METHOD AND SYSTEM FOR IN-LINE ADDRESS QUALITY AND MAIL PREPARATION ON AN INDICIA PRINTING SYSTEM

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ABSTRACT
The present application generally relates to mail processing equipment and techniques. More specifically, the present application relates to a mail processing system and related method for transporting and imaging addressed mail pieces of a mailing to qualify the mailing for postage discounts. An address analysis component of the mail processing system compares the address included on a respective mail piece to postal authority standards for compliance with requirements for discounted postage based on pre-sort rules. A postage metering component prints the discounted postage indicia and a printing component prints delivery point barcodes.
S705 Setup mail processing job parameters using the touch screen 140 and the keyboard computer 150 or access previously loaded job file.

S710 Load mailpieces into the feeder 105, start the meter system transport 430 and reset the image processing computer 305. Start feeder operation.

A-from FIG. 8

Item present? YES

S720 Scan mailpiece with line scan camera 114 to obtain an image of mailpiece

S725

NO

Stop image capture
Stop mailpiece on the scale

S730

Perform address processing 400 of mailpiece image to obtain a postal authority certified address and associated delivery point barcode (520, 620) plus human readable corrected address data 630, if required.

S740 Send address processing result to the meter data processing system 440. (No code (UAA); purge; address certified; address certified with corrections)

S745 Certified addr. Obtained?

NO

Advance mailpiece from scale through printers without printing indicia or a delivery point barcode.

S755 Alert operator of UAA addressed mailpiece in the stacker. Operator removes mailpiece and restarts the feeder 105.

YES

S760 Create print commands for delivery point barcode 520, 620; machine ID 510; 5 digit delivery code 515, 615 and human readable corrected address data 630, if required.

S765 To FIG. 8

FIG. 7
Create print commands for postage indicia 315, 320, 321 at bulk mail presort discount rate and for Ancillary Service Endorsements (Address Service Requested 530). Alternately, if move update is available, the move address delivery point print commands will be created and the ancillary service endorsement is omitted.

Start the scale and printer transport when both the mailpiece weight (if required) and the address quality processing are complete.

Print the indicia line 132 and barcode line 135

Store data record associated with processed mailpiece.

Is job complete?

Perform corrective action
- Pay postage due with meter tape
- Combine with next day mail to meet minimum
- Rework / re-meter mailpieces at correct rate

Have piece count minimums been met?

Compile data record for mailing and archive the record in data storage 453
Produce postal authority reports if required.
Produce client reports as required. Compile address change data. Close the mailing jobs and re-set the mail piece counts.

Deliver mail in labeled trays to postal authority equipped to accept bulk mail

FIG. 8
METHOD AND SYSTEM FOR IN-LINE ADDRESS QUALITY AND MAIL PREPARATION ON AN INDICIA PRINTING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/178,653 entitled “METHOD AND SYSTEM FOR ENHANCED SERVICES ON A MAIL PROCESSING SYSTEM” filed on May 15, 2009, the disclosure of which is entirely incorporated herein by reference.

TECHNICAL FIELD

[0002] The present subject matter generally relates to a system and method for transporting and imaging a mail piece having a printed mailing address. An address analysis component of the system compares the address included on a mail piece to postal standards for compliance with requirements for discounted postage based on pre-sort rules. A postage metering component prints the discounted postage indicia and a printing component prints delivery point barcodes.

BACKGROUND

[0003] The United States Postal Service (USPS®) is in the process of updating many of its requirements for delivery point barcode application to mail pieces and its rules for mail preparation required to earn postage discounts. The barcode change is a conversion to the Intelligent Mail® barcode (1 Mb). The 1 Mb will replace the POSTNET and PLANET barcodes and most of the information in the key line and endorsement line printed on the envelope. The mail postage discounts are driven largely by the pre-sort and address quality requirements where groupings of delivery points are defined by the USPS (e.g., MX-AADC, AADC, 3-digit, and 5-digit sort groups). AADC stands for Automated Area Distribution Center, where USPS will perform the in depth mail sorting needed to facilitate mail delivery. Each group receives a postage discount if the mail pieces are sorted to the corresponding group and at least 150 mail pieces are in the group. All of the discounts listed require sorting of the mail pieces into pre-sort groupings except for Mixed AADC. Mixed AADC requires that all of the mail pieces have a valid delivery point barcode on the mail piece.

[0004] In order to earn mail postage discounts, address list service providers have to make all addresses in a mailing list meet postal authority standards for quality and move up and reorder the addresses in the list into pre-sort groupings. Using the address data for the mail pieces the mailing is then manufactured on a mail inserting or wrapping system. Inserters and wrappers are large and expensive machines designed to produce hundreds of thousand to millions of mail pieces per day. Alternatively, mail that is prepared for delivery to the USPS maybe processed on a mail sorter. The mail sorter processes each mail piece and checks or corrects the address for quality and move update and puts the mail pieces into pre-sort groups using hundreds of sort bins. Mail sorters also are expensive machines capable of processing in excess of 30,000 mail pieces per hour. However, there is no option for a small volume mailer to earn mail postage discounts on their own with a mailing machine that can meet USPS standards and be affordable to the small mailer. In addition, inserters and sorters are not able to print the correct postage indicia on each mail piece based on weight and pre-sort postage discount that the mail piece has been qualified to receive. Currently, postage meters can not operate at the throughout rate associated with sorters. Although postage meters are integrated onto inserters and can adjust the postage applied based on weight, they can neither adjust postage applied based on pre-sort discount qualification, nor can they print a delivery point barcode in the clear zone based on address quality updates.

[0005] Hence a need exists for a system and method that can meet the needs of a variety of sized mailers such as postage metering and integrate the functionality needed to qualify for mail discounts.

SUMMARY

[0006] It is desirable to provide for a mail processing system for processing a plurality of mail pieces in mailing to qualify the mailing for postage discounts. The system includes a feeder and transport for individually feeding and transporting each of the plurality of mailpieces. An image capturing device is positioned along the transport for capturing an image of an address positioned on each of the plurality of mail pieces. An address quality processing device reads the address image of a respective one of the mail pieces and obtains a postal authority qualified delivery point code for the respective mail piece. A system processor is configured to receive the postal authority qualified delivery point code; generate printer control data for printing discounted postage meter indicia on the respective mail piece; and create printer control data for printing a postal authority approved delivery point barcode on the respective mail piece. At least one digital printer prints the discounted postage meter indicia and the authority approved delivery point barcode on the respective mail piece.

[0007] It is further desirable to provide for a method of qualifying a mailing including a plurality of addressed mail pieces for mailing postage discounts. The method includes loading the plurality of mail pieces onto a feeder for individually feeding each mail piece into a mail processing system. A respective one of the mail pieces is transported to an imaging component of the mail processing system. An address of the respective mail piece is imaged. The address image is read with an optical character recognition (OCR) device. The read address of the respective mail piece is qualified to postal authority standards. A weight for the respective mail piece is obtained. A pre-sort mail discounted meter postage indicia is printed and is based on the qualified address and the obtained weight. A postal authority delivery point barcode is printed and corresponds to the delivery point of the qualified address in the clear zone on the mailpiece.

[0008] It is yet further desirable to provide for a method of processing a mailing including a plurality of addressed mail pieces. The method includes loading the plurality of mail pieces onto a feeder for individually feeding a first and second mail piece into a mail processing system. The first and second mail pieces are individually transported to an imaging component of the mail processing system. An address for each of the first and second mail pieces is imaged. The address images of the first and second mail pieces are read with an (OCR) device. The read addresses of the first and second mail pieces are compared to a client address list to determine if the read addresses of the first and second mail piece are present on the client list. The first mail piece is rejected upon a determination that the read address of the first mail piece is determined not to be on the client list or the first mail piece is marked to be
purged. The processing of the second mail piece is continued upon a determination that the read address of the second mail piece is determined to be on the client list.

[0009] Additional objects, advantages and novel features will be set forth in part in the description which follows, and in part will become apparent to those skilled in the art upon examination of the following and the accompanying drawings or may be learned by production or operation of the examples. The objects and advantages of the present teachings may be realized and attained by practice or use of the methodologies, instrumentality and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The drawing figures depict one or more implementations in accord with the present teachings, by way of example only, not by way of limitation. In the figures, like reference numerals refer to the same or similar elements.

[0011] FIG. 1 is an illustration of a table top mailing machine capable of qualifying mail for postage discounts and printing postage indicia.

[0012] FIG. 2 is an illustration of a table top mailing machine, with the covers removed, that is capable of qualifying mail for postage discounts and printing postage indicia.

[0013] FIG. 3 is an exemplary diagram of the components of the system solution for the table top mailing machine.

[0014] FIG. 4 is an exemplary block diagram of the system components and processes.

[0015] FIG. 5 is an exemplary illustration of a mail piece processed by the table top mailing machine with a CASS qualifying address.

[0016] FIG. 6 is an exemplary illustration of a mail piece processed by the table top mailing machine where Suite Link error was detected and corrected.

[0017] FIG. 7 is part of a process flow diagram of an exemplary illustration of steps associated with processing a mail piece for mail postage discounts.

[0018] FIG. 8 is continuation of the process flow of FIG. 7 and is an exemplary illustration of further steps associated with processing a mail piece for mail postage discounts.

[0019] FIG. 9 illustrates a network or host computer platform, as may typically be used to implement a server.

[0020] FIG. 10 depicts a computer with user interface elements, as may be used to implement a personal computer or other type of work station or terminal device.

DETAILED DESCRIPTION

[0021] In the following detailed description, numerous specific details are set forth by way of examples in order to provide a thorough understanding of the relevant teachings. However, it should be apparent to those skilled in the art that the present teachings may be practiced without such details. In other instances, well known methods, procedures, components, and circuitry have been described at a relatively high-level, without detail, in order to avoid unnecessarily obscuring aspects of the present teachings.

[0022] The teachings herein alleviate one or more of the above noted problems with a table top mailing machine that implements the USPS requirements for pre-sorted bulk mail discounted postage for the mixed AADC bulk mail postage discount rate for first class, Standard class and for non-profit standard class. Bulk mail is any grouping of mail pieces that make up a mailing that meets the postal authority standards required to qualify for postage discounts with no consideration to the class of the mailing. Other requirements, mostly having to do with Undeliverable as Addressed (UAA) mail pieces, are required to receive a postage discount. These requirements include having all addresses conformance to the Coding Accuracy Support System (CASS); Delivery Point Validation (DPV); SuiteLink and LACSI Link requirements. In addition, conformance to the Move Update requirements with addresses that have been updated with NCOALink and move update notification to the customer or with Ancillary Service Endorsement selected must be performed. The table top mailing machine initially will use Address Service Requested since NCOALink is not currently available. Since the mail processing system is based on a digital meter platform, the correct discounted postage is printed on each qualifying mail piece and along with the correct delivery point barcode.

[0023] The various features of the mail processing system disclosed herein relate to a postage meter with a feeder, mail transport, envelope flag sealer, scale, an indicia printer and a barcode printer. The meter transport is upgraded with a multline optical character reader (ML OCR) imaging system and address quality analysis processor to ensure that the addresses meet USPS standards before a delivery point barcode is printed. In an alternate solution, the mail processing system will print permit postage indicia versus the normal postage meter indicia which include actual postage affixed.

[0024] Reference now is made in detail to the illustrated features illustrated in the accompanying drawings and discussed below. FIG. 1 illustrates a mail processing system 100 configured to qualify a mailing for postage discounts and printing postage indicia and postal authority clear zone delivery point barcodes. The mail processing system 100 in FIG. 1 is an example of a “table top mailing machine” which is ideal, but not limited to, mailers with smaller sized mailings. The imaging/analyzing, metering and printing components together make up a “all in one” or “all inclusive” mail processing machine that is of sufficient size to be considered a “table top mailing machine.”

[0025] Those skilled in the art generally would consider a mailing as a group of mailpieces which are contained in trays. The mailing is one class of mail delivery service and usually qualifies for bulk mail discount postage. The USPS is assigning to the Intelligent Mail® barcode (1 Mb) for the delivery point barcode. Examples included herein are not intended to limit the delivery point barcode to 1 Mb format since the delivery point barcode will evolve and the mailing processing system will be updated to accommodate the changes by those skilled in the art. The mail processing system 100 includes a general purpose mail piece feeder 105 to singulate and feed one mail piece at a time into the transport 106 from a stack of mail pieces. The mail piece enters the transport 106 and is transported past the aperture of the imaging device 110 where an image of the entire mail piece is captured without stopping the transport 106. The mail piece is transported onto the scale 120 and held there until the address quality analysis results are reported from the address quality system. Additional hold time may be required in dynamic mode, while waiting for the weight results from the scale 120. If the mail piece weight is known in advance, such as with an identical weight mailing and the known weight is entered through the operator interface, the scale 120 is not utilized. The mail piece is transported from the scale 120 to the printing device 130 and into the stacker 155. The printing device 130 contains numerous
digital print cartridges for printing addresses, indicia and Ancillary Service Endorsements 132 plus printing of a delivery point barcode in the clear zone 135. The operation interface 140 is provided with a touch screen display. User interface requirements that are needed for operation of the mail processing system 100 are controlled from the touch screen. An optional key board, which contains the system computer 150, is used for data entry and trouble shooting. Data entry and trouble shooting can be input by way of the operation interface 140 without the need of a keyboard. Optionally, system computer 150 can be separately housed from the key board or housed within or openly connected to the operation interface 140.

Fig. 2 illustrates an exposed view of the mail processing system 100, which provides a more detailed view of the interior of system 100. This illustration shows another view of the feeder 105 and the transport 106. Also visible is the water container 160 for the envelope flap sealer, which is not visible in the illustration. Cover 165 is shown in the open position for access for jam removal and for sealer maintenance. The imaging device 110 (shown in the open position relative to the mail processing system 100) includes a line scan camera and folded light path (not shown) which are housed in the box assembly 111, and the LED illumination chamber and image aperture (not shown) are integrated into the protrusion 112. The design of protrusion 112 is such that the image focal point and illumination are as close to the mail piece as possible, when image device 110 is in the closed position. The image device 110 is held in the open position by a gas shock 113 or other suitable position adjusting (pivoting) mechanism. The scale transport 121 is positioned after the feeder 105 and imaging device 110. A mail piece detection photo sensor 122 is located before the image aperture contained in protrusion 112 to sense the presence of a mail piece. The distance from the sensor 122 to the image aperture must be known alone with the transport 106 speed so that the start time for image capture is timed to coincide with the arrival of the mail piece at the image aperture. When the sensor 122 no longer senses the presence of a mail piece, the same calculation is used to stop image capture and initiate image processing. The printer 130 houses all of the digital print cartridges on holders that are attached to slides which allow for positioning the print area between the top and bottom of the mail piece as required. The approximate position of the indicia printer 132 and the barcode (printer 135) and correct address printer 135 are shown. The illustrations of Figs. 1 and 2 are exemplary and those of ordinary skill in the mail processing art can configure the required components in a variety of configurations that will otherwise achieve the required functionality.

Fig. 3 is an exemplary diagram of the components for the mail processing system 100. The imaging device 110 as described above is operably connected to the image processing computer 305. The line scan camera contained in the box assembly 111 (Fig. 2) is connected to the image processing computer 305 via a network interface connection (NIC) and is configured to receive continuous line scan data. When a mail piece is detected by the sensor 122, image collection commences. Image collection is stopped when the sensor 122 no longer detects the mail piece. After the address quality analysis is completed, the results are sent to the system computer 150. The system computer 150 is capable of providing instructions for formatting and printing the two forms of postage indicia, postage affixed meter indicia 320 and alter-...
(i.e. not personal mail that was added to the group of mail pieces to be processed). In addition, mail pieces that are no longer desired to be mailed can be extracted from the mailing by stopping the mail processing machine 100 and instructing the operator to remove the mail piece. No postage meter indicia would be printed on the mail piece. An example of a mail piece to be removed is a dummy notice to turn off electricity or stop some other service for which payment was over due when the mail piece was made but for which payment has now been received. Those skilled in the art will incorporate other possible examples of mail pieces that should be purged from the mailing. Additional mail processing machines 101 can be connected to the server 362 to aggregated data from multiple mail processing machines 101. This data aggregation may show that mail from different mail processing machines 101 in a facility can be combined to meet the minimum mail piece quantities needed to qualify for a bulk mail per-sort discounted postage. The server 362 can be used to produce client and postal authority reports as required.

[0030] Reference is now made to FIG. 4 for an explanation of the exemplary block diagram of mail processing system 100, the system components and the operational processes. The mail processing system 100 has three major components needed to perform the address quality analysis and address updates. In addition the mail processing system 100 performs the functions needed for preparation of a discount bulk mailing and performs as a postage meter. The components of the system are the mailing transport 430, the meter data processing system 440 and the image processing computer 305. As indicated in the FIGS. 1 and 2, the mail processing system 100 has a front end which contains a mail piece 435 feeder 105, a scanner 160, a photo sensor 122 and the imaging system 110. The active components of the imaging system 110 include a line scan camera 114 and an illumination device 115, such as a LED or fluorescent device. Alternately, a time delay integration (TDI) line scan camera can be used if the illumination level is low. An area camera or contact image sensor can also be used as an active component of the imaging system. The photo sensor 122 is connected to the imaging system 110 as shown or connected directly to the image processing computer 305 to start image capture of the mail piece 435. The line scan camera 114 is connected to the imaging processing computer 305 via a bi-directional network interface connection NIC 432. This interface allows for camera setup such as, but not limited to, reset, gain settings and scan synchronization rate. The image of the mail piece 435 is transferred line-by-line in compliance with the NIC protocol. The midsection of the mail processing system 100 is the scale where the mail piece is weighed and held until the address quality response is received from the image processing computer 305. The final section is the printer section 130 which contains the prepositional digital print cartridges. The mailing transport 430 may have an optional diverter 131 for reject mail pieces (FIG. 4).

[0031] The imaging processing computer 305 performs the processing steps for address quality analysis 400 from the image of the mail piece 435. The address quality analysis starts with locating the address block including, line segmentation, word and character segmentation and optical character recognition (OCR) of the letters as shown in FIGS. 5 and 6, 505 and 605 respectively. The contents of the address block are read with OCR processing 410 and looked up in the CASS certified address directory 415. The USPS has added additional address quality checks such as, but not limited to Deliver Point Validation (DPV), SuiteLink, LACSLink, and future postal authority requirements will likely follow. These quality checks are performed as part of step 415. If a move update using the National Change of Address (NCOALink) software process is approved for use on the system, the name data from the address block will be processed along with the address to determine if a move is associated with the address and addresssee 420. If a move address is identified, the new address is provided. Optionally, the client address mailing list 365 is transferred to the image processing computer 305 either directly from the server 362 or via the system computer 150. The server 360 is connected to one or more mail processing machines via a network connection and a router 460. The client address mailing list 365 is used in the address quality processing 400 to validate that each mail piece that is processed is part of the mailing and is not marked to be purged 422. If the mail piece is not part of the mailing based on a comparison of the address read by the OCR process 410 and an address in the client address mailing list 365 or the address is marked for purging, the system computer 150 receives an error message and executes processes similar to the UAA processes 446 and 448. The results of the address quality analysis are sent to the meter data processing system 440 via a NIC. A router 460 is required for this configuration since access to the postage reset center 465 is required and electronic document transmittal to the postal authority 355 may be required. The communication utilizes the World Wide Web. The address quality analysis results are passed through the router 460 to the network services 450 part of the keyboard computer 150. Other communication protocols may be selected by those skilled in the art depending on preferences and system architecture.

[0032] The meter data processing system 440 illustrates the major components of the postage meter and the processing steps (442, 444, 446, 448) performed for bulk mail processing. The postage meter is accessible by way of touch screen 140 and a system computer 150. The system computer 150 interfaces with the Postage Security Device (PSD) 454 to obtain postage to be included in the meter indicia 320 and encoded in the IBI 315. Transport control is achieved through the control board 452 and the printer cartridges are interfaced to the system computer 150 by a printer driver. Data storage 453 is provided to archive the mailing job data and individual mail piece data. A USPS certified digital postage meter has numerous additional features that are required to perform as a postage meter, which are not defined herein, since the features are well known by those skilled in the art.

[0033] The first step in processing the data returned from the address quality processing 400 is the delivery point data associated with an address that passed CASS and DPV 442. The delivery point data is used to build the 1 Mb, 520 in FIG. 5 along with mailing job parameters. An example of the 1 Mb data structure is illustrated in Table 2 (below). The first data field 10 is a barcode identifier, which is two digits or more in length. The field 10 is reserved for future use by the postal authority. The second data field 11 is three digits in length and used to identify whether address change service (ACS) is requested, or whether ACS address service and Confirm is requested. The mail processing system 100 will initially use the Ancillary Service Endorsement in place of ACS. However, if ACS and Confirm are used in the future, the digits 080 may be used to identify a request for ACS and the digits 140 may be used to identify the request for combined service of ACS and Confirm. Confirm is the USPS service that is used to
track a mail piece through the postal network and confirm its
delivery. The third data field 12 indicates a mailer identifier
number ("Mailer ID"). The third data field 12 may be six
digits or nine digits in length depending on the number of mail
pieces provided to the USPS per year. High volume mailers
are assigned a six digit ID and table top mailing machine
customers will generally have a 9 digit Mailer ID. The Mailer
ID will be entered through the touch screen 140 and/or the
keyboard 150.

[0034] The fourth data field 13 of the 1 Mb data structure is
nine digits in length for high volume mailers and six digits in
length for smaller sized mailers. Various USPS requirements
dictate the structure of this number. For example, if the Con-
firm service and ACS are selected, this field may contain a
unique number which remains unique for at least 45 days,
which is substantially long enough to ensure no ambiguous
tracking results can occur because two mail pieces with the
same Mailer ID and identification number are in the postal
network at the same time. The unique number may contain
match back data or reference match back data provided the
uniqueness requirement is met. If ACS is selected, the fourth
data field 13 can be allocated for a match back code that is
used to efficiently access the correct address data record in
the client’s address list. Use of a match back code may enable
cost effective address and addressee record updating. The
match back code may also serve as a unique identification number,
thus allowing for both Confirm and ACS with match back.
Since the mail processing system will initially use the basic 1
Mb service, data field 13 can be a fixed number or might be
derived for data field 2 in the IBI. The fifth data field 14 is
reserved for the delivery point data (e.g., ZIPCODE) which
can be 5, 9 or 11 digits in length to identify a delivery point
address code. The delivery point data 14 is provided by the
address quality processor 400 and must be 11 digits in length
for the mail processing system.

TABLE 2

<table>
<thead>
<tr>
<th>Type</th>
<th>Field</th>
<th>Digits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking Code</td>
<td>Barcode Identifier (10)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Service Type Identifier (11)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mailer ID (12)</td>
<td>6/9</td>
</tr>
<tr>
<td></td>
<td>Unique Identifier (unique number and/or ACS match back code) (13)</td>
<td>5/6</td>
</tr>
<tr>
<td>Routing Code</td>
<td>Delivery Point data (14)</td>
<td>0, 5, 9, or 11</td>
</tr>
</tbody>
</table>

[0035] FIG. 5 is an example of a mail piece that has been
processed by the mail processing system 100 for which the
address 505 has passed the CASS and DPV quality analysis.
The indicia 320, IBI 315 and class of mail 321 are printed by
the printer 132 (FIG. 2) positioned at the top of the mail piece.
The address service requested 530 is printed by the same
printer.

[0036] Currently, the USPS offers the following services
for address service requested. The mail piece is forwarded to
the new location when possible and a printed notice is
returned to the mailer with the new address information. This
notice is then used by the mailer to update the address list.

[0037] Months 1-12: the mail piece is forwarded at no
charge; the mailer is provided a separate notice of new
address and charged an address correction fee (manual
$0.50, electronic, see page one).

[0038] Months 13-18: for First-Class Mail, the mailpiece
is returned with the new address attached at no charge.
For Standard Mail, the mailpiece is returned at a
weighted fee. The weighted fee is 2.472 times the appli-
cable single-piece First-Class Mail or Priority Mail post-
age.

[0039] After month 18 or if undeliverable at any time: the
mailpiece is returned with reason for non-delivery. Fee
charged for Standard Mail.

[0040] Other Ancillary Service Endorsements maybe
utilized to give the mailer the move update service that is
most suitable for their operation.

[0041] A different print cartridge 135 (FIG. 2) is used to
print the delivery point barcode (e.g. 1 Mb) 520 within the
clear zone 525 at the bottom of the envelope. The clear zone
is reserved for printing postal authority delivery point bar-
codes and update address data if required. Immediately to the
left of the barcode is a numeric printout for the 5 digit ZIP-
CODE 515 and the machine identifier 510. An exemplary
machine code format is shown in Table 3.

TABLE 3

<table>
<thead>
<tr>
<th>Machine Identifier (510)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
</tr>
<tr>
<td>XXX</td>
</tr>
<tr>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Directory Date</th>
<th>System ID</th>
<th>Unique Character</th>
<th>Mail Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[0042] In FIG. 4, print data is generated 444 for the clear
zone 525. For example, delivery point barcode 620 and the
updated address 630 of FIG. 6 are generated in the clear zone
525. The delivery point barcode 620 and updated address data
630 are transferred from the image processing computer 305.
An updated address is required to be printed if a SuiteLink or
LACSLink match was found. For some address updates, the
5-digit ZIPCODE will change from the address block 605
5-digit ZIPCODE. The updated numeric ZIPCODE 615 will
be printed in place of the address block 5-digit ZIPCODE. If
NCOAI link move update is enabled, the delivery point bar-
code 620, the updated address 630 and numeric 5-digit ZIP-
CODE 615 will reflect the move update address data. The
machine identifier 510 does not change unless a different mail
processing system is used. FIG. 6 is an example of SuiteLink
update where "STE 890" was missing from the address.

[0043] Processes 446 and 448 are required when the
address quality processing 400 did not CASS qualify the
address or the address failed DPV. Since these UAA mail
pieces can not be included in the discounted bulk mailing,
they are not printed with a discounted postage indicia and
may be discarded. In this case, the indicia printing will be
inhibited 446 and the mailing transport feeder 105 will be stopped 448. The UAA mail piece will be advanced to the top of the stack of processed mailpieces where it will have to be removed from the stack. Once the mail piece is removed, the operator can restart the system. Alternately, a diverter can be added to remove the UAA mail pieces. The mailing documentation will not reflect the removed or diverted mail pieces. As defined above, a tray label printer 345 and a report printer 350 are optionally attached to the system computer 150. Remote assess 470 may be provided to the system computer 150 to access data associated with each mailing and each mail piece processed.

[0044] Attention is now turned to FIGS. 7 and 8 to illustrate the method steps associated with processing a mail piece for bulk mail postage discounts. The process starts with step S705 where the job setup is accomplished using the touch screen 140 and/or the keyboard 150. Some job data may be accessed from previous job entries or the data is entered in its entirety as a new entry. Data items will include, but are not limited to, user, department, class of mailing, ancillary service endorsement selection. Many of the controls are done from virtual push button selections on the touch screen 140. Once the job is setup S710 and the mailing processing system 100 is ready to run, the mail pieces are loaded on to the feeder 105 section. The mailing transport 430 is started via the touch screen 140 and the image processing computer 305 is given a reset signal. Once these steps are completed, the feeder feeds a single mail piece into the transport. In step S715 the mail piece is detected by the photo sensor 122 before it reaches the image system aperture 112. Based on the calculated time at which the mail piece will arrive at the aperture, image lines from the line scan camera 114 will be processed by the image processing computer 305 in step S725. The scan start time delay is calculated from the distance between the sensor 122 and the aperture 112 plus the transport speed. Steps S720 and S725 are repeated until the mail piece is no longer detected by the sensor 122. In step S730, the line by line image capture of the mail piece is stopped after the same time delay as the start time delay. The mail piece is advanced to the correct location on the scale 120 for proper weighing at which point the scale transport is stopped. Address quality processing 400 of the mailpiece image is performed in step S735 to obtain a postal authority certified address and associated delivery point bar code (520, 620) plus human readable corrected address data 630, if required. The result of the address quality processing is sent to the system computer 150 in the meter data processing system 440 as a result of step S740. The messages include No code (UA), purge, not in client address mailing list 365, address certified; and address certified with corrections. Each message contains the necessary NIC protocol and the data needed by the meter data processing system 440 to print the correct data with printers 132 and 135 or for stopping the transport for a UAA No code purge or not in client address mailing list 365.

[0045] If a certified address response is not received S745, the mail piece 435 is advanced from the scale and through the printer assembly 130 to the output stack or optional diverter. The indicia 315, 320 and 321 are not printed and the delivery point barcode is not printed, step S750. In step S755, the operator is alerted that a UAA mail piece is in the stacker 155 (FIG. 1) and must be removed. The feeder is manually restarted and control returned to step S710. If the address was certified, step S760 defines the print file generation of the delivery point barcodes 520 and 620 for printing in the clear zone 525 (FIGS. 5 and 6). Also the human readable address 630 is included in the print file for the clear zone printing based on SuiteLink and LACSLink results and optionally for NCOA link move update results. The 5-digit numeric ZIP-CODE 515, 615 and the machine identification 510 are included in the print file for printer 135. These two items are printed to the left of the clear zone. Control is transferred to FIG. 8 S765.

[0046] In step S805, print file commands for printer 132 are created for the postage indicia 315, 320 which match the postage amount that corresponds to the qualified pre-sort bulk mail discounted postage rate and the class of delivery service 321 being processed. The print file for printer 132 includes the ancillary service endorsement (Address Service Requested) print commands. In step S806 the scale transport 121 and printer transport are started when the print file data derived from the address quality processing 400 is ready and the mail piece weight is measured (if weight is required). In step S807, the indicia line is printed by printer 132 and the barcode line is printed by printer 135 while the mail piece is transported under the digital print cartridges. Although the steps S760, S805, S806 and S807 are shown in sequential order, those skilled in the art will maximize throughput by performing as many of these steps in parallel as possible. For example, the mail piece may be advanced off the scale while the print file data is compiled. As long as the print controller has the print control data before the mail piece is under the print cartridge, the printing operation will perform correctly. Data is compiled in step S810 for each mail piece to include the data from Tables 1, 2 and 3 and other relevant job data for use in client and postal authority documents plus mail piece item tracking. The mail piece data is accessible through the remote access 470 by scanning the IB1 or 1 Mb on individual mail pieces. If the mailing job is not complete S815, the feeder 105 is restarted to feed the next mail piece and control is returned S715 in FIG. 7. As mentioned above, improved throughput is achieved by feeding the next mail piece as soon as the previous mail piece is advanced off the scale. Numerous transport control options are available those skilled in the art. For example the feeder transport 106 (FIG. 3) and the printer transport 130 could run continuously, stopping only the feeder picker and the scale transport 121 as required.

[0047] If the job is complete S815, checking the job data to be sure piece count minimums for the class of mail being processed are met or exceeded is done in step S820. The pre-sorted first class bulk mail discount is only available if the number of mail pieces processed is 500 or more and for pre-sorted standard mail the minimum is 200 mail pieces. These counts are displayed on the touch screen display 140 so that the operator can determine if the minimums are going to be met based on the mail available for the job. If minimum mail piece counts for a job or group of jobs for the same class of mail are not expected to be met before the mailing has to be closed and delivered to the postal authority, the operator has the option to find additional mail of the same class to add to the piece count. If additional mail is available, the minimums can be met and the loss of postage discounts avoided. If not, corrective action, step S825, is required when the minimums are not met. The corrective actions are, but are not limited to, paying the difference between the discounted rate and the single piece rate for each mail piece using a postage meter tape for the entire amount due, or if the total quantity of mail pieces for a given class are not expected to meet the minimums, the job can be extended into the next day provided that
the date the mail will be submitted to the postal authority matches the date in the indicia. In addition, the mail pieces can be individually re-metered with the delta postage needed to meet the single piece rate. Mailing job and mail piece data records are archived in the data storage 453 and the mailing job is closed.

[0048] If the minimums are met S820, then the mailing job is closed and the job and individual mail piece records are archived in accordance with the business requirements, step S830. Individual client or department reports will be produced as required for the business and financial accounting. The postal authority reports that are required are minimal for mailings of less than 10,000 mail pieces in given day. The archived records may suffice to recreate postal bulk mail documents if requested or official forms such as a postage statement may be needed. Since all the data needed for postal authority documentation is archived, the meter data processing system 440 can populate any form with the required data once the format of the form is specified. Optionally, the mail processing machine 100 or the server 362 will compile a listing of all address changes that were identified during the address quality processing 400. The address update list includes but is not limited to standard address format for CASS, Suite and apartment data from SuiteInf link, rural route corrections from LACSLInf link and move update data from NCOALInf link. The reporting and data archiving is all part of closing the mailing jobs for each class of mail run in a given day. The mail processing system is reset to run new mailing jobs by restart the minimum mail piece counts. The final step S835 is to delivery the mail in mail trays, which have the correct tray label attached, to the postal authority bulk mail acceptance unit.

[0049] As shown by the above discussion, functions relating to the mail processing system 100 may be implemented on one or more computers 150 and 305 (FIGS. 1 and 4). Additional processors may be used by those skilled in the art to process data and control devices are required by the computer architecture design and data retrieval requirements. Although special purpose devices may be used, such devices also may be implemented using one or more hardware platforms intended to represent a general class of data processing device commonly used to run "server" programming so as to implement the functions discussed above, albeit with an appropriate network connection for data communication.

[0050] As known in the data processing and communications arts, a general-purpose computer typically comprises a central processor or other processing device, an internal communication bus, various types of memory or storage media (RAM, ROM, EEPROM, cache memory, disk drives etc.) for code and data storage, and one or more network interface cards or ports for communication purposes. The software functionalities involve programming; executing executable code as well as associated stored data, e.g. files used for the workflow templates for a number of production jobs as well as the various files for tracking data accumulated during one or more productions runs. The software code is executable by the general-purpose computer that functions as the control processor and/or the associated terminal device. In operation, the code is stored within the general-purpose computer platform. At other times, however, the software may be stored at other locations and/or transported for loading into the appropriate general-purpose computer system. Execution of such code by a processor of the computer platform enables the platform to implement the methodology for generating an integrated mailpiece, in essentially the manner performed in the implementations discussed and illustrated herein.

[0051] FIGS. 9 and 10 provide functional block diagram illustrations of general purpose computer hardware platforms. FIG. 9 illustrates a network or host computer platform, as may typically be used to implement a server. FIG. 10 depicts a computer with user interface elements, as may be used to implement a personal computer or other type of work station or terminal device, although the computer of FIG. 10 may also act as a server if appropriately programmed. It is believed that those skilled in the art are familiar with the structure, programming and general operation of such computer equipment and, as a result, the drawings should be self-explanatory.

[0052] For example, the system computer 150 and the image processing computer 305 may be a PC based implementation of a central control processing system like that of FIG. 10, or may be implemented on a platform configured as a central or host computer or server like that of FIG. 9. Such a system typically contains a central processing unit (CPU), memories and an interconnect bus. The CPU may contain a single microprocessor (e.g. a Pentium microprocessor), or it may contain a plurality of microprocessors for configuring the CPU as a multi-processor system. The memories include a main memory, such as a dynamic random access memory (DRAM) and cache, as well as a read only memory, such as a PROM, an EPROM, a FLASH-EPROM or the like. The system memories also include one or more mass storage devices such as various disk drives, tape drives, etc.

[0053] In operation, the main memory stores at least portions of instructions for execution by the CPU and data for processing in accord with the executed instructions, for example, as uploaded from mass storage. The mass storage may include one or more magnetic disk or tape drives or optical disk drives, for storing data and instructions for use by CPU. For example, at least one mass storage system in the form of a disk drive or tape drive, stores the operating system and various application software as well as data. The mass storage within the computer system may also include one or more drives for various portable media, such as a floppy disk, a compact disc read only memory (CD-ROM), or an integrated circuit non-volatile memory adapter (i.e. PC-MCIA adapter) to input and output data and code to and from the computer system.

[0054] The system also includes one or more input/output interfaces for communications, shown by way of example as an interface for data communications with one or more other processing systems. Although not shown, one or more such interfaces may enable communications via a network, e.g., to enable sending and receiving instructions electronically. The physical communication links may be optical, wired, or wireless.

[0055] The computer system may further include appropriate input/output ports for interconnection with a display (140) and a keyboard (FIGS. 1 and 2) serving as the respective user interface for the processor/controller (150). For example, a printer control computer may include a graphics subsystem to drive the output display. The output display, for example, may include a cathode ray tube (CRT) display, or a liquid crystal display (LCD) or other type of display device. The input control devices for such an implementation of the system would include the keyboard for inputting alphanumeric and other key information. The input control devices for the system may further include a cursor control device (not shown),
such as a mouse, a touchpad, a trackball, stylus, or cursor direction keys. The links of the peripherals to the system may be wired connections or use wireless communications.

The computer system runs a variety of applications programs and stores data, enabling one or more interactions via the user interface provided, and/or over a network to implement the desired processing, in this case, including those for performing address quality, indicia printing and metering, as discussed above.

The components contained in the computer system are those typically found in general purpose computer systems. Although summarized in the discussion above mainly as a PC type implementation, those skilled in the art will recognize that the class of applicable computer systems also encompasses systems used as host computers, servers, workstations, network terminals, and the like. In fact, these components are intended to represent a broad category of such computer components that are well known in the art. The present examples are not limited to any one network or computing infrastructure model—i.e., peer-to-peer, client server, distributed, etc.

Hence aspects of the techniques discussed herein encompass hardware and programmed equipment for controlling the relevant document processing as well as software programming, for controlling the relevant functions. A software or program product, which may be referred to as a “program article of manufacture” may take the form of code or executable instructions for causing a computer or other programmable equipment to perform the relevant data processing steps regarding the manufacturing of an integrated mailpiece, where the code or instructions are carried by or otherwise embodied in a medium readable by a computer or other machine. Instructions or code for implementing such operations may be in the form of computer instruction in any form (e.g., source code, object code, interpreted code, etc.) stored in or carried by any readable medium.

Such a program article or product therefore takes the form of executable code and/or associated data that is carried on or embodied in a type of machine readable medium. “Storage” type media include any or all of the memory of the computers, processors or the like, or associated modules thereof, such as various semiconductor memories, tape drives, disk drives and the like, which may provide storage at any time for the software programming. All or portions of the software may at times be communicated through the Internet or various other telecommunications networks. Such communications, for example, may enable loading of the relevant software from one computer or processor into another, for example, from a management server or host computer. Thus, another type of media that may bear the software elements includes optical, electrical and electromagnetic waves, such as used across physical interfaces between local devices, through wired and optical cable networks and over various air-links. The physical elements that carry such waves, such as wired or wireless links, optical links or the like, also may be considered as media bearing the software. As used herein, unless restricted to tangible “storage” media, terms such as computer or machine “readable medium” refer to any medium that participates in providing instructions to a processor for execution.

Hence, a machine readable medium may take many forms, including but not limited to, a tangible storage medium, a carrier wave medium or physical transmission medium. Non-volatile storage media include, for example, optical or magnetic disks, such as any of the storage devices in any computer(s) or the like. Volatile storage media include dynamic memory, such as main memory of such a computer platform. Tangible transmission media include coaxial cables; copper wire and fiber optics, including the wires that comprise a bus within a computer system. Carrier-wave transmission media can take the form of electric or electromagnetic signals, or acoustic or light waves such as those generated during radio frequency (RF) and infrared (IR) data communications. Common forms of computer-readable media therefore include for example: a floppy disk, a flexible disk, hard disk, magnetic tape, any other magnetic medium, a CD-ROM, DVD or DVD-ROM, any other optical medium, punch cards paper tape, any other physical storage medium with patterns of holes, a RAM, a PROM and EPROM, a FLASH-EPROM, any other memory chip or cartridge, a carrier wave transporting data or instructions, cables or links transporting such a carrier wave, or any other medium from which a computer can read programming code and/or data. Many of these forms of computer readable media may be involved in carrying one or more sequences of one or more instructions to a processor for execution.

While the foregoing has described what are considered to be the best mode and/or other examples, it is understood that various modifications may be made therein and that the subject matter disclosed herein may be implemented in various forms and examples, and that the teachings may be applied in numerous applications, only some of which have been described herein. It is intended by the following claims to claim any and all applications, modifications and variations that fall within the true scope of the present teachings.

What is claimed:

1. A mail processing system for processing a plurality of mail pieces in mailing to qualify the mailing for postage discounts, the system comprising:
   a feeder and transport for individually feeding and transporting each of the plurality of mailpieces;
   an image capturing device positioned along the transport for capturing an image of an address positioned on each of the plurality of mail pieces;
   an address quality processing device for reading the address image of a respective one of the mailpieces and obtaining a postal authority qualified delivery point code for the respective mail piece;
   a system processor configured to:
      receive the postal authority qualified delivery point code;
      generate printer control data for printing discounted postage meter indicia on the respective mail piece;
      create printer control data for printing a postal authority approved delivery point barcode on the respective mail piece;
      and
      at least one digital printer for printing the discounted postage meter indicia and the authority approved delivery point barcode on the respective mail piece;

2. The system according to claim 1, wherein the image capturing device comprises:
   a line scan camera, area camera, contact image sensor, or time delay integration (TDI) line scan camera for acquiring the address image; and
   an optional illuminator.

3. The system according to claim 2, wherein the image capturing device further comprises:
an image processing computer for receiving the address image of the respective mail piece from the line scan camera or time delay integration (TDI) line scan camera and performing address quality analysis on the address image.

4. The system according to claim 3, wherein the image processing computer is configured to verify the address of the respective mail piece with at least one of the following postal authority requirements: Coding Accuracy Support System (CASS), Delivery Point Validation (DPV), SuiteLink or LACSLink.

5. The system according to claim 1, wherein the image processing computer is configured to update the address of the respective mail piece based on name and address with a postal authority approved move update process.

6. The system according to claim 5, wherein the move update process is NCOALink.

7. The system according to claim 1, further comprising a postage metering device positioned downstream of the image capturing device, the postage scale configured to receive the respective mail piece and obtain weight information for the respective mail piece, wherein the postage scale of the meter indicia printed by the printer is based on the weight and the address quality analysis results.

8. The system according to claim 1, wherein the postage metering device is operably connected to a postage security device for obtaining postage for the respective mail piece.

9. The system according to claim 1, further comprising a data storage device to store mail piece data associated with each processed mailing.

10. The system according to claim 1, wherein the mail processing system is a table top mailing machine.

11. A method of qualifying a mailing including a plurality of addressed mail pieces for postage discounts, the method comprising steps of:

- loading the plurality of mail pieces onto a feeder for individually feeding each mail piece into a mail processing system;
- transporting a respective one of the mail pieces to an imaging component of the mail processing system;
- imaging an address of the respective mail piece;
- reading the address image with an optical character recognition (OCR) device;
- qualifying the read address of the respective mail piece to postal authority standards;
- obtaining a weight for the respective mail piece;
- printing a pre-sort mail discounted meter postage indicia based on the qualified address and the obtained weight; and
- printing a postal authority delivery point barcode, which corresponds to the delivery point of the qualified address in the clear zone on the mailpiece.

12. The method of claim 11, wherein the qualifying step includes:

- verifying the read address against at least one of the following postal authority requirements: Coding Accuracy Support System (CASS), Delivery Point Validation (DPV), SuiteLink or LACSLink.

13. The method of claim 11, further comprising the step of updating the read address with move update information by way of a postal authority approved move update requirement.

14. The method of claim 13, wherein the postal authority approved move update requirement is selected from NCOALink or Ancillary Service Endorsements.

15. The method of claim 11, wherein the imaging step includes imaging the address of the respective mail piece by way of an area camera, contact image sensor, line scan camera or time delay integration (TDI) line scan camera.

16. The method of claim 11, wherein the pre-sort mail discounted meter postage indicia is based on at least one of Mixed Automated Area Distribution Center (MX-AADC), Automated Area Distribution Center (AADC), 3-digit and 5-digit sort groups.

17. The method of claim 11, wherein the imaging of the postal authority delivery point barcode includes printing an Intelligent Mail barcode (1 Mb) in a clear zone of the respective mail piece.

18. The method of claim 11, wherein the printing of the postal authority delivery point barcode includes printing of a human readable updated address, wherein the updated address is obtained from a postal authority approved address process selected from one or more of SuiteLink, LACSLink, or NCOALink.

19. The method of claim 11, wherein a 5-digit ZIP and a machine ID is printed to the left of the postal authority delivery point barcode.

20. The method of claim 11, wherein the printing of the pre-sort mail discounted meter postage indicia is inhibited if the address of the respective mail piece is not able to be qualified against postal authority standards.

21. The method of claim 11, further comprising the step of creating one or more reports containing contents and make up of the mailing.

22. The method of claim 11, further comprising the step of archiving in data storage, data associated with the mailing and data associated with each individual mail piece.

23. The method of claim 11, further comprising the step of compiling an address change list identifying address updates from the qualifying to postal standards process.

24. The method of claim 11, wherein the obtaining step includes weighing the respective mail piece on a postage metering device.

25. The method of claim 11, wherein the obtaining step includes obtaining weight information for the respective mail piece based on weight category.

26. A computer programmed to execute the method of claim 11.

27. A program product, comprising a physical machine-readable storage medium and executable code embodied in the medium, wherein execution of the code by at least one programmable computer causes the at least one programmable computer to perform the steps of the method of claim 11.

28. A method of processing a mailing including a plurality of addressed mail pieces, the method comprising steps of:

- loading the plurality of mail pieces onto a feeder for individually feeding a first and second mail piece into a mail processing system;
- individually transporting first and second mail pieces to an imaging component of the mail processing system;
- imaging an address for each of the first and second mailpieces;
- reading the address images of the first and second mail pieces with an (OCR) device;
- comparing the read addresses of the first and second mail piece to a client address list to determine if the read addresses of the first and second mail piece are present on the client list;
rejecting the first mail piece upon a determination that the read address of the first mail piece is determined not to be on the client list or the first mail piece is marked to be purged; and continue processing the second mail piece upon a determination that the read address of the second mail piece is determined to be on the client list.

29. The method of claim 28, wherein the continued processing of the second mail piece further includes the steps of: obtaining a weight for the second mail piece; printing a pre-sort mail discounted meter postage indicia on the second mail piece based on the qualified address and the obtained weight; and printing a postal authority delivery point barcode on the second mail piece, which corresponds to the delivery point of the qualified address in the clear zone on the second mailpiece.

30. The method of claim 28, wherein the step of rejecting the first mail piece further includes the step of: diverting the first mail piece from the mail processing system.

31. The method of claim 11, wherein the loading step includes: loading the first mail piece onto a first feeder of a first mail processing system; and loading the second mail piece onto a second feeder of a second mail processing system.

32. The method of claim 31, wherein the first and second mail processing systems are in connection by way of a server.

33. The method of claim 32, wherein the server is configured to store mail piece data associated with each mail piece processed on each of the first and second mail processing systems.

34. The method of claim 33, wherein the server produces client and postal authority reports from the first and second mail processing systems.