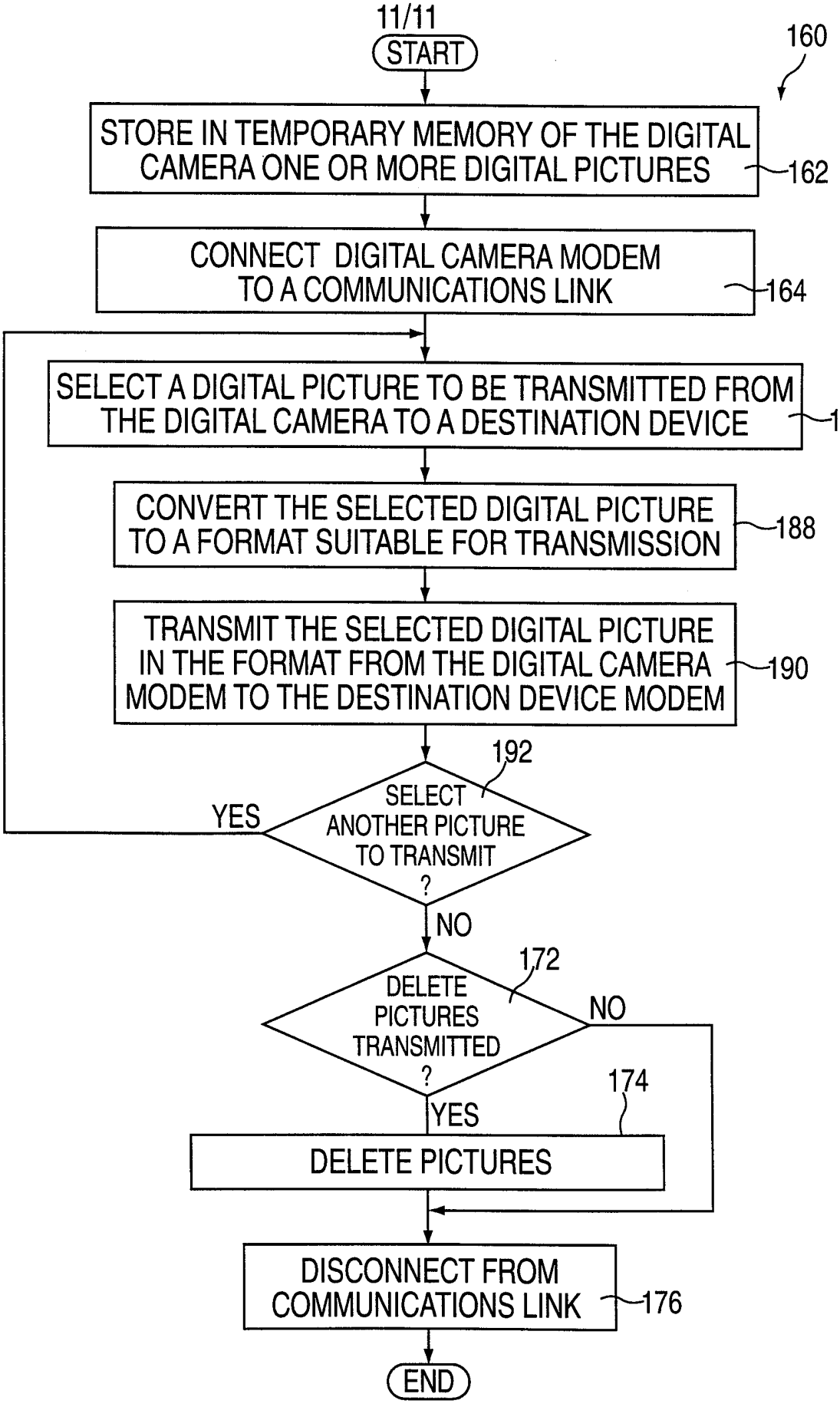

FIG. 11

SUBSTITUTE SHEET (RULE 26)