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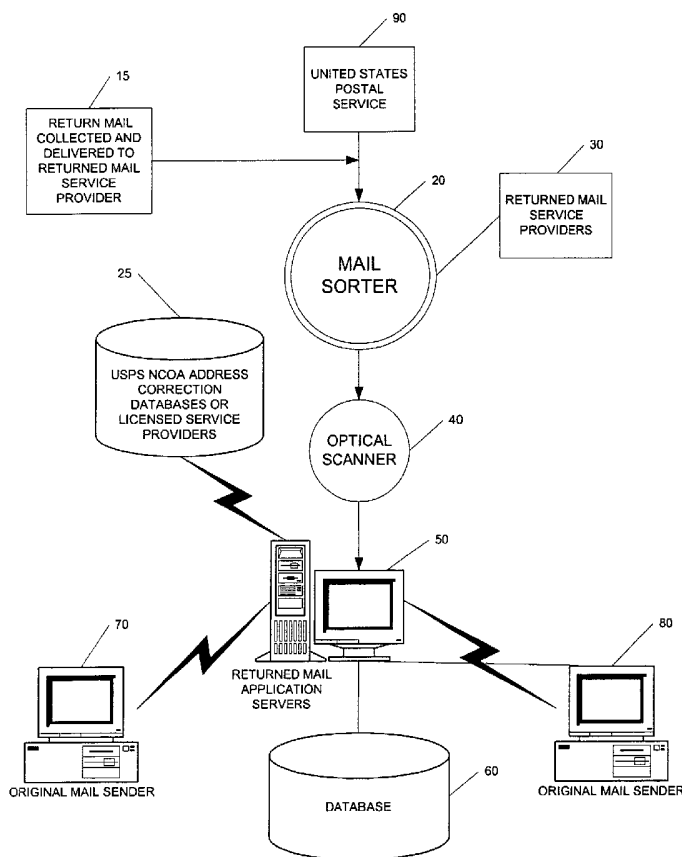
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[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR PROCESSING RETURNED MAIL



(57) Abstract: A method, system and program product for processing returned mail includes the steps of encoding pieces of mail with data including the identity of the intended recipient, mailing the pieces of mail with data including the identity of the intended recipient, mailing the pieces of mail to the intended recipients, collecting at a processing location those pieces of mail that are returned as undeliverable, scanning the data form the returned pieces of mail, electronically updating at least address information for the intended recipients of the returned mail, and electronically transmitting the updated address and other information to a subscriber for updating the subscriber's database of recipient address.



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**ATTORNEY DOCKET NO. R105 1010.PCT****SYSTEM AND METHOD FOR PROCESSING RETURNED MAIL****Background of the Invention**

[0001] The present invention relates generally to mail processing, and more particularly to a method, system, and program product for processing business mail that is returned to the sender due to an inaccurate or expired address for the intended recipient.

[0002] Many businesses mail thousands or even millions of pieces of mail each month to customers, clients, and prospects. Such businesses include, for example, insurance companies, mortgage and finance companies, bulk mail advertisers, and credit card companies. Inevitably, a certain percentage of the items that are mailed each month by these businesses are returned to the sender, usually because the intended recipient has moved without notice or otherwise is no longer at the address to which the mail was sent. Other causes, such as incomplete addresses and local changes in addresses of residences in an area also may result in returned mail. Intended recipients also can change their names through marriage or otherwise, which also can result in returned mail.

[0003] The processing of mail that is returned to sender historically has been a time-consuming labor-intensive process for high volume mail users. It is not uncommon for such high volume users to retain a staff of several employees whose job it is to receive the returned mail, manually research the reasons for the unsuccessful delivery, obtain,

where possible, the correct addressing information for the intended recipient, and oversee a second mailing to the corrected address. Even with the availability of address updating services to aid in researching for the correct address, the process is substantially a manual one subject to human error and delays. Furthermore, the cost of maintaining a staff to handle returned mail, to update company address databases, and the postage expense that is incurred before the mail actually reaches the intended recipient is substantial. Finally, human error is always an issue with such manual systems.

[0004] Accordingly, a need exists for an improved method of processing returned mail that overcomes the historical problems with prior art manual handling and that does so quickly, more accurately, and at substantially less cost. It is to the provision of such a method and system that the present invention is primarily directed.

#### **Summary of the Invention**

[0005] Successful performance of the invention as described herein depends upon the subscribers providing specification compliant mail for processing. In general terms this means that: (1) the physical properties (length, height, thickness, weight, etc.) of the mail to be processed conform to United States Postal Service (USPS) automation letter mail standards, modified to exclude post-cards and "self-mailers" and (2) the mail includes return address block information specially formatted as a two-dimensional barcode.

[0006] Subscribers provide the address of the return mail service provider in the return address block, which receives mail, returned as undeliverable by the USPS.

The return mail provider service provider captures the data from the returned items and apply its special expertise in obtaining corrected address information. The return mail service provider then electronically transfers corrective data records to the subscriber.

[0007] In one exemplary embodiment, data including the identification of the addressee is encoded on each item of a subscriber's mail to be delivered. Items of mail found to be undeliverable subsequent to mailing are received at a processing location where they are loaded onto a transport mechanism and then optically scanned. The optically scanned data is stored in a data file for further processing. The names and addresses of the intended recipients in the data file are then transmitted to a service bureau electronically for updated addresses. Upon receiving updated addresses, the new address data is delivered to the subscriber in electronic form for use in updating the subscriber's customer address files.

#### **Description of the Drawings**

[0008] The invention is better understood by reading the following detailed description of an exemplary embodiment in conjunction with the accompanying drawings.

[0009] Fig. 1 illustrates the processing flow for the returned mail handling system in accordance with an exemplary embodiment of the present invention.

[0010] Fig. 2 illustrates the processing logic at the returned mail application servers for handling of mail determined to be undeliverable in accordance with an exemplary embodiment of the present invention.

[0011] Fig. 3 illustrates the processing logic for updating address records associated with returned mail in accordance with an exemplary embodiment of the present invention.

[0012] Fig. 4 illustrates the processing logic associated with encoding a subscriber's mailing form with the return address of the returned mail service provider in accordance with an exemplary embodiment of the present invention.

[0013] Fig. 5 illustrates the processing logic for updating customer records by a subscriber associated with returned mail in accordance with an exemplary embodiment of the present invention.

#### **Detailed Description of the Invention**

[0014] The present invention is directed to an improved method and system for processing returned mail that successfully addresses the problems with prior art methods. The methodology is offered to subscribers through a return mail processing service provider that can be centrally located or that can have regional locations. The return mail process is particularly applicable to high volume (bulk) mail users such as credit card companies, but is also applicable to any mail user who experiences and must deal with quantities of returned mail each month. The methodology of the process is described in the following.

[0015] Each piece of mail to be sent by a subscriber to its own customers is optically encoded on its face or back side with a block of machine-readable data in the form of a two-dimensional (2-D) barcode that can include a wide variety of information. This information can include the name and address of the addressee, identifying

information regarding the sender, electronic mail address of the sender, and virtually any other information useful to include on the mail. In reality, a relatively large volume of information can be encoded in such optical data blocks. For example, information related to the address history of the addressee and similar data can be included.

[0016] Portable Data File 417 (PDF417) is the most widely used 2-D barcode. Developed by Symbol Technologies, Inc, this barcode can hold up to 1800 bytes of any digital data in a printed area the size of a business card. An optical scanner reads the barcode horizontally and vertically.

[0017] A subscriber, for example, a credit card company, also includes on each piece of mail, in addition to the optically encoded data, a written return address that is not the address of the subscriber but rather the address of the central, or one of the regional locations, of the service provider. Accordingly, when a piece of mail is undeliverable for any reason, it is returned by the post office to the service provider offering the processing services of the present invention. As an alternative, a subscriber can elect to receive its own returned mail, bundle it together, and then deliver it to the service provider for return mail processing. In any event, at the service provider's location, thousands of pieces of undeliverable mail sent originally by many subscribers to their customers are received either directly from the post office or from subscribers.

[0018] Referring to Fig. 1, at the service provider's location, the returned mail (block 15) is passed through a high volume mail sorter 20 and optical scanner 40. The optical scanner 40 reads the information previously optically encoded onto each mail piece

before it was sent. This information is conveyed to a computer based application server 50 programmed to store and process the scanned information according to the methodology of the invention. The information scanned from the returned mail pieces may be processed in a number of ways by the application server 50 depending upon the desired services to be provided. In one exemplary embodiment, the application server is programmed to sort the data in an appropriate way initially, for example, by subscriber. The addresses of the addressees may then be extracted from the scanned data for processing.

[0019] The application server 50 preferably is electronically linked by a data line, which may be any conventional telecommunications data line, to the computers and databases 25 of an auxiliary address service that provides up-to-date addresses for millions of people throughout the country. These may be the same address services that historically have been accessed as a research source by the return mail handling staff of subscribers in manually updating addresses of returned mail. Software interfaces are provided on the address service's computers and database 25 and in the application server 50 such that the two computers may exchange data and information electronically and automatically. In one embodiment, the application server 50 transmits to the address service's computer 25 the inaccurate and/or out-of-date address of the intended recipient of each piece of returned mail. In response, the service provider's computer 25 returns to the application server the correct and up-to-date address of the intended recipient. Other information also can be accessed and downloaded such as, for example, data reflecting name changes of recipients due to marriage, or data reflecting other changes in status.



[0020] Once the updated data is downloaded from the address service's computer 25, the application server 50 creates a database for each subscriber containing a variety of information regarding the returned pieces of mail. For instance, the database clearly would contain the identity of the intended recipient and the new updated address retrieved from the address service's computer 25. Any other pertinent information also may be included such as name change information or even job or economic status changes that may be of interest or important to the subscriber.

[0021] Once the corrected up-to-date database is created for the returned mail of a subscriber, the application server 50 establishes a data connection with a computer 70, 80 of the subscriber. The updated data files are then transferred electronically to the subscriber's computer 70, 80, which is provided with software to receive and interpret the data, update the subscriber's mailing list with the new addresses contained in the data, and to update the subscriber client or customer files to reflect any other information that may be transmitted with the data. The subscriber may use this updated information as it deems appropriate. For example, the subscriber's computer may be programmed to produce immediate re-mailings of the invoices or other mail that originally was returned by the post office as undeliverable. Alternatively, the subscriber may forgo such a re-mailing and simply use the updated addresses for the next successive mailing cycle.

[0022] Fig. 2 illustrates the processing logic performed at the returned mail application servers for the handling of mail determined to be undeliverable. Processing starts in logic block 200 with the delivery of the physical envelopes to the return mail service provider from the United States Postal Service. The undeliverable

mail is then fed through the mail sorter 20 with barcode optical scanner 40, as indicated in input block 202. The optical scanner 40 then reads the machine-readable information on each envelope as indicated in logic block 204. The two-dimensional barcode is then decoded from each envelope as indicated in logic block 206. Data contained on the envelope is collected and an output data file is created in output block 208. The data in this output file is then sorted by customer numbers, as indicated in logic block 210. From this sorted data, output files are created based on the customer number as indicated in output block 212.

[0023] Fig. 3 illustrates the processing logic for updating address records associated with returned mail. Processing starts as indicated in logic block 300 with the identification of output files by customer number and the queuing of the output files for additional address correction services. In decision block 302, a test is made to determine if the sender (originator) wants the return mail application service provider to provide corrected addresses for intended recipients. If the sender does not want to have correct addresses provided for the intended recipients, the returned mail data records are placed on the Internet website of the service provider for pickup by the sender (logic block 304). As indicated in output block 306, the original mail sender picks up the data records of the undeliverable USPS mail. If a determination is made in decision block 302 that the sender wants to have correct addresses provided for the intended recipients, then the return mail application server then sends the returned mail data records to an address update service bureau, such as the USPS NCOA address correction databases or the databases provided by licensed service providers. This processing step is indicated in logic block 308. The addresses of the intended

recipients are then updated when possible based on information provided by the service bureau as indicated in output block 310. The updated records are provided to the return mail service provider as indicated in logic block 312. The returned mail data records are then placed on the Internet website of the service provider or a dialup service for sender pickup as indicated in logic block 314. The original mail sender then picks up the data records of the undeliverable USPS mail as indicated in output block 316.

[0024] An alternative embodiment of the invention is illustrated in Fig. 4 in which the return mail application service provider encodes a subscriber's mailing form with the return address of the return mail service provider. Processing starts as indicated in block 400 with sender data being received by the return mail application service provider. The sender data is then encoded with a two-dimensional barcode to be printed on a customer form so that the two-dimensional barcode appears in the return address location of a dual pane window envelope as indicated in logic block 402. The return address of the sender is included in the return address space after the sender's logo and/or company name with the two-dimensional barcode printed just below the return address as indicated in logic block 404. The form to be mailed is then printed in hard copy format and prepared for the U.S. postal system with the return address and two-dimensional barcode included on the form as indicated logic block 406. The mailing is then released to the U.S. postal system, like any other piece of U.S. mail, as indicated in logic block 408. Next, in decision block 410, a determination is made if the mail is deliverable or should be returned to the sender from the United States Postal Service. As indicated in logic block 412, deliverable mail is then physically

delivered to the addressee as normal. For undeliverable mail, the physical mail is then delivered to the sender as specified on the mail item for further data processing as indicated in logic block 414.

[0025] Fig. 5 illustrates the processing logic for updating customer records by a subscriber that originated the returned mail. Processing begins in logic block 500 with the delivery of the actual physical envelopes found to be undeliverable by the United States Postal Service to the sender. The envelopes are individually read with a two-dimensional hand-held barcode optical scanner as indicated in input block 502. The optical scanner reads the physical envelope as indicated in logic block 504. Next, as indicated in logic block 506, the two-dimensional barcode on the envelope is decoded. An output file is then created from the decoded envelopes as indicated in output block 508. The output file so generated is then used to update the original data source as indicated in output block 510.

[0026] The requirements for an automated system to aid in data capture (and outcome-based sorting) of returned mail items includes the following components, which are available from Lockheed Martin Distribution Technologies, Inc:

1. a standard letter mail transport;
2. a camera subsystem to read the PDF417 2-D barcode. Hardware and process software in this device are derived from a standard mixed media optical character recognition (MLOCR) camera configuration. Recognition software is integrated to read a PDF417 format two-dimensional barcode printed as a portion of the return address block.

3. an application specific sort program to coordinate camera and transport processes.

[0027] When the return mail service provider receives the returned mail as undeliverable items from the USPS (from a mixture of subscriber mailings), the letters are faced and passed through the transport mechanism. The camera system attempts to read the two-dimensional barcode as the item passes. The possible outcomes of this operation are:

1. no two-dimensional barcode is located on the envelope - such items are either improperly faced in the transport or are not bar-coded;
2. a two-dimensional barcode is found, but cannot be decoded - such items could have been printed at a non-compliant quality level or marred/damaged during transit through the USPS system, or could simply be "chance" failures in the recognition process;
3. a two-dimensional barcode is found and successfully decoded.

[0028] Physical sorting of the mail and the recording of envelope data depends on the read outcome. Rejected mail can be selectively routed to different reject bins depending on the two different reject types (i.e., no code found or code cannot be determined). No data is saved for rejected items. Data records for successfully decoded items are saved for later retrieval with the items themselves routed to a successful read bin. Data records are saved in a date/time-stamp file corresponding to the time of run-initialization. At any time, the operator may momentarily end processing, causing this file to be closed and become network accessible for the return

mail service provider data processing operations. On processing restart, a new and newly named data file is opened with new envelope data records saved to this file.

[0029] The data content of the 2-D barcode can be four to seven lines as follows:

1. one alphanumeric string (20 – 60 characters);
2. three to six lines of address information (maximum of 40 characters per line); and
3. a total maximum of 300 characters (including non-printing characters).

[0030] An output file is created for each mail run, with run beginning and end defined by operator action at the sort computer user interface. The name for each output file incorporates a date/time relative to the time of run initialization. The output file contains records only for successfully read 2-D Codes. A vertical bar marks the beginning and end of each record in the file. Another record delimiting character can be specified instead of the vertical bar. However, care must be taken to ensure that it is not a possible character within the barcode data. Between the pair of vertical bars is the continuous byte string returned by the 2-D barcode decode process. Thus, the content and parsing structure of the printed code are transparent to recognition and output processes with line interpretation/ parsing governed by embedded line delimiters (such as CR/LF).

[0031] Accordingly, it will be appreciated that an improved method of processing returned mail is now provided that addresses the shortcomings of historical manual updating methods and does so at a substantially reduced cost. A high volume mail user subscriber need no longer retain large staffs for manually receiving, researching, updating, and re-mailing pieces of mail that are returned undeliverable. The

methodology of the present invention, instead of being virtually all manual, is accomplished virtually entirely automatically through the exchange of data files between computers. Thus, not only is the necessity for the physical handling of large volumes of physical envelopes eliminated for subscribers, the address file updating process can be accomplished much quicker than is possible with manual processing. The likelihood of human error in researching and updating addresses is eliminated with the result that a more reliable and constantly updated address database may be maintained.

[0032] The returned mail handling system of the present invention can be realized in software or a combination of hardware and software. Any kind of computer system or other apparatus adapted for carrying out the methods described herein is suited. A typical combination of hardware and software in this context could be a web-based server computer with a computer program that, when loaded and executed, controls the web-based server computer such that it carries out the methods described herein. The returned mail handling system can be embedded in a computer program product, which includes all the features enabling the implementation of the methods described herein, and which, when loaded in a computer system, is able to carry out these methods.

[0033] Additionally, the corresponding structures, materials, acts, and equivalents of all means plus function elements in any claims are intended to include any structure, material or acts for performing the functions in combination with other claim elements as specifically claimed.

[0034] Those skilled in the art will appreciate that many modifications to the exemplary embodiment of the present invention are possible without departing from the spirit and scope of the present invention. In addition, it is possible to use some of the features of the present invention without the corresponding use of the other features. Accordingly, the foregoing description of the exemplary embodiment is provided for the purpose of illustrating the principles of the present invention and not in imitation thereof since the scope of the present invention is defined solely by the appended claims.



**What is Claimed is:**

1. A method for processing a plurality of undeliverable mail items comprising the steps of:
  - encoding data including identification information on each of a plurality of mail items prior to mailing;
  - receiving those items of the plurality of mail items that are returned as being undeliverable; and
  - scanning and processing the encoded data on the items of undeliverable mail.
2. The method for processing a plurality of undeliverable mail items of claim 1 wherein the step of encoding data includes placing an optically encoded barcode on each of the plurality of mail items.
3. The method for processing a plurality of undeliverable mail items of claim 2 wherein the barcode is a two-dimensional barcode.
4. The method for processing a plurality of undeliverable mail items of claim 3 wherein the two-dimensional barcode is a Portable Data File 417 (PDF417) barcode.

5. The method for processing a plurality of undeliverable mail items of claim 1 further comprising the step of loading the plurality of undeliverable mail items on a transport mechanism for sorting into a plurality of categories.
6. The method for processing a plurality of undeliverable mail items of claim 5 wherein the plurality of categories includes a barcode not decoded category and a barcode decoded successfully category.
7. The method for processing a plurality of undeliverable mail items of claim 1 wherein the step of scanning the encoded data on the undeliverable mail includes reading an optically encoded barcode on each item and decoding the barcode to determine the identification information associated with an intended recipient of the item.
8. The method for processing a plurality of undeliverable mail items of claim 7 further comprising the step of generating an output file from the scanned and decoded data in the optically encoded barcode.
9. The method for processing a plurality of undeliverable mail items of claim 8 further comprising the step of transmitting the generated output file to a mailing address service provider in order to obtain a different address for each intended recipient of an undeliverable mail item.

10. A method for processing returned mail items sent by a subscriber to a recipient, the returned mail items incorporating encoded identification information, the method comprising the steps of:
  - collecting the returned mail items at a processing location;
  - reading the encoded information from the returned mail items;
  - electronically gathering updated information including a different address of the intended recipient; and
  - electronically transmitting updated information to the subscriber for updating of a subscriber's address database.
11. The method for processing returned mail items of claim 10 wherein the encoded information is placed in an optically encoded barcode on each of the plurality of mail items.
12. The method for processing returned mail items of claim 11 wherein the barcode is a two-dimensional barcode.
13. The method for processing returned mail items of claim 12 wherein the two-dimensional barcode is a Portable Data File 417 (PDF417) barcode.
14. The method for processing returned mail items of claim 10 further comprising the step of loading the plurality of undeliverable mail items on a transport mechanism for sorting into a plurality of categories.

15. The method for processing returned mail items of claim 14 wherein the plurality of categories includes a barcode not decoded category and a barcode decoded successfully category.
16. The method for processing returned mail items of claim 10 wherein the step of reading the encoded information includes scanning an optically encoded barcode on each item and decoding the barcode to determine identification information associated with the intended recipient of the item.
17. The method for processing returned mail items of claim 16 further comprising the step of generating an output file from the scanned and decoded data in the optically encoded barcode.
18. The method for processing returned mail items of claim 17 further comprising the step of transmitting the generated output file to a mailing address service provider in order to obtain a different address for each intended recipient of an undeliverable mail item.
19. A computer readable medium containing a computer program product for processing a plurality of undeliverable mail items, the computer program product comprising:

- program instructions that capture optically scanned encoded data including identification information on each item of undeliverable mail;
- program instructions that store the captured optically scanned data in a data file;
- program instructions that update the stored data to reflect a different address of the intended recipient of each item of undeliverable mail; and
- program instructions that transmit the updated stored data to a subscriber in electronic form to update the address files of the subscriber.
20. The computer program product for processing a plurality of undeliverable mail items of claim 19 wherein the encoded data is placed in an optically encoded barcode on each mail item.
21. The computer program product for processing a plurality of undeliverable mail items of claim 20 wherein the bar code is a two-dimensional bar code.
22. The computer program product for processing a plurality of undeliverable mail items of claim 19 wherein the encoded identification information includes a name and current address associated with the intended recipient of the mail item.

23. The computer program product for processing a plurality of undeliverable mail items of claim 19 further comprising program instructions that transmit the stored data file electronically to a mailing address service provider in order to obtain a different address for each intended recipient of an undeliverable mail item.
24. A system for processing a plurality of undeliverable mail items comprising:
- a scanner for reading optically encoded data that includes identification information on each item of undeliverable mail;
  - a processor for operation of a computer program for capturing the identification information in the encoded data and writing the identification information into a data file; and
  - a database for storing the data file containing identification information.
25. The system for processing a plurality of undeliverable mail items of claim 24 wherein the computer program includes instructions that update the stored data in the data file with a different address associated with each of the undeliverable mail items.
26. The system for processing a plurality of undeliverable mail items of claim 24 wherein the computer program includes instructions that deliver the updated

stored data to a subscriber in electronic form for use in updating the address files of the subscriber.

27. The system for processing a plurality of undeliverable mail items of claim 24 wherein the optically encoded data contains a two-dimensional bar code.

28. The method for processing a plurality of undeliverable mail items of claim 1, wherein the step of processing encoded data comprises the steps of:

storing the encoded data in a data file;

updating the stored data to correct the address of each intended recipient of the items of undeliverable mail; and

delivering the updated data to a subscriber for use in updating the mailing address files of the subscriber.

29. The method for processing a plurality of undeliverable mail items of claim 1, wherein the identification information encoded on each mail item includes a name and current address associated with an intended recipient of the mail item.

30. The method for processing a plurality of undeliverable mail items of claim 2, wherein the optically encoded bar code is placed on either the front side or the back side of each mail item.

31. The method for processing a plurality of undeliverable mail items of claim 2, wherein the optically encoded bar code is placed in a return address section on each of the plurality of mail items.
32. The method for processing a plurality of undeliverable mail items of claim 11, wherein the optically encoded bar code is placed on either the front side or the back side of each mail item.
33. The method for processing a plurality of undeliverable mail items of claim 11, wherein the optically encoded bar code is placed in a return address section on each of the plurality of mail items.
34. The method for processing a plurality of undeliverable mail items of claim 20, wherein the optically encoded bar code is placed on either the front side or the back side of each mail item.
35. The method for processing a plurality of undeliverable mail items of claim 20, wherein the optically encoded bar code is placed in a return address section on each of the plurality of mail items.
36. The system for processing a plurality of undeliverable mail items of claim 24, further comprising a mail transport device for conveying the plurality of



undeliverable items and sorting the undeliverable mail items into a plurality of bins.

37. The system for processing a plurality of undeliverable mail items of claim 24, wherein the scanner is a hand-held device.
38. The system for processing a plurality of undeliverable mail items of claim 24, wherein the scanner is a mixed media optical character recognition (MLOCR) device.

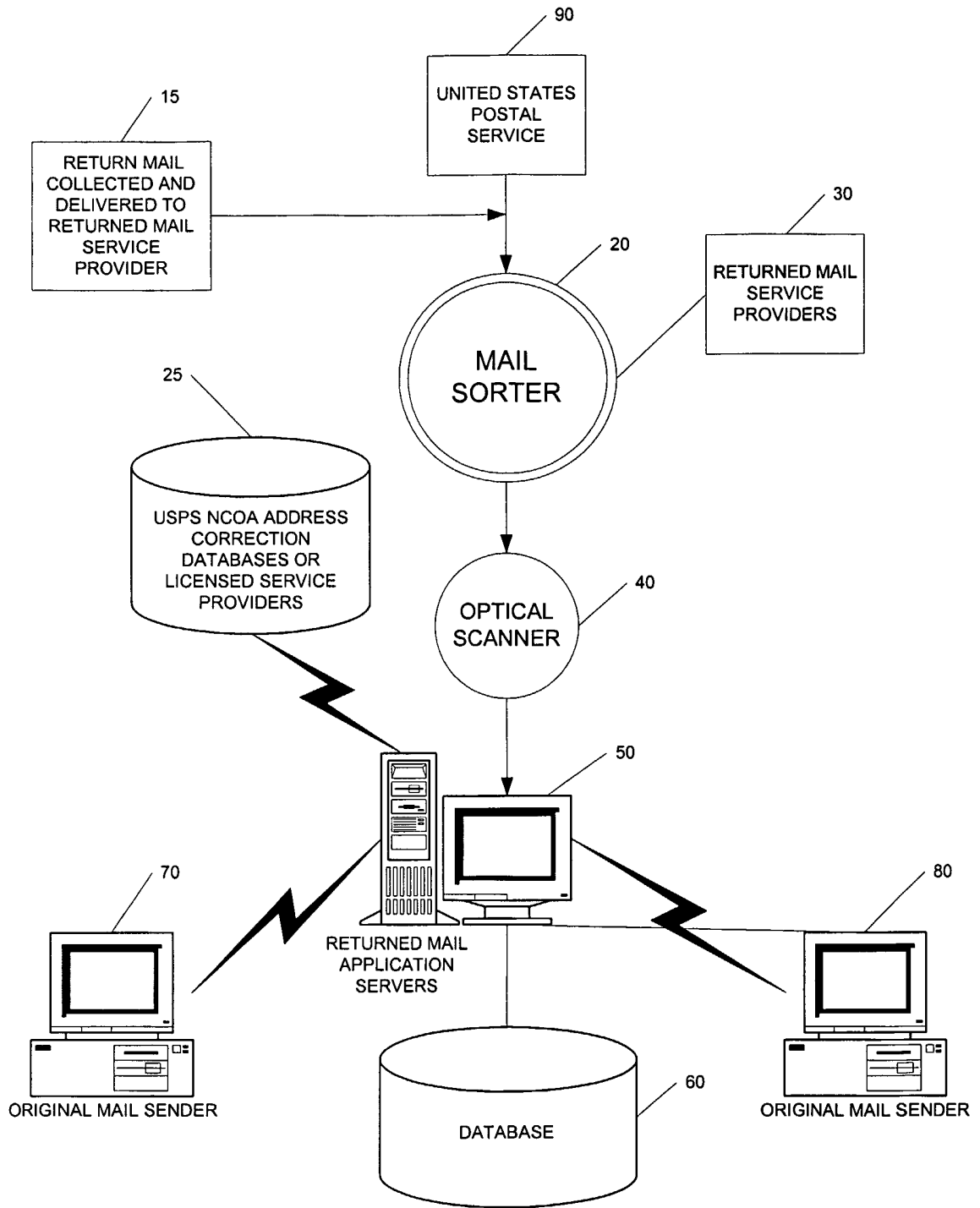


FIG. 1

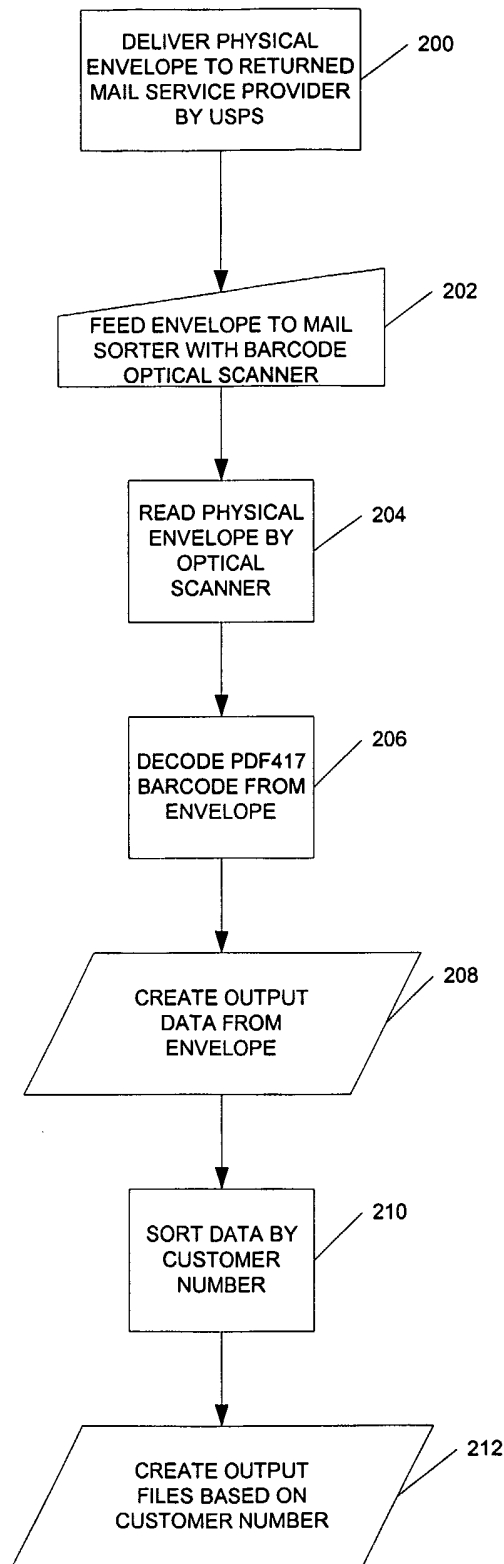


FIG. 2

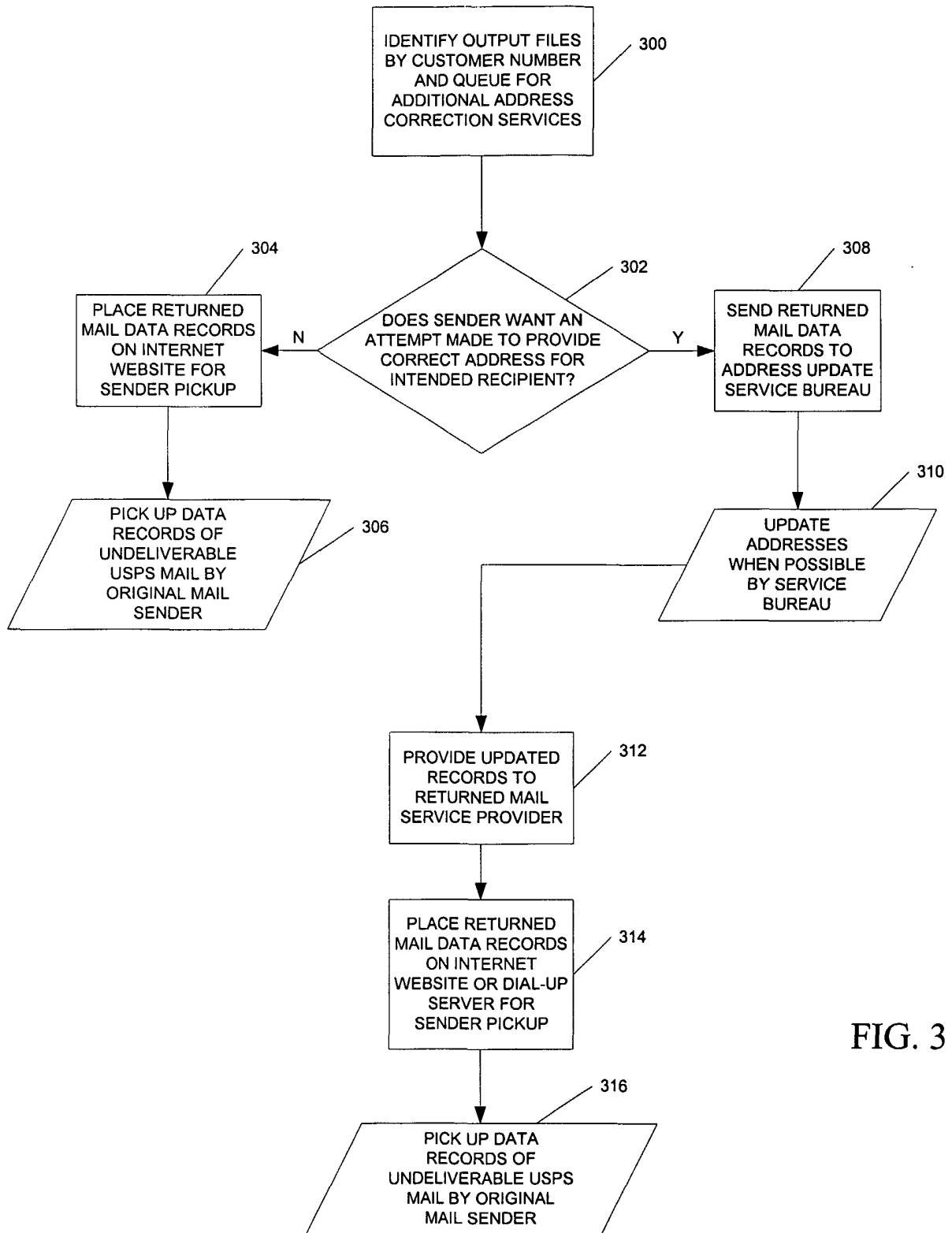


FIG. 3

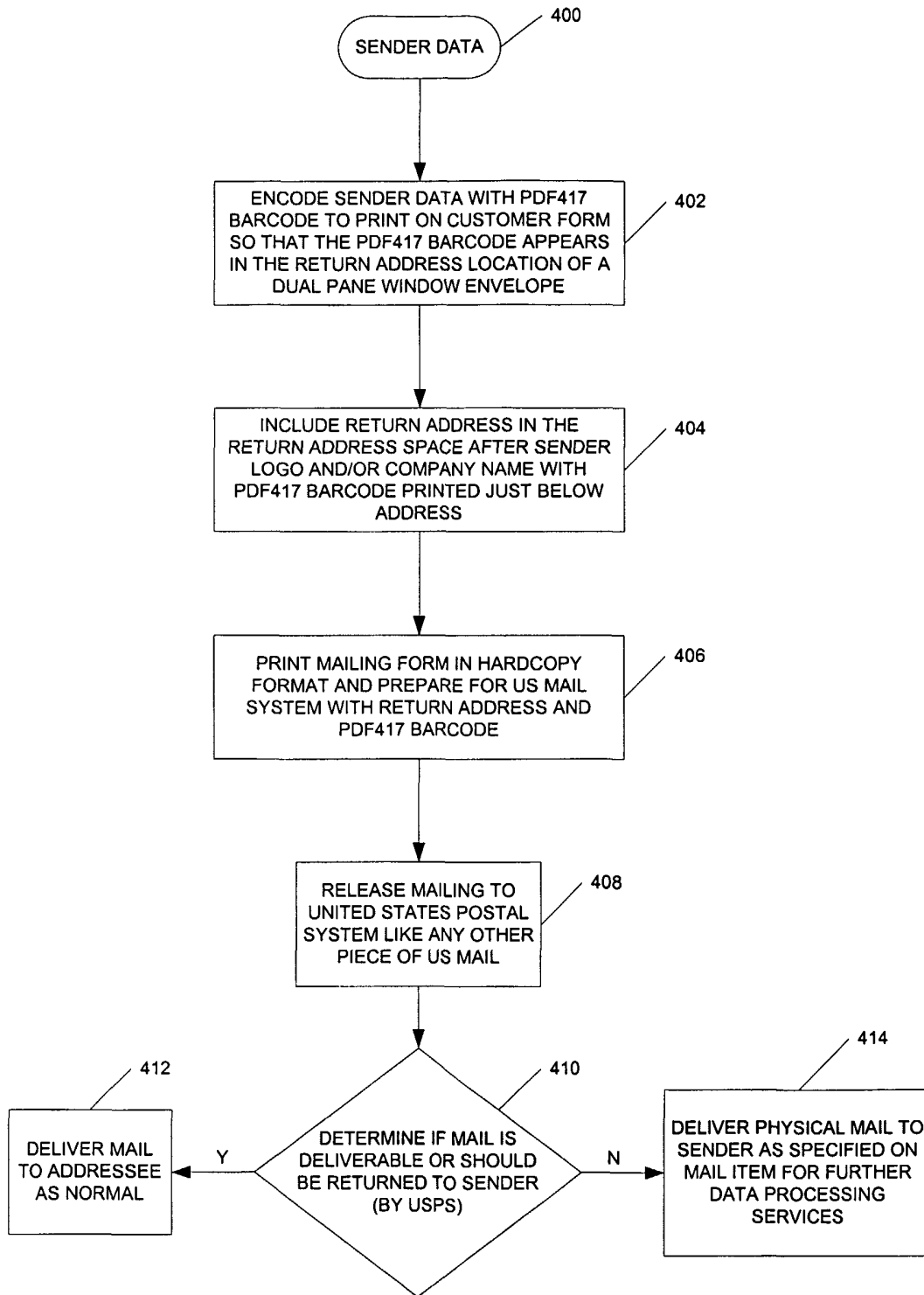


FIG. 4

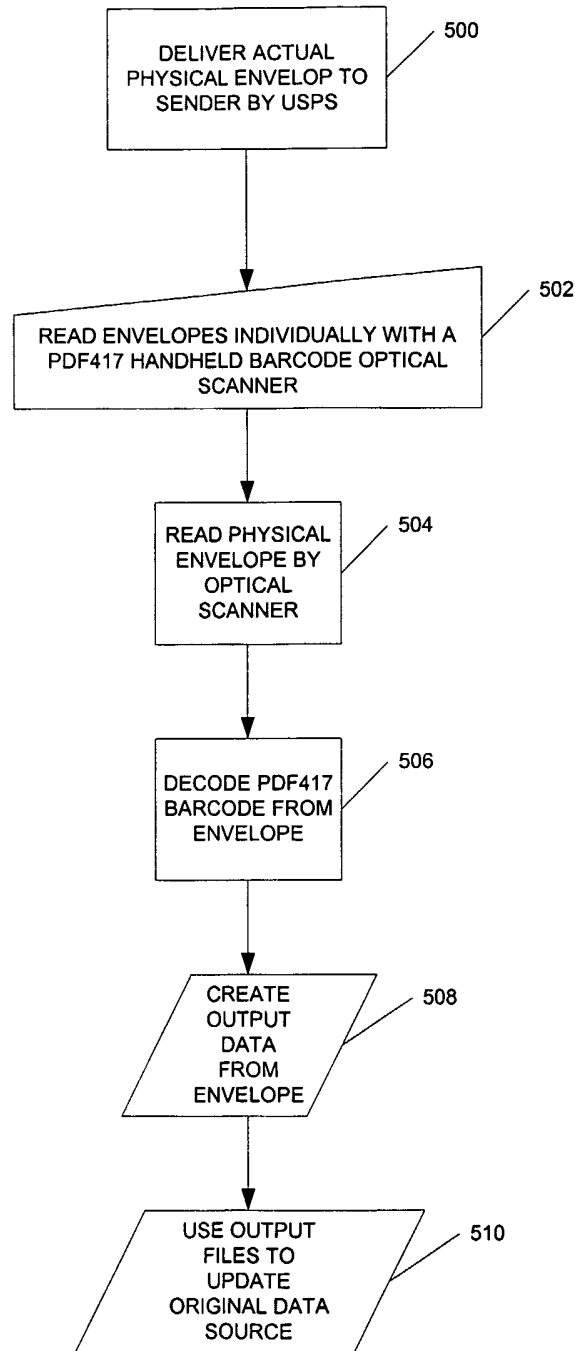


FIG. 5