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(54) System and method for producing personalized imaged material

(57) A system and method for producing personalized imaged material includes sclectively gathering stock sheets and assembling the stock sheets into designated sets of sheets, or in an alternative method, sequentially feeding the stock sheets. The stock sheets in each designated set of sheets are sequentially processed to image personalized information onto the stock sheets. The personalized sheets are sequentially presented for finishing, which can include associating an additional item with the personalized sheets. Processing is carried out by collators, feeding systems, and variable data imaging systems, and finishing systems. Operational control is provided by a control system that includes a data structure containing user information and recipient profile information. An operations controller executes job requests for a particular user and accesses recipient profiles to image personalized information onto the stock sheets. The system and method are useful for direct marketing, invoicing, document preparation, preparation of personalized books, and the like.

FIG.4a

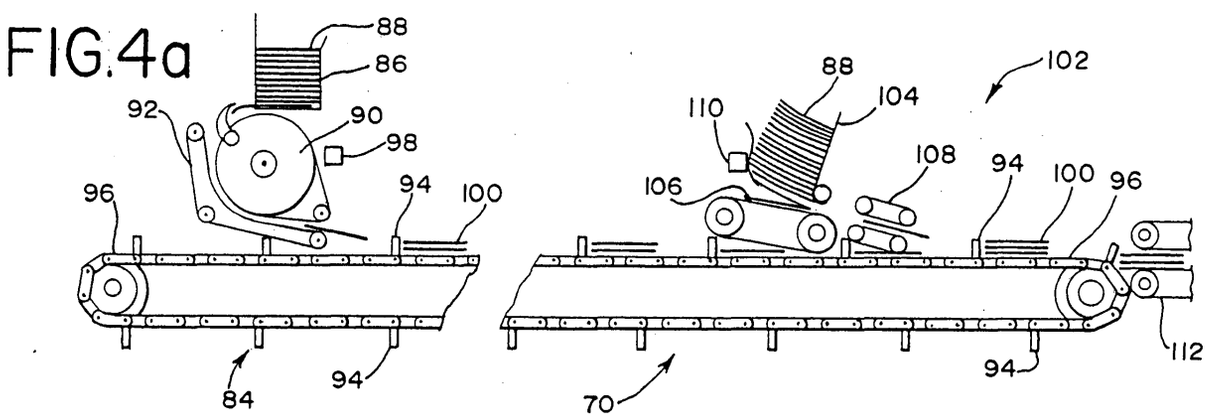

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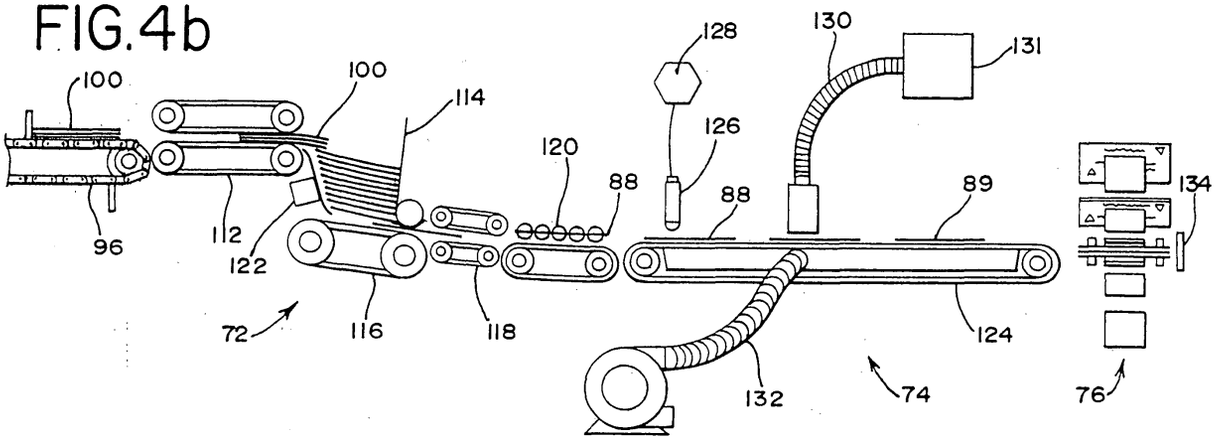
FIG.4b


100
100
114
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Description

RELATED APPLICATION

[0001] This application is a continuation-in-part of commonly-assigned, co-pending patent application serial no. 10/712,291, filed November 12, 2003, the subject matter of which is incorporated by reference herein.

TECHNICAL FIELD

[0002] The present invention relates, generally, to collation and selective insertion of imaged material, and more particularly, to systems and methods for dynamic insertion and custom finishing of printed material.

BACKGROUND

[0003] With the advent of computer technology, a wide variety of processing and handling system are now available to produce customized printed material. High volume production of selectively inserted printed material and packaging of the printed material can now be performed by computer-controlled equipment. Large volume production of advertising materials, account statements, and bulk mailing can be carried out using high-volume collation and packaging systems. For example, bulk mailing systems can place several enclosures or inserts into packages intended for mailing to selected recipients. The packages typically include common items that are sent to all recipients and additional items inserted into the package for selected recipients. The creation of mailing packages containing individualized inserts can only be realized on a cost-effective basis through the use of automated, high-speed equipment.

[0004] The preparation of individualized packages of printed material requires the use of scanning technology for product quality control. Typically, selective insertion systems employ machine readable indicia printed on control documents to ensure the proper printed materials are enclosed within a designated package. In one such system, selected inserts are placed into billing statements under the control of an integrated system controller. The controller directs selective insertion of enclosures into the billing statements. The system controller directs the inserter to selectively include inserts with the billing statement according to instructions from a data processor.

[0005] Selective insertion systems are also used to place inserts into bulk mailing items, such as advertising mailers and advertising inserts within newspapers. In one such system, newspapers are collated with materials that vary depending upon the product interest of selected newspaper subscribers. In addition to placing selective inserts within the newspaper, the system also prints indicia identifying the selected subscriber on a jacket of the newspaper.

[0006] High-speed, computer-controlled processing equipment is also used for permit and pre-sort bulk mailing for delivery to the U.S. Postal Service. Scanning equipment is used to pre-sort bulk mailings and to inspect and verify that mail pieces have been properly presorted and proper postage applied. Such systems include stacking structures for accommodating a plurality of like stationery items. Printing systems are used to print various parts of information stored by a computer system on selected stationery items from the stacking structure. Identification marks are placed on the stationery items for use by the U.S. Postal Service for marking and identifying pre-sorted letters.

[0007] Automated systems have also been developed that validate the sequence and package completeness of output from a high-speed printer. The equipment can add covers and inserts and, if required, bind the printed material together in a variety of ways and place the printed material in a package. The systems are configured to assemble a variety of documents, such as insurance policies, contracts, instructional materials, parts and repair manuals, and business reports of various types. For example, the system can place particular clauses within insurance policies that are to be selectively mailed to policy holders residing in a particular state. The automated printing and assembly equipment thus enables large volume distribution of insurance policies and other documents that contain particular information relevant to selected recipients.

[0008] Although computer controlled systems have enabled development of high-volume printed material handling systems, systems and methods have yet to be developed to address the particular need for individualized fmished printed material. Further, advancements in system configuration are necessary to fully realize the potential of advanced printing and handling systems. Accordingly, a need existed for systems and methods to address a wide variety of applications for personalized printed material and finishing of the printed material.

SUMMARY

[0009] In an embodiment of the invention, a method for producing personalized imaged material includes selectively ejecting predetermined stock sheets from a plurality of sheet feeders. The stock sheets are sequentially processed to image personalized information onto the stock sheets to form personalized sheets and the personalized sheets are sequentially finished.

[0010] In another embodiment of the invention, a method for producing personalized printed material includes selectively gathering stock sheets and assembling the stock sheets into designated sets of sheets. The stock sheets in each designated set of sheets are sequentially processed to image personalized information onto the stock sheets. The stock sheets are then re-gathered into the designated sets of sheets and pack-

aged with additional items.

[0011] In yet another embodiment of the invention, a method for producing personalized printed material includes selectively gathering stock sheets and assembling the stock sheets into designated sets of sheets. Each stock sheet is sequentially processed into a feeding system and personalized information is imaged onto the stock sheets. The stock sheets are re-gathered into the designated sets of sheets presented for final processing.

[0012] In still another embodiment of the invention, a method for producing personalized imaged material includes selectively ejecting predetermined stock sheets from a plurality of sheet feeders to form a sequential order of stock sheets. Each stock sheet contains specified indicia thereon. The stock sheets are sequentially processed to image personalized information onto the stock sheets to form personalized sheets. Each personalized sheet is associated with an additional item, where a feature of the additional item is related to one or both of the specified indicia or the personalized information.

[0013] In a further embodiment of the invention, a method for producing personalized imaged material includes providing a multi-bin collator, where each bin contains stock sheets having predetermined indicia thereon. Selected bins are activated in response to control signals from a control system and one or more stock sheets are fed from the selected bins onto a conveyance device. The stock sheets are sequentially processed to image personalized information onto the stock sheets to form personalized sheets and the personalized sheets are sequentially finished.

BRIEF DESCRIPTION OF THE DRAWING

[0014] FIG. 1a is a front view of an exemplary preprinted sheet that may be used as a stock sheet in accordance with the invention;

[0015] FIG. 1b is a front view of the stock sheet illustrated in Fig. 1a having personalized information printed thereon;

[0016] FIG. 2a is a front view of an insert sheet that may be used as an addressing vehicle in accordance with the invention;

[0017] FIG. 2b is a front view of the insert sheet illustrated in Fig. 2 having personalized information printed thereon in accordance with the invention;

[0018] FIG. 3a is a schematic block diagram of a control system arranged in accordance with the invention;

[0019] FIG. 3b is a schematic block diagram of a general information file structure in accordance with the invention;

[0020] FIG. 3c is a schematic block diagram of customer data files in accordance with the invention;

[0021] FIG. 4a is a schematic diagram of two exemplary collation systems arranged in accordance with the invention;

[0022] FIG. 4b is a schematic diagram of a re-feeder, an imaging system, and a re-gathering system arranged in accordance with the invention;

[0023] FIG. 4c is a top view of the schematic diagram illustrated in FIG. 4b and including additional components of a packaging system arranged in accordance with the invention;

[0024] FIG. 4d is a schematic diagram of an insertion and imaging system arranged in accordance with the invention;

[0025] FIG. 5 is a flow diagram illustrating a process control sequence for a single-lane machine in accordance with the invention;

[0026] FIG. 6 illustrates another embodiment of a process control sequence for a single-lane machine in accordance with the invention;

[0027] FIG. 7 illustrates a process control sequence for a single-lane machine arranged in accordance with a further embodiment of the invention;

[0028] FIG. 8 is a schematic top view of a dual-lane machine arranged in accordance with one embodiment of the invention;

[0029] FIG. 9 is a schematic top view of a dual-lane machine arranged in accordance with another embodiment of the invention;

[0030] FIG. 10 is a flow diagram of a process control sequence for a dual-lane machine in accordance with the invention;

[0031] FIG. 11 illustrates a process control sequence for a dual-lane machine in accordance with another embodiment of the invention;

[0032] FIG. 12 is a schematic diagram of a sequential collation and imaging system arranged in accordance with another embodiment of the invention;

[0033] FIG. 13 is a schematic diagram of a finishing system including a folding, labeling, and imaging system arranged in accordance with one embodiment the invention;

[0034] FIG. 14 is a top view illustrating the folding, labeling, and imaging operation carried out by the finishing system illustrated in FIG. 13;

[0035] FIG. 15 is a schematic diagram of a finishing system arranged in accordance with one embodiment the invention for associating an object with a package or with a personalized sheet; and

[0036] FIGs. 16a-16c are top views illustrating a sequential imaging and finishing process in accordance with an embodiment of the invention.

[0037] It will be appreciated that for simplicity and clarity of illustration, machine elements shown in the Figures have not necessarily been drawn to scale. For example, the dimensions of some of the elements are exaggerated relative to others for clarity. Further, where considered appropriate, reference numerals have been repeated among the Figures to indicate corresponding elements.

DETAILED DESCRIPTION

[0038] The present invention provides a system and method for low-cost, high-volume production of personalized printed materials. A computerized processing system enables a wide range of imaged materials to be automatically processed and packaged for delivery to recipients. The system and method of the invention can be utilized to address numerous applications including, but not limited to, direct marketing, invoice preparation, customized documentation preparation, and the like. The computer control processing system enables the storage of large quantities of information concerning various aspects of the recipients of the personalized imaged materials. The computerized control system also enables storage of user information that can be selectively coupled with recipient information to provide personalized imaged materials to selected recipients based on user criteria and recipient data files.

[0039] As will become apparent from the following description, the various embodiments of the invention are designed with maximum flexibility to enable the use of the system for a wide variety of applications and the preparation of small and large volume imaged material production. Although the exemplary embodiments of the invention described below generally relate to direct marketing, those skilled in the art will appreciate that the system and method of the invention can equally be applied to a wide variety of different imaged materials.

[0040] Shown in FIG. 1a is a front view of a pre-printed sheet 20. In the illustrative embodiment, pre-printed sheet 20 includes indicia 22 showing the source of the pre-printed sheet, in this instance Solar Communications, Inc., the assignee of the present invention and a coupon blank 24. In accordance with the invention, pre-printed sheet 20 can be one of many such pre-printed sheets having a variety of coupon blanks and different provider indicia. The provider indicia can vary in a number of ways including different products, different advertising information, and different providers, which may be divisions of a single business entity or different business entities. As used herein, the term "indicia" is intended to apply to all forms of imaged information including identifying marks, printed text, graphic elements, and the like.

[0041] FIG. 1b is a front view of pre-printed sheet 20 after processing in the system of the invention to image personalized information thereon. In accordance with one aspect of the invention, pre-printed sheet 20 has been subjected to an imaging process to place customized indicia 26 and 28 on coupon blank 24. As a result of the imaging process, coupon blank 24 now includes a particular value, shown as indicia 26, and a barcode, shown as indicia 28, for identification and tracking purposes. By processing pre-printed sheet 20 through the imaging system of the invention, a stock sheet has been processed to place personalized information onto the stock sheet. In accordance with the invention, numerous additional customized or personalized indicia can be imaged onto pre-printed sheet 20. For example, specific products, additional pricing information, and the like, could also be imaged on pre-printed sheet 20.

[0042] A front view of an exemplary insert sheet 30 is illustrated in FIG. 2a. Insert sheet 30 includes provider indicia 32. Insert sheet 30 can be one of a number of different inserts, including an addressing insert for mailing purposes, a special insert identifying additional products or services, and the like. In the aspect of the invention where insert sheet 30 functions as an addressing vehicle, personalized information in the form of a recipient address 34 is placed on insert sheet 30, as illustrated in FIG. 2b. Additionally, further provider information 36 can also be imaged onto insert sheet 30 prior to packaging. Those skilled in the art will appreciate that numerous additional indicia can also be imaged onto insert sheet 30 including additional provider information, package opening incentives, and the like.

[0043] A computer control system for preparing personalized printed material in accordance with the invention is illustrated in FIG. 3a. The control system includes a data structure 38 that is interfaced to an operations controller 40. Data structure 38 includes an information database that includes a wide variety of provider and recipient information. The provider information can include source identification information, brand information, specific product information, market pricing, and discount information, and the like. The information database can also include recipient information, such as identification, product preferences, store preferences, geographic location, and the like. In another aspect of the invention, information database 42 can include information relating to additional applications of the invention, such as invoicing, custom document preparation, preparation of personalized books, and the like. Where the provider is, for example, a service company, such as a utility company, the provider information can include regional rate information, billing code information, invoice routing information, and the like. The recipient information could include annual usage information, special fees or rate information, rate discount information, and the like. Further, where the provider is a book publisher or distributor, the recipient information could include, for example, names for insertion into personalized books, such as, for example, children's books, and the like.

[0044] In accordance with the invention, the assembled information in information database 42 is organized into general information files 44 and specific information files 46. FIG. 3b illustrates an example of the file organization within general information files 42. The file database includes user profile data 48 and various topic category files 50. The content of user profile data 48 will depend upon the particular business activity of the user, in addition to the number and type of user locations, the particular products or services offered by the user, and the like. Topic category 50 can include particular product

information, such as product type, product brand, general pricing information, such as discounts, and the like.

[0045] Specific information files 46 can include numerous data relating to specific recipients of the personalized printed materials. As illustrated in FIG. 3c, the recipient data files can include identification information, specific pricing applying to a specified recipient or groups of recipients, product preferences for individual recipients and groups of recipients, store preferences of individual recipients, geographic location of particular recipients, and the like.

[0046] Those skilled in the art will appreciate that the architecture of data structure 38 described above is but one of many different possible architectures of a data structure for the present invention. Depending upon the particular application of the present invention, data structure 38 can have additional information files from those described above. For example, additional information files can include regulatory information, statutory information, and the like. In accordance with the invention, as illustrated in FIG. 3a, operations controller 40 is interfaced with a variety of processing systems used in the production of personalized imaged material.

[0047] Operations controller 40 provides command and control instructions to one or more collators 52, refeeders 54, imaging systems 56, inserters 58, and finishing systems 60. Operations controller 40 responds to commands to provide personalized printed materials intended for particular recipients as requested by specific users.

[0048] A system manager 62 responds to input instructions from operations personnel and instructs operations controller 40 to prepare sets of personalized printed material using particular data files maintained in data structure 38. System manager 62 initiates and maintains all of the data files within data structure 38 and, accordingly, maintains an awareness of the status of all data files in data structure 38.

[0049] Those skilled in the art will appreciate that the functions of system manager 62 and operations controller 40 can be carried out by electronic devices, such as microprocessors, microcontrollers, and the like. Further, the databases maintained in data structure 38 can be stored in hard memory devices, such as dynamic-random-access-memory (DRAM), static-random-access-memory (SRAM), on-board memory structures, and the like. System operators can enter command instructions to system manager 62 and data into data structure 38 through any of a number of different input/out devices, such as computer terminals, voice-activated systems, scanning devices, and the like.

[0050] Upon receiving instructions in the form of a job request from system manager 62, operations controller 40 matches the job request information with user profile data 48 and topic category files 50 with one or more recipient data files in specific information files 46. Once the user information and recipient information is matched, operations controller 40 relays command signals to the various operating equipment to produce the requested personalized printed material.

[0051] FIGs. 4a-4d illustrate one embodiment of a single-lane machine for practicing the present invention. The various components making up the single-lane machine include a collator 70, a re-feeder 72, an imaging system 74, a re-gathering system 76, and a finishing system 78. The single-lane machine can also include an insertion system 80 and a second imaging system 82.

[0052] In accordance with the invention, collator 70 can be one of several different types of collators. Two exemplary collators are schematically illustrated in FIG. 4a. A vacuum and rotary feed collator 84 includes a bin 86 that gravity feeds stock sheets 88 to a rotary feed device 90. Rotary feed device 90 in conjunction with a belt 92 sequentially feeds stock sheets 88 onto the spaces between conveyor lugs 94. Conveyor lugs 94 are distributed along conveyor system 96. As conveyor system 96 moves in a lateral direction from left to right, rotary feed device 84 feeds stock sheets 88 onto the space between conveyor lugs 94 in response to commands received from operations controller 40 through a system relay 98. System relay 98 activates rotary feed device 84 in response to instructions from operations controller 40 and returns operational status information to operations controller 40.

[0053] In accordance with one embodiment of the invention, a number of rotary feed systems 84 are positioned above and laterally distributed along conveyor system 96. Each of the rotary feed systems supplies a stock sheet from its bin onto select spaces on conveyor system 96. After a select space has passed beneath several rotary feed systems 84, a designated set of sheets 100 is assembled on a select space of conveyor system 96. The make-up of designated set 100 depends upon the particular activation sequence of rotary feed system 84 as conveyor system 96 moves in a generally left to right direction. Those skilled in the art will recognize that rotary feed systems 84 could also be positioned along side of conveyor system 96 and feed stock sheets either at a right angle to the direction of motion of conveyor system 96 or in the same direction of motion. As described above, operations controller 40 responds to commands from operations personnel and uses information in data structure 38 to initiate activation signals to the various rotary feed systems of the collator.

[0054] A friction feed collator 102 is also illustrated in FIG. 4a. Friction feed collator 102 includes a bin 104 containing stock sheets 88. A friction belt 106 grabs stock sheets that are released from bin 104 and feeds the stock sheets through a feed conveyor system 108 onto the spaces between conveyor lugs 94. In similarity to rotary feed collator 84, friction feed collator 102 includes a number of friction feed systems positioned above and laterally distributed along conveyor system 96. Each friction feed system is equipped with a system relay 110 that receives instructions from operations con-

troller 40 and sends operation status information back to operations controller 40. Those skilled in the art will recognize that friction feed systems could also be positioned along side of conveyor system 96 and feed stock sheets either at a right angle to the direction of motion of conveyor system 96 or in the same direction of motion.

[0055] Collator 70 can deliver a varying number of stock sheets into the space between lugs 94 on conveyer system 96. In this method, the feed device delivers multiple copies of the stock sheets in its bin into the same space on conveyor system 96. Accordingly, a designated set of sheets at a specific location on conveyer system 96 can have a number of sheets from the same bin. Collator 70 can also delivery multiple sheets from more than one bin into the same space on conveyor system 96. Thus, the make up of a designated set of sheets can also include multiple sheets from several bins. The ability to feed multiple sheets from the same bin is advantageous, for example, in the case where a designated set of sheets include admission tickets to an event, such as a sporting event, or fine arts event, or the like.

[0056] Conveyor system 96 transfers designated set 100 to a pick-up system 112. As illustrated in FIG. 4b, pick-up system 112 is a component of re-feeder 72. Re-feeder 72 also includes a bin 114 and friction feed belt 116. Designated sets 100 are loaded into bin 114 and individual stock sheets are sequentially fed by friction feed belt 116 through transfer system 118 and into aligning system 120. Re-feeder 72 sequentially feeds stock sheets into aligning system 120 upon commands received through a system relay 122 from operations controller 40.

[0057] In accordance with one embodiment of the invention, re-feeder 72 is configured to operate at transfer rates substantially greater than the operational rate of collator 70. In a preferred embodiment of the invention, re-feeder 72 operates at a rate that ranges from about the same rate as collator 70 (about a 1 to 1 operating speed ratio) to about 2 to about 50 times faster than collator 70. The high operating speed of re-feeder 72 ensures that designated sets 100 transferred from collator 70 can be sequentially processed at a rate that will accommodate the large number of stock sheets 88 contained within each designated set 100.

[0058] Those skilled in the art will recognize that other types of feeding systems can be used to assemble the designated sets of sheets prior to imaging. For example, a continuous rotary feed system can be used to collect the sets of sheets from the collator and sequentially deliver the individual sheets to aligning system 120. Further, an operator can manually collect the sets of sheets and deliver the sets of sheets to aligning system 120. Accordingly, the present invention contemplates human intervention where necessary or where cost effective to provide interfacing between operating systems.

[0059] Regardless of the method used to collect the designated sets of sheets, aligning system 120 aligns each stock sheet 88 to position each stock sheet at a proper orientation for imaging by imaging system 74. Once aligned by alignment system 120, stock sheets 88 are transferred to a vacuum belt 124 in imaging system 74. As each stock sheet 88 is transferred to vacuum belt 124, a scanning device 126 scans the stock sheet for a code or other graphic indicia to ensure that the correct stock sheet will be presented to imaging system 74. Scanning device 126 sends optical signals to a digital signal converter 128 that relays scan information to operations controller 40. Operations controller 40 verifies that the stock sheet 88 is a proper member of designated set 100 prior to imaging personalized indicia onto stock sheet 88 by imaging system 74. If scanning device 126 detects an incorrect sheet, imaging system 74 diverts the entire set of sheets from which the incorrect sheet originated to a waste bin (not shown) and operations controller 40 reorders the set of sheets containing the incorrect sheet.

[0060] While the foregoing processing sequence envisions that all of the stock sheets will be imaged with personalized information, the present invention also contemplates processes in which not all of the sheets in a set of sheets are imaged. In some cases it may not be desirable to image personalized information on each sheet within a set of sheets. For example, cover and end sheets within a set may have a different format than the remaining sheets within a set. Accordingly, it is within the scope of the present invention that certain ones of designated set 100 are transferred through imaging system 74 without being imaged.

[0061] In accordance with the inventive process, vacuum belt 124 positions stock sheet 88 within the imaging field of an imaging device 130. Imaging device 130 can be one of a number of different imaging devices including a variable data imaging system, a laser printer, an ink jet printer, and the like. In a preferred embodiment of the invention, imaging device 130 is a solvent-based ink jet system that can image stock sheets at a conveyor speed of about 500 to about 1000 linear feet per minute. Imaging system 130 is preferably a system configured to image stock sheets 88 from a position immediately above the stock sheets. Alternatively, imaging system 130 can also image stock sheets 88 from a position immediately below the stock sheets. In accordance with the invention, imaging device 130 also includes an imaging control system 131 and vacuum system 132 that provides vacuum pressure for vacuum belt 124.

[0062] Preferably, re-feeder 72 and imaging system 74 operate at a speed that is consistent with the demand for individually processing the stock sheets within a designated set 100 that contains a maximum number of stock sheets. At such an operating speed, the number of stock sheets in each designated set can vary, while the linear speed of vacuum belt 124 remains constant. For example, where a designated set 100 contains three stock sheets and another designated set 100 contains seven stock sheets, operations controller 40 will instruct

re-feeder 72 to skip four feeds, plus a number for buffer purposes when processing the three-sheet designated set. Operations controller 40 also instructs refeeder 72 to skip a certain number for buffer purposes when processing the designated set containing seven stock sheets. The insertion of buffers when processing designated sets 100 having different numbers of stock sheets allows time, if needed, for the re-gathering of the designated sets and transferring the designated sets to final processing. The number of buffer positions depends on the overall operating speed of the single-lane machine.

[0063] Those skilled in the art will recognize that a wide variety of personalized indicia can be imaged onto the stock sheets by imaging system 74. The type of information can vary depending upon the nature of the material being imaged. For example, in the case of invoice preparation, the personalized information can include usage of services, such as utility services including, electricity, water, and the like, and for communications services, such as television, telephone, internet services, and the like. In addition to advertising mailers, the as described above the stock sheets can include admission tickets to various events. In this case, there can be multiple tickets for a given event date and imaging system 74 can image each ticket for a given date with seat number, ticket price, and the like. Accordingly, it is within the scope of the present invention that all such printed materials be processed by the system and method of the invention.

[0064] After stock sheets 88 are imaged to contain personalized information, they are transferred to re-gathering system 76 and reassembled into the original designated sets initially prepared by collator 70. Where needed for final processing purposes, re-gathering system 76 can include a rotary indexing device 134 that delivers re-gathered designated sets 100 to a conveyor 136. Stations 138 within rotary indexing device 134 rotate into alignment with vacuum belt 124 and receive personalized sheets 89 from imaging system 74. Alternatively, another type of indexing and turn over device, such as a belt system and the like can also be used. In yet another alternative, re-gathering system does not include a turn over device. Those skilled in the art will appreciate that the re-gathering system illustrated in FIGs. 4b-4d is one of many different possible equipment configurations for re-gathering the sheets processed by imaging system 74.

[0065] In an alternative embodiment, collator 70, refeeder 72, imaging system 74, and re-gathering system 76 can all operate at variable transfer rates. These systems can be independently controlled by, for example, servo motors that are electronically linked to operations controller 40. Operations controller 40 monitors the numbers of sheets in the sets and the operating speed of each operating system. By varying the operating speeds through an interlinked control system, a relatively constant throughput can be obtained where the number of sheets in consecutive sets varies. In synchronizing the operating speeds, one system can be instructed to operate at a higher transfer rate than an adjacent system, and visa versa. The use of electronically-linked, machine speed controls can be broadly employed to synchronize the collator operating speed and the various interface components and processing components in the finishing operations. Accordingly, an interlinked operating speed control system that independently varies the transfer rates of the various process systems is contemplated by the present invention.

[0066] Once re-gathered and indexed, the designated sets of personalized sheets 101 can be transferred to a number of fmishing operations. Those skilled in the art will appreciate that numerous types of finishing procedures can be carried out to organize the designated sets of sheets into a user specified format. For example, the designated sets of sheets can be bound together or attached using some other physical attachment means, such as clips, pins, staples, glue, and the like. Also the designated sets of sheets can be packaged by overwrapping, or shrink wrapping, or the like. Additionally, the designated sets of sheets can be inserted into an envelope suitable for mailing with the U.S. Postal Service or another document delivery service. In the machine embodiment illustrated in Figs. 4a-4d, the single-lane machine is arranged to insert index sets of sheets 101 into envelopes 140.

[0067] As described above, the single-lane machine can also include insertion system 80 and second imaging system 82. Insertion system 80 includes a bin 142 that contains insert sheets 144. Insert sheets 144 can be any of a number of different types of sheets having a variety of information imaged thereon. In the embodiment of the invention described with reference to FIGs. 1 and 2, insert sheets 144 are intended to provide address information for particular recipients in addition to user information.

[0068] Upon receiving control signals from operations controller 40, system relay 146 commands insertion system 80 to transfer an insert sheet 144 from bin 142 through transport system 148 to second imaging system 82. Second imaging system 82 includes an imaging device 150 that receives image control commands from operations controller 40 through imaging control system 152. Second imaging system 82 also includes an alignment system 154 to properly align insert sheets 144 within the imaging field of imaging device 150. In similarity with imaging device 130, imaging device 150 can be a variable field imaging system, or printing system, such as a laser printer or an inkjet printer, or the like. In a preferred embodiment of the invention, imaging device 150 is an inkjet printing system.

[0069] Once personalized information has been imaged onto insert sheet 144, the second imaging system 82 transfers the insert sheet to a selected station within rotary indexing 134. As a result of the operation of insertion system 80 and second imaging system 82, designated sets of sheets 101 each contain an insert pro-

viding address information to selected recipients.

[0070] Although the single-lane machine described above has been set forth with respect to particular machine components, those skilled in the art will appreciate that numerous different mechanisms exist for performing the various operations described above. For example, in addition to rotary indexing systems, other types of vertical stacking indexing systems and lateral stacking indexing systems could also be used. Further, in addition to the rotary feed and friction feed collators described above, a swing arm collator could also be used to prepare designated sets of sheets for delivery to the re-feeding system. Further, the single-lane machine described above can include additional sensing devices and electronic control and relay systems to send information to the operations controller and to receive instructions from the operations controller. Additionally, although the single-lane machine described above has been illustrated with reference to conveyor belt systems for transferring the stock sheets and designated sets of sheets, other types of conveyance mechanisms can also be used. For example, rollers, air bearing systems, vibrating systems, and the like.

[0071] Although the machine described and illustrated above sets forth an embodiment in which all machine components are linked together, those skilled in the art will appreciate that the system can be assembled as individual components. For example, a human operator or a mechanical transfer system can provide an interface between the various machine components. In an alternative embodiment, the collator can feed sets of sheets to a collection area and a human operator or a mechanical transfer system can deliver the sets of sheets to the re-feeder. Further, the sets of documents from the re-gathering system can be transported to the finishing system by a human operator or a mechanical transfer system.

[0072] Those skilled in the art will appreciate that the machine system described above can be operated under a number of different control programs. The following description sets forth several different program control sequences that can be used for the machine system described above. In accordance with the invention, the following program control sequences can also be employed to operate machine systems that differ from those described above.

[0073] One embodiment of a process control sequence for a single-lane machine arranged in accordance with the invention is illustrated in FIG. 5. The control sequence begins by reading database information from data structure 38 into operations controller 40 at step 160. Re-feeder 72 is programmed for a maximum number of inserts at step 162. The various bins of collator 70 are activated by commands from operations controller 40 at step 164. Information regarding the number of inserts or stock sheets to be included in a designated set is relayed to re-feeder 72 at step 166. Scanning device 126 is instructed to scan each sheet for verification at step 168. Imaging control system 131 upon receiving instructions from operations controller 40 prints personalized information on the sheet at step 180. At step 182 an optional drying procedure is carried out cure the imaged sheet. The optional drying system can reside in proximity to vacuum belt 124 at a position downstream from imaging device 130. Re-gathering system 76 is instructed to index, collect and re-collate the printed sheets into the original sets of sheets at step 184. If needed, the re-collated sets of sheets can be turned over or otherwise positioned for final processing at step 186. Final processing as described above is carried out at step 188.

[0074] An additional embodiment of a process control sequence for the single-lane machine described above is illustrated in FIG. 6. The processing sequence illustrated in FIG. 6 is intended for use with a variable speed re-gathering system. The process sequence is similar to that illustrated in FIG. 5 with the exception that the re-feeder is not programmed for a maximum number of inserts. Steps 190 and 192 are similar to steps 160 and 164 in the process sequence described above. At step 194, operations controller 40 sends instructions to re-feeder 72 for the required number of sheets for each designated set. Steps 196, 198, and 200 are similar to steps 168, 180, and 182 described above. At step 202, the number of stock sheets in each designated set is relayed by operations controller 40 to re-gathering system 76. Electronic control within re-gathering system 76 adjusts the speed of rotary indexing system 134 according to the number of sheets required in each set. Steps 204 and 206 are similar to steps 186 and 188 described above.

[0075] FIG. 7 illustrates a process control sequence for the single-lane machine described above in the embodiment in which the single-lane machine includes an insertion system 80 and second imaging system 82. Steps 208-224 are similar to steps 160-186 described above. At step 226, operations controller 40 instructs insertion system 80 and second imaging system 82 to provide a personalized insert sheet into the designated sets of sheets. At step 228, the insert sheet is dried in an optional drying system that can be located immediately downstream from second imaging system 82. Step 230 is similar to step 188 described above.

[0076] In accordance with the invention, an alternative embodiment of a system for producing personalized printed material is illustrated in FIG. 8. The system includes a first collator 232 coupled to a first re-feeder 234. A second collator 236 is coupled to a second re-feeder 238. In accordance with the invention, first collator 232 includes more bins then second collator 236. A first imaging system 240 is coupled to first re-feeder 234 and a second imaging system 242 is coupled to second re-feeder 238. The first imaging system 240 and the second imaging system 242 transfer sheets with personalized information imaged thereon to a reassembly station 244. Reassembly station 244 includes a merging station

246 where sets of sheets originating from first collator 232 and imaged with personalized information by imaging system 240 and sheets originating from second collator 236 and image with personalized information by second imaging system 242 are merged together. Merging station 246 transfers the merged sets of sheets to a final processing system 248. Final processing system 248 can include a turnover device 250 and, in one embodiment of the invention, a packaging system 252 that packages the sets of sheets in one of the packaging types described above. The packaging system is coupled to a transport system 254 that transports the packaged sets of sheets to a staging area for storage or delivery.

[0077] In accordance with the embodiment of the invention illustrated in FIG. 8, second collator 236 is loaded with stock sheets that are intended for insertion into the set of sheets to identify special matters to be included within the designated sets of sheets. For example, the stock sheet loaded in second collator 236 can be generic sheets that are intended to be inserted within all designated sets of sheets that are produced under one or more job requests.

[0078] In accordance with the invention, yet another alternative embodiment of a system for producing personalized printed material is illustrated in FIG. 9. In similarity with the embodiment illustrated in FIG. 8, the system includes a first collator 232, a first re-feeder 234, and a first imaging system 240. Also included are a second collator 236, a second re-feeder 238, and a second imaging system 242. In the system illustrated in FIG. 9, merging station 246 is positioned in line with first collator 232. Reassembly station 244 transfer sets of sheets from second imaging system 242 to merging station 246. Final processing station 248 is also aligned with first collator 232. Those skilled in the art will recognize that other arrangements are possible for the dual-lane illustrated in FIG. 8. For example, in accordance with the invention, additional collators could be added and coupled to reassembly station 244 and their output merged at merging station 246.

[0079] FIG. 10 illustrates a process control sequence for a dual-lane machine as illustrated in Figs. 8 and 9. At step 260, operations controller 40 receives instructions from a system operator to assembly sets of personalized sheets according to a user job request. At step 262, first and second re-feeders 234 and 238 are programmed to assemble a maximum number of inserts or stock sheets into each designated set. Each of collators 232 and 236 are then directed according to processing command sequences 264 and 266, respectively. Each of the individual processing steps within command sequences 264 and 266 are similar to the steps previously described. At step 268, operations controller 40 instructs merging station 246 to re-gather the sheets from imaging systems 240 and 242. The merged sets of sheets are then turned over, if necessary, by a turnover system 250 at step 270. Final processing as previously described is then carried out a step 272.

[0080] A process control sequence for a dual-lane machine in accordance with another embodiment of the invention is illustrated in FIG. 11. The processing sequence illustrated in FIG. 11 provides operating instructions for a dual-lane machine as illustrated in Figs. 8 or 9. The system, however, also includes an insertion system and imaging system as illustrated in FIG. 4d. Steps 274 and 278 are the same as steps 260 and 262 described above. Also, processing control sequences 280 and 282 are the same as processing control sequences 264 and 266. Steps 284 and 286 are the same as steps 268 and 270. At step 288 operations controller 40 instructs the insertion system and the imaging system to provide a personalized sheet for each set of sheets that can be used, for example, for addressing purposes. An optional drying step for the insert sheets is performed at step 290 and final processing is carried out at step 292.

[0081] In an alternative embodiment of the invention, stock sheets are individually fed directly from a collator and sequentially imaged. The alternative embodiment differs from the embodiment described above in that the stock sheets are not gathered into sets of sheets nor processed by a re-feeder prior to imaging. Rather than gather the sheets into sets, the sheets are sequentially fed one at a time to the imaging system directly from a collator. In the alternative embodiment, the sheets can be gathered after imaging and before final processing.

[0082] The method in accordance with the alternative embodiment further includes sequentially finishing the imaged sheets. In the finishing process, the sheets are processed one at a time. The finishing process can include simply folding the imaged sheets. Also, the finishing process can include placing personalized indicia on either an inner surface of the sheets or an outer surface of the folded sheets, or on both the inner surface and the outer surface. Alternatively, the finishing process can also include packaging the imaged sheets with selectively gathered sheets into a package. Additionally, one or more additional items can be associated with the package. For example, an object such as a promotional item can be associated with package. The sequential processing is controlled by the control system described above.

[0083] Illustrated in FIG. 12 is a schematic diagram of a sequential collation and imaging system arranged in accordance with the alternative embodiment of the invention. A sequential collator 300 is coupled to an aligning system 302, which is in turn coupled to an imaging system 304. In similarity to collator 102, collator 300 includes a series of bins 306 that hold stock sheets 308. Each bin includes sheet feeding apparatus for delivering stock sheets to a conveyor system 310. In contrast to the operation of the collator illustrated in FIG. 4a, collator 300 sequentially ejects sheets from the sheet feeders onto conveyer system 310 for delivery one at a time to alignment system 302.

[0084] Alignment system 302 aligns each sequential-

ly feed sheet and delivers each sheet by means of a conveyor system 312 to imaging system 304. Imaging system 304 is similar to imaging system 74 and includes an imaging device 314 and an optional scanning device 316. In accordance with the previous embodiment described above, personalized indicia is imaged onto the sheets by transferring the sheets past imaging system 314 on a conveyor system 318 to produce personalized sheets 320. Scanning device 316 communicates with the control system and verifies that the correct sheet is about to be imaged. After imaging, personalized sheets 320 are transferred by conveyor system 318 a finishing system, where personalized sheets 320 are sequentially processed into a final form.

[0085] As described above, the present invention also contemplates processes in which not all of the sheets are imaged. In some cases it may not be desirable to image personalized information on each sheet. Accordingly, it is within the scope of the present invention that certain ones of stock sheet 308 are transferred through imaging system 304 without being imaged.

[0086] The finishing system coupled to imaging system 304 can be similar to finishing system 78 described above, with the exception that the sheets are entirely sequentially processed to their final form. One embodiment of a finishing system is illustrated in FIG. 13. The finishing system includes a folding system 322, a labeling system 324, and an imaging system 326.

[0087] Folding system 322 can be any of a number of different sheet handling systems that manipulate flat sheets into a folded form. In the embodiment illustrated in FIG. 13, folding system 322 is a plow fold that receives personalized sheets 320 from conveyor system 318 and folds the sheets in a bifold by forcing one half of each sheet over on itself producing folded sheets 334. Personalized sheets 320 are propelled through folding system 322 by a conveyor 328.

[0088] A top view illustrating the folding, sealing, and imaging operation is illustrated in FIG. 14. Each sheet is folded along a folding line 336. In one embodiment of the invention, folding line 336 is a perforated line formed on or near a center line in the stock sheets.

[0089] Once the personalized sheets are folded, labeling system 324 forms a wafer seal 330 to secure the fold. In the illustrated embodiment, labeling system 324 is a labeling device that applies wafer seal 330 to the outside edge of the folded sheets opposite from folding line 336.

[0090] Following seal formation, imaging system 326 images personal information 332 on an outer surface of folded sheets 334. Imaging system 326 is similar to the imaging systems described above. Information 332 can be a variety of personalized information, such as specialized advertising, discount offers, recipient address information, and the like. Where personalized indicia is to be placed on an inner surface of personalized sheets 320, an additional imaging system (not shown) is employed to place the indicia on the sheets prior to processing the sheets though folding system 322.

[0091] Although the foregoing finishing process is described in the context of a fully automated process, those skilled in the art will recognize that manual handling operations can be performed at various stages of the process. For example, operators can be used to collect stacks of sheets from the previous operation and transfer the sheets to the next operation. As the sheets are imaged by imaging system 304, an operator can collect the sheets and place the sheets in transfer bins. The sheets can then be taken by the operator to a folding system and be sequentially processed from the bins through folding system. Accordingly, the present invention contemplates human intervention to assist processing operations, for example, where machine cost is prohibitive or where mechanical interfacing is impractical.

[0092] Those skilled in the art will recognize that the finishing operation illustrated in FIGs. 13 and 14 is one of many different kinds of finishing operations that can be carried out with the personalized sheets prepared in accordance with the invention. For example, various types of packaging operations can also be performed. In one embodiment of the invention, personalized sheets prepared by any of the foregoing methods are placed in a package. The package can be an envelope, such as envelope 140 or a plastic package, or the like.

[0093] As part of the finishing process, the personalized sheets can be packaged with one or more additional items. For example, an object can be attached to the package or inserted into the package with the personalized sheet or sheets. Further, the object can be attached directly to the personalized sheets. The objects can include, for example, product samples, vouchers, marketing aids, such as games, and the like.

[0094] A schematic diagram of a system and method for associating an item with the personalized sheets according to one embodiment of the invention is illustrated in FIG. 15. A package attaching system 340 includes first and second package delivery systems 342 and 344, respectively. Each of package delivery systems 342 and 344 includes a feed station 346 and a rotary placement device 348. A conveyor system 350 transports personalized sheets 320 past the package delivery systems. A number of objects to be attached to personalized sheets 320 are loaded into feed stations 346.

[0095] In accordance with an embodiment of the invention, package attaching system 342 can deliver more than one type of object can be attached to the personalized sheets. For example, package delivery system 342 can provide a product sample 352 for attachment to designated personalized sheets 354, while package delivery system 344 provides vouchers 356 for attachment to designated personalized sheets 358. In a process where objects are attached to the personalized sheets, a gluing system 359 applies glue at a designated location on the upper surface of personalized sheets 230 as the sheets are received from the preceding operation and transported by conveyor system 350.

[0096] In addition to objects such as product sample, marketing aids, vouchers, and the like, additional personalized sheets can be associated with personalized sheets 374. For example, coupons previously processed to image personalized information for a particular recipient can be inserted into a package and the package attached to personalized sheets 374. Further, instead of attaching an item to personalized sheets 320, the items can be inserted into a package by a package insertion system, or over wrapped or shrink wrapped as described above.

[0097] Although only two package delivery systems are illustrated in FIG. 15, those skilled in the art will recognize that numerous such package delivery systems can be employed for delivery of a variety of objects for attachment or package insertion. Further, the package delivery systems can be employed to attach two different objects to the same sheet or insert two different objects into the same package. In a process where objects are attached to personalized sheets 320, package attaching system 340 can be coupled to folding system 322 to prepare folded sheets 334 that include an object attached inside the folded sheet.

[0098] A process for sequentially imaging and finishing personalized sheets is illustrated in FIGs. 16a-16c. In accordance with the process described above, a collator, such as collator 300 sequentially places stock sheets 360 into spaces 362 between lugs 364 on a conveying device 366. Each stock sheet 360 includes previously placed indicia 368 thereon. A control system, such as the control system illustrated in FIGs. 3a-3c, directs collator 300 to eject a particular stock sheet 360 onto a particular one of spaces 362 on conveying device 366. Under the direction of the control system, stock sheets 360 are arranged in a pre-designated, sequential order on conveying device 366. As illustrated in FIG. 16a, each stock sheet contains different indicia 368 thereon.

[0099] An alignment system, such as alignment system 302, aligns the stock sheets on a vacuum belt 370 and a scanning device, such as scanning device 316, communicates with the control system and verifies that the scanned stock sheet is the correct stock sheet for its occupied position in the sequence. An imaging system, such as imaging system 304, images personalized information 372 onto each stock sheet to produce personalized sheets 374. As described above, the present invention also contemplates processes in which not all of the sheets are imaged with personalized information.

[0100] Once personalized sheets 374 are imaged, objects are attached to the personalized sheets, as illustrated in FIG. 16b. Gluing system 359 applies glue 376 to one or more predetermined locations on personalized sheets 374. Glue 376 is positioned above folding line 336 so that objects can be attached generally opposite to personalized information 372.

[0101] In accordance the illustrated embodiment of the invention, different objects can be attached to personalized sheets 374 depending upon the content of indicia 368 and the content of personalized information 372. For example, object 378 is attached to personalized sheet 380, while object 382 is attached to personalized sheet 384. In this way, a particular recipient can receive a mailing, for example, that contains a personalized advertising sheet having a store logo, a personal message directed to the particular recipient, and an item, such as a product sample, that is related to a particular retailer or to product information in the personal message.

[0102] Once objects are attached, personalized sheets 374 are folded using a folding device, such as folding system 322, and sealed using a labeling device, such as labeling system 324, to place wafer seals 330 on folded sheets 386. An imaging system, such as imaging system 304, is used to place information 388, such as name and address information, and the like, on the outer surface of folded sheets 386.

[0103] Those skilled in the art will recognize that the order of the process steps described above can be varied to carry out a number of different finishing processes. For example, instead of attaching an object and folding the personalized sheet over the object, the object can be attached to an outside surface of the folded sheets.

[0104] Thus is apparent that there has been described a system and method for producing personalized imaged material that fully provides the advantages set forth above. Those skilled in the art will recognize that numerous modifications and variations can be made without departing from the spirit of the invention. For example, the collators and insertion systems can be configured in a variety of layout formats to accommodate varying floor space requirements. Accordingly, all such variations and modifications are within the scope of the appended claims and equivalents thereof.

Claims

1. A method for producing personalized imaged material comprising:

   (a) selectively ejecting predetermined stock sheets from a plurality of sheet feeders;
   (b) sequentially processing the stock sheets to image personalized information onto the stock sheets to form personalized sheets; and
   (c) sequentially finishing the personalized sheets.

2. The method of claim 1, wherein sequentially finishing the personalized sheets comprises packaging the personalized sheets with one or more additional items.

3. The method of claim 2, wherein packaging the per-

sonalized sheets comprises providing a package and associating an object with the package.

4. The method of claim 3, wherein associating an object with the package comprises inserting the object into the package.

5. The method of claim 3, wherein associating an object with the package comprises attaching the object to the package.

6. The method of claim 3, wherein associating an object with the package comprises attaching the object to at least one of the personalized sheets.

7. The method of claim 3, wherein associating an object with the package comprises associating an object selected from the group consisting of product samples, vouchers, and marketing aids.

8. The method of claim 1, wherein sequentially finishing the personalized sheets comprises:

(a) folding the personalized sheets to form a folded package; and
(b) sealing the folded package.

9. The method of claim 8 further comprising imaging personalized indicia on an outer surface of the folded package.

10. The method of claim 1 wherein selectively ejecting predetermined stock sheets comprises:

(a) providing a multi-bin collator, wherein each bin contains stock sheets having predetermined indicia thereon; and
(b) activating selected bins in response to control signals from a control system and feeding the stock sheets from the selected bins onto a conveyance device,

wherein the conveyance device sequentially delivers the stock sheets to the imaging system.

11. The method of claim 10 further comprising scanning the package for verification and aligning the package prior to imaging.

12. The method of claim 1, wherein sequentially finishing the personalized sheets comprises inserting each of the personalized sheets into a package.

13. A method for producing personalized printed material comprising:

(a) selectively gathering stock sheets and assembling the stock sheets into designated sets of sheets;
(b) sequentially processing the stock sheets in each designated set of sheets to image personalized information onto the stock sheets;
(c) re-gathering the stock sheets into the designated sets of sheets; and
(d) packaging the designated sets of sheets with additional items.

14. The method of claim 13, wherein packaging the designated sets of sheets with additional items comprises associating an object with the designated sheets.

15. The method of claim 14, wherein associating an object with the designated sheets comprises providing a package and inserting the object into the package.

16. The method of claim 14, wherein associating an object with the package comprises attaching the object to the package.

17. The method of claim 14, wherein associating an object with the package comprises attaching the object to the personalized sheet.

18. The method of claim 14, wherein associating an object with the package comprises associating an object selected from the group consisting of product samples, vouchers, and marketing aids.

19. The method of claim 14, wherein associating an object with the package comprises inserting a personalized sheet into a package.

20. A method for producing personalized printed material comprising:

(a) selectively gathering stock sheets and assembling the stock sheets into designated sets of sheets;
(b) sequentially processing each stock sheet into a feeding system
(c) imaging personalized information onto the stock sheets;
(c) re-gathering the stock sheets into the designated sets of sheets; and
(d) presenting the designated sets of sheets for final processing.

21. The method of claim 20, wherein sequentially processing each stock sheet into a feeding system comprises transporting the designated sets of sheets from a collator to the feeding system, and wherein the feeding system operates at a rate of about 1 to about 50 times faster than the transport rate of the collator.

22. The method of claim 21, wherein the feeding system comprises a re-feeder system.

23. The method of claim 21, wherein the feeding system comprises a rotary feed system.

24. The method of claim 20, wherein selectively gathering stock sheets comprises:

(a) providing a multi-station collator; and
(b) activating selected bins in response to control signals from a control system.

25. The method of claim 24, wherein imaging personalized information comprises transferring the stock sheets from the multi-station collator to an imaging system.

26. The method of claim 25, wherein the designated sets of sheets have a varying number of stock sheets, and wherein the operating speeds of multi-station collator, the feeding system, and the imaging system are synchronized such that the stock sheets are processed at substantially constant throughput rate.

27. A method for producing personalized imaged material comprising:

(a) selectively ejecting predetermined stock sheets from a plurality of sheet feeders to form a sequential order of stock sheets,
wherein each stock sheet contains specified indicia thereon;
(b) sequentially processing the stock sheets to image personalized information onto the stock sheets to form personalized sheets; and
(c) associating an additional item with each personalized sheet,

wherein a feature of the additional item is related to one or both of the specified indicia or the personalized information.

28. The method of claim 27 further comprising:

(a) folding the personalized sheets to form a folded package containing the additional item;
(b) sealing the folded package; and
(c) imaging personalized indicia on an outer surface of the folded package.

29. The method of claim 27 further comprising:

(a) imaging personalized indicia on an inner surface of the personalized sheets;
(b) folding the personalized sheets to form a folded package containing the additional item; and
(b) sealing the folded package.

30. The method of claim 27 wherein selectively ejecting predetermined stock sheets comprises:

(a) providing a multi-bin collator, wherein each bin contains stock sheets; and
(b) activating selected bins in response to control signals from a control system and feeding the stock sheets from the selected bins onto a conveyance device,

wherein the conveyance device delivers the stock sheets to the imaging system in the sequential order.

31. A method for producing personalized imaged material comprising:

(a) providing a multi-bin collator, wherein each bin contains stock sheets having predetermined indicia thereon;
(b) activating selected bins in response to control signals from a control system and feeding one or more stock sheets from the selected bins onto a conveyance device;
(c) sequentially processing the stock sheets to image personalized information onto the stock sheets to form personalized sheets; and
(d) sequentially finishing the personalized sheets.

32. The method of claim 31, wherein the stock sheets comprise sheets having predetermined indicia selected from the group consisting of marketing information , advertising information, invoice information, and event information.

33. The method of claim 31, wherein the stock sheets comprise sheets having advertising information thereon, and wherein personalized information comprises coupon information.

34. The method of claim 31, wherein the stock sheets comprise sheets having invoice information thereon, and wherein personalized information comprises usage and billing amounts.

35. The method of claim 31, wherein the stock sheets comprise sheets having event information thereon, and wherein personalized information comprises seating and ticket price information.

FIG.1a

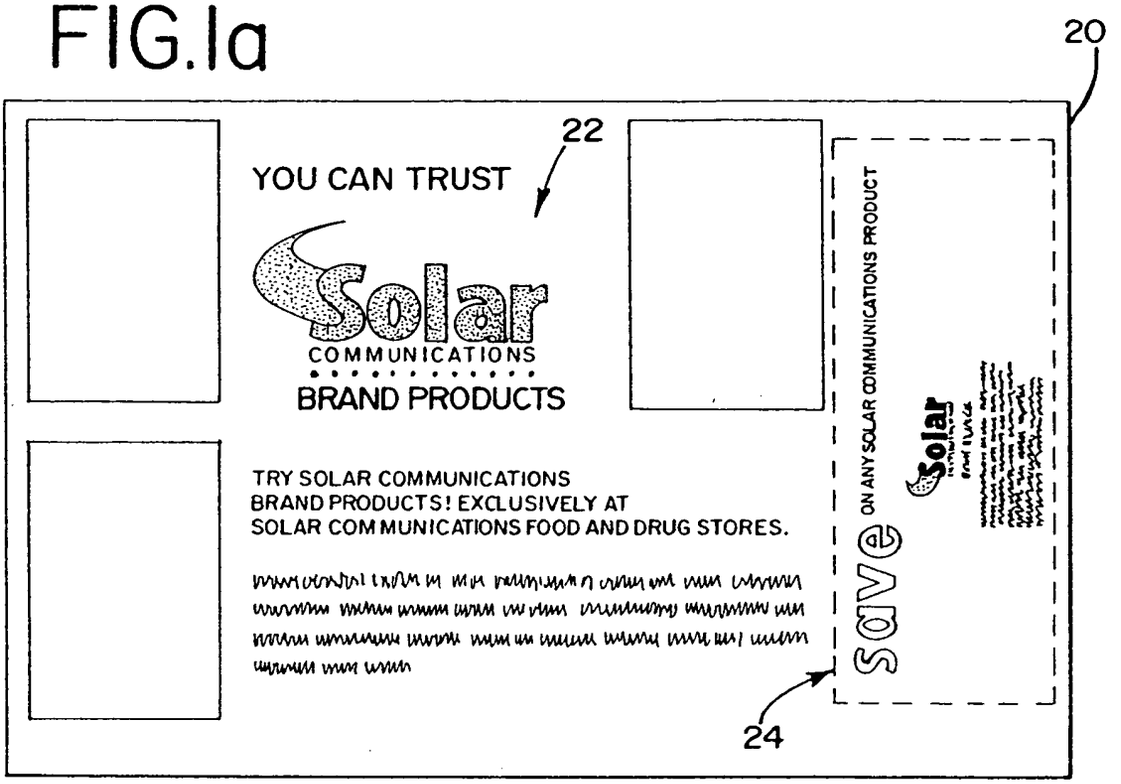

20
22
YOU CAN TRUST
Solar
COMMUNICATIONS
BRAND PRODUCTS
TRY SOLAR COMMUNICATIONS
BRAND PRODUCTS! EXCLUSIVELY AT
SOLAR COMMUNICATIONS FOOD AND DRUG STORES.
save
ON ANY SOLAR COMMUNICATIONS PRODUCT
24

FIG.1b

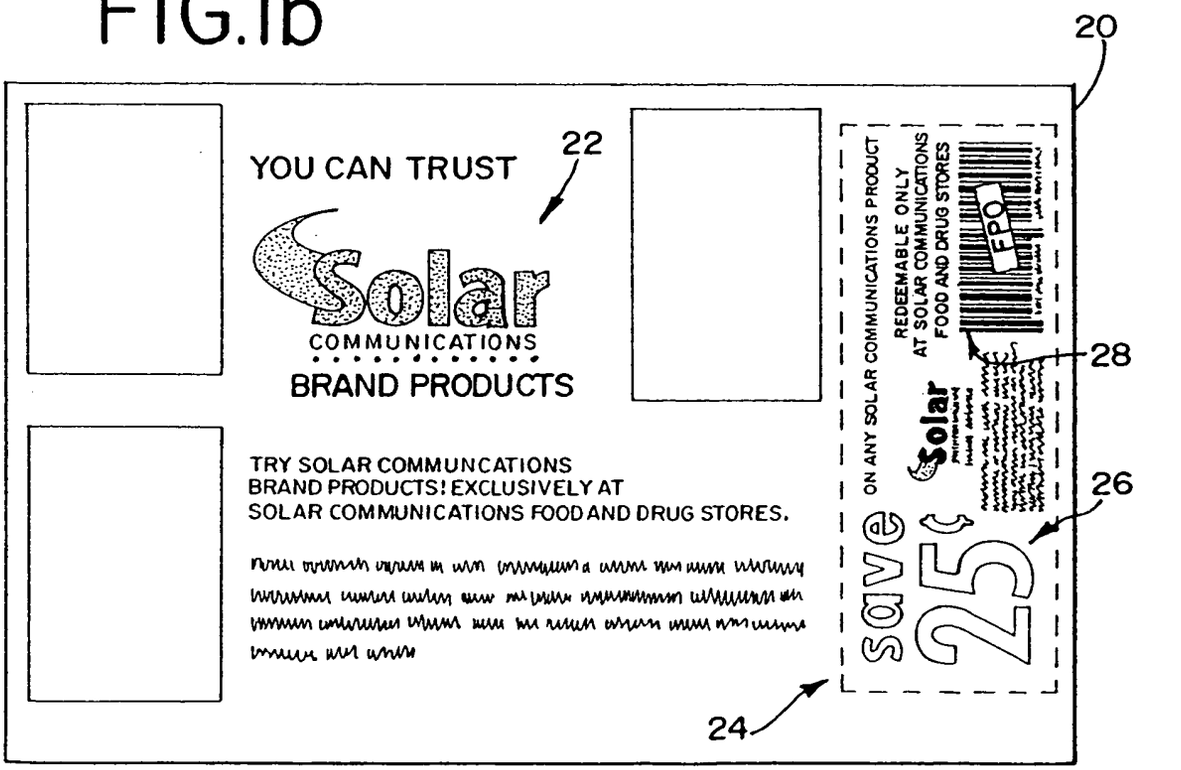

20
22
YOU CAN TRUST
Solar
COMMUNICATIONS
BRAND PRODUCTS
TRY SOLAR COMMUNCATIONS
BRAND PRODUCTS! EXCLUSIVELY AT
SOLAR COMMUNICATIONS FOOD AND DRUG STORES.
save
ON ANY SOLAR COMMUNICATIONS PRODUCT
REDEEMABLE ONLY
AT SOLAR COMMUNICATIONS
FOOD AND DRUG STORES
25¢
FPO
28
26
24

FIG.2a

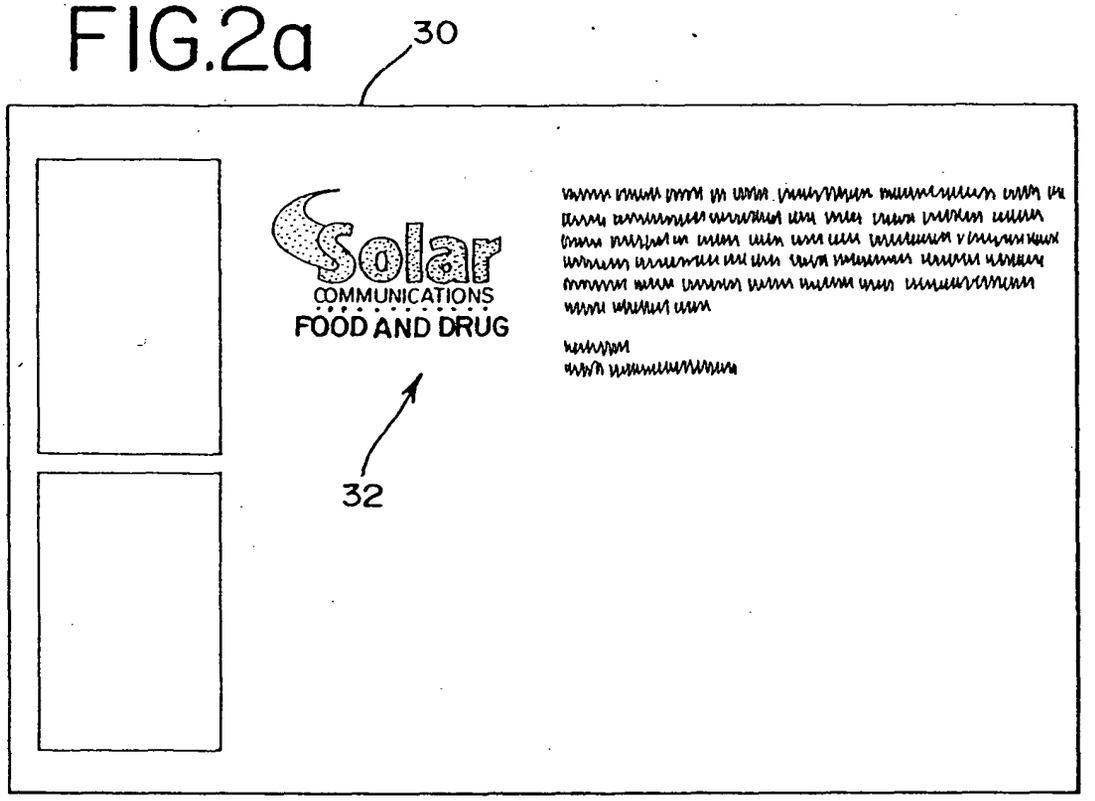

30
Solar
COMMUNICATIONS
FOOD AND DRUG
32

FIG.2b

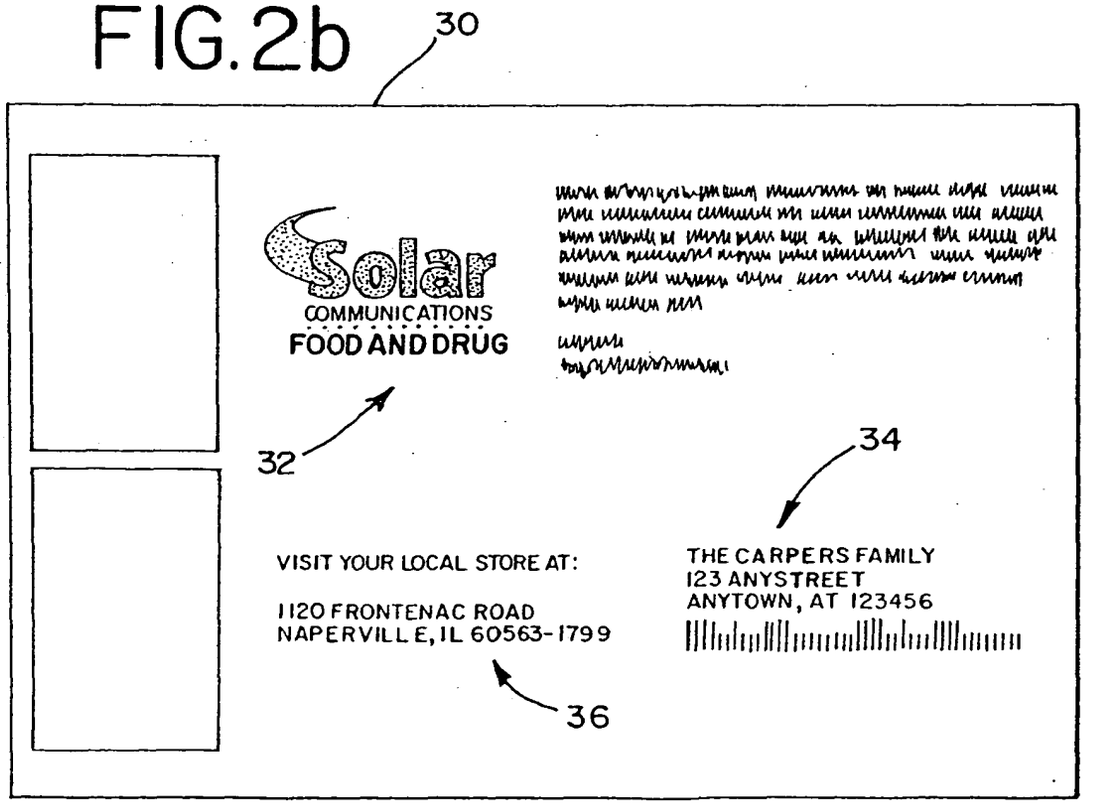

30
Solar
COMMUNICATIONS
FOOD AND DRUG
32
34
VISIT YOUR LOCAL STORE AT:
1120 FRONTENAC ROAD
NAPERVILLE, IL 60563-1799
36
THE CARPERS FAMILY
123 ANYSTREET
ANYTOWN, AT 123456

FIG. 3a

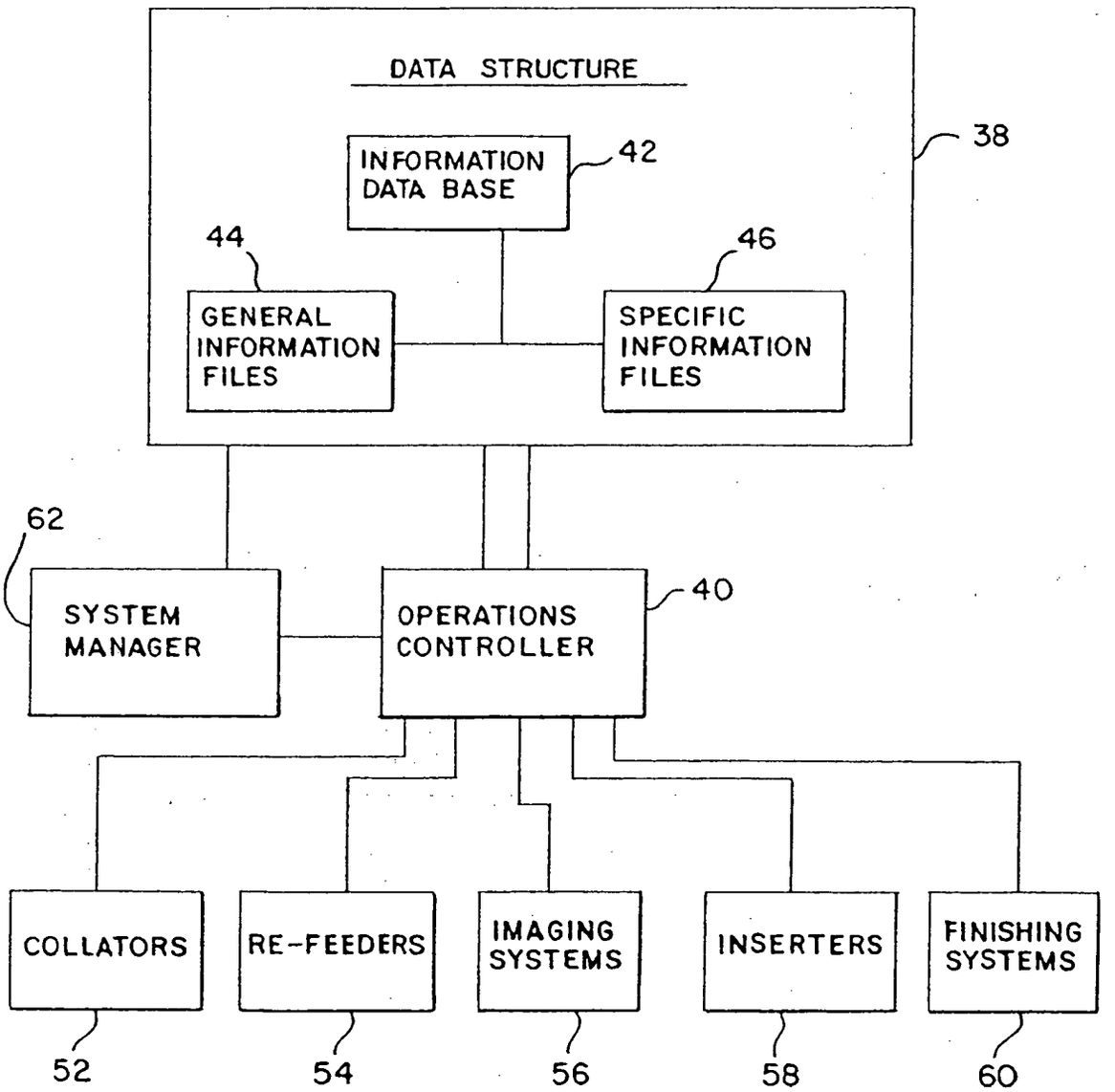

DATA STRUCTURE
38
INFORMATION DATA BASE
42
44
46
GENERAL INFORMATION FILES
SPECIFIC INFORMATION FILES
62
SYSTEM MANAGER
OPERATIONS CONTROLLER
40
COLLATORS
RE-FEEDERS
IMAGING SYSTEMS
INSERTERS
FINISHING SYSTEMS
52
54
56
58
60

FIG.3b

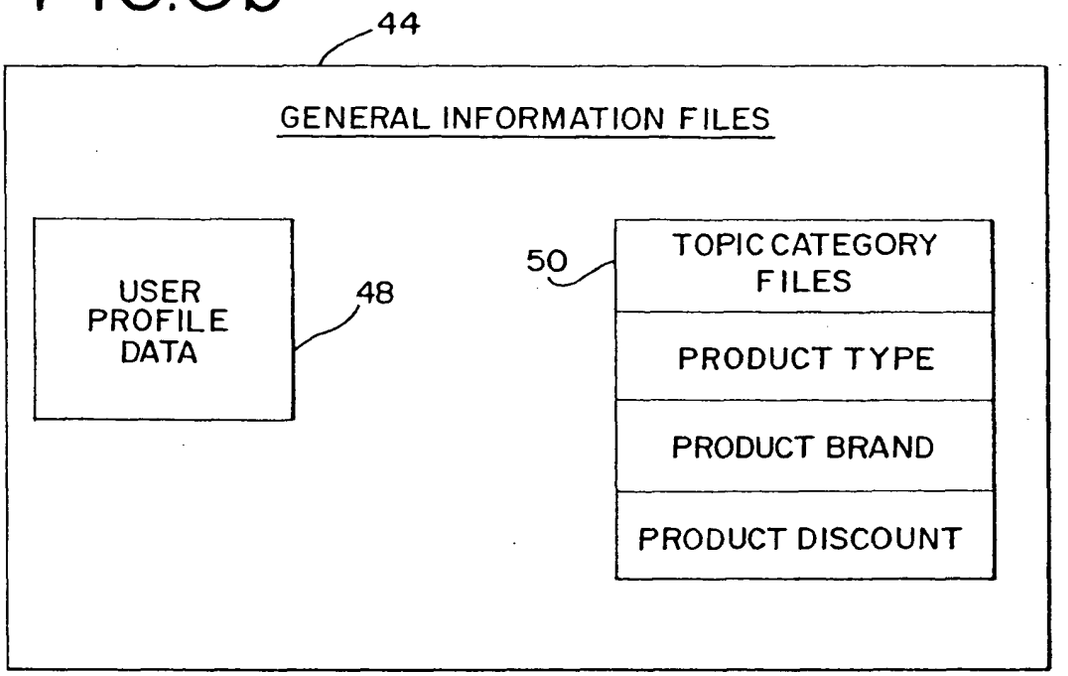
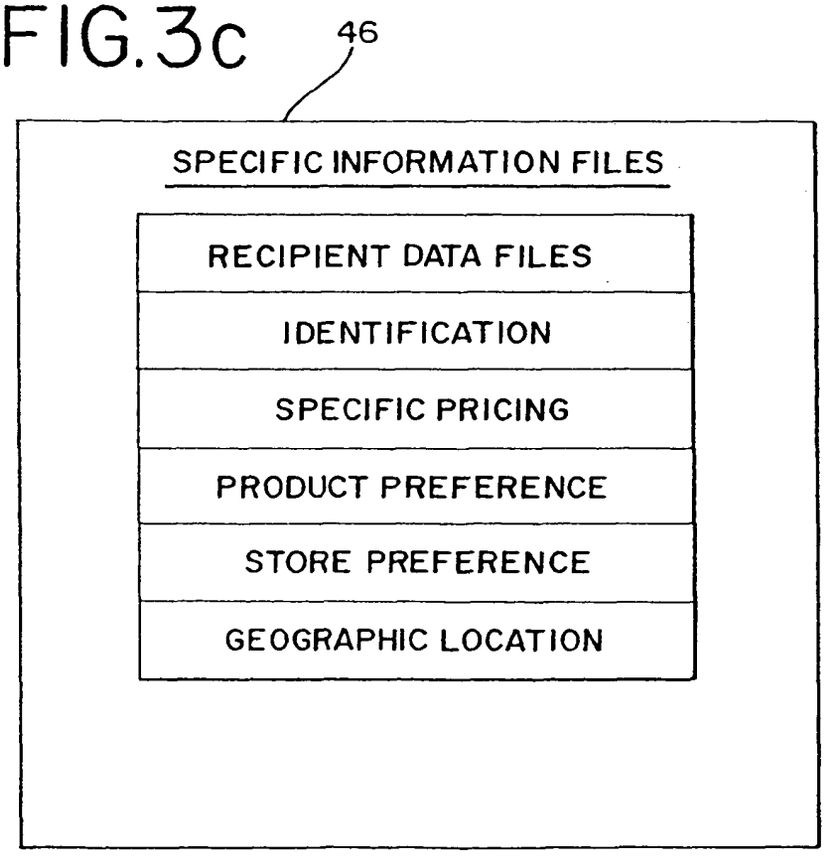

44
GENERAL INFORMATION FILES
USER PROFILE DATA
48
50
TOPIC CATEGORY FILES
PRODUCT TYPE
PRODUCT BRAND
PRODUCT DISCOUNT

FIG.3c


46
SPECIFIC INFORMATION FILES
RECIPIENT DATA FILES
IDENTIFICATION
SPECIFIC PRICING
PRODUCT PREFERENCE
STORE PREFERENCE
GEOGRAPHIC LOCATION

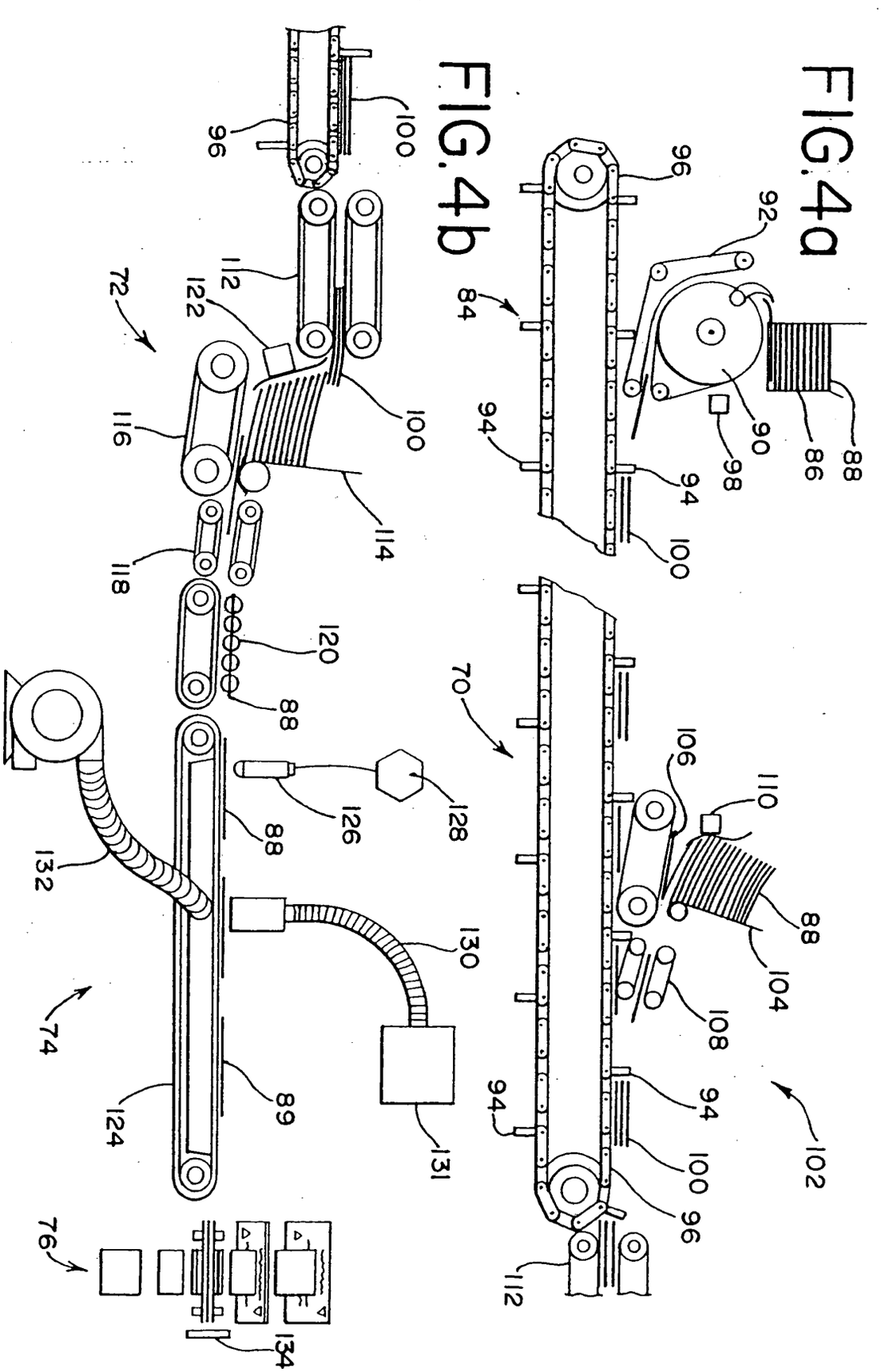


FIG.4a
FIG.4b
84
96
92
88
86
90
98
94
100
102
70
106
110
104
108
112
72
122
116
114
118
120
74
126
128
130
132
131
124
89
76
134

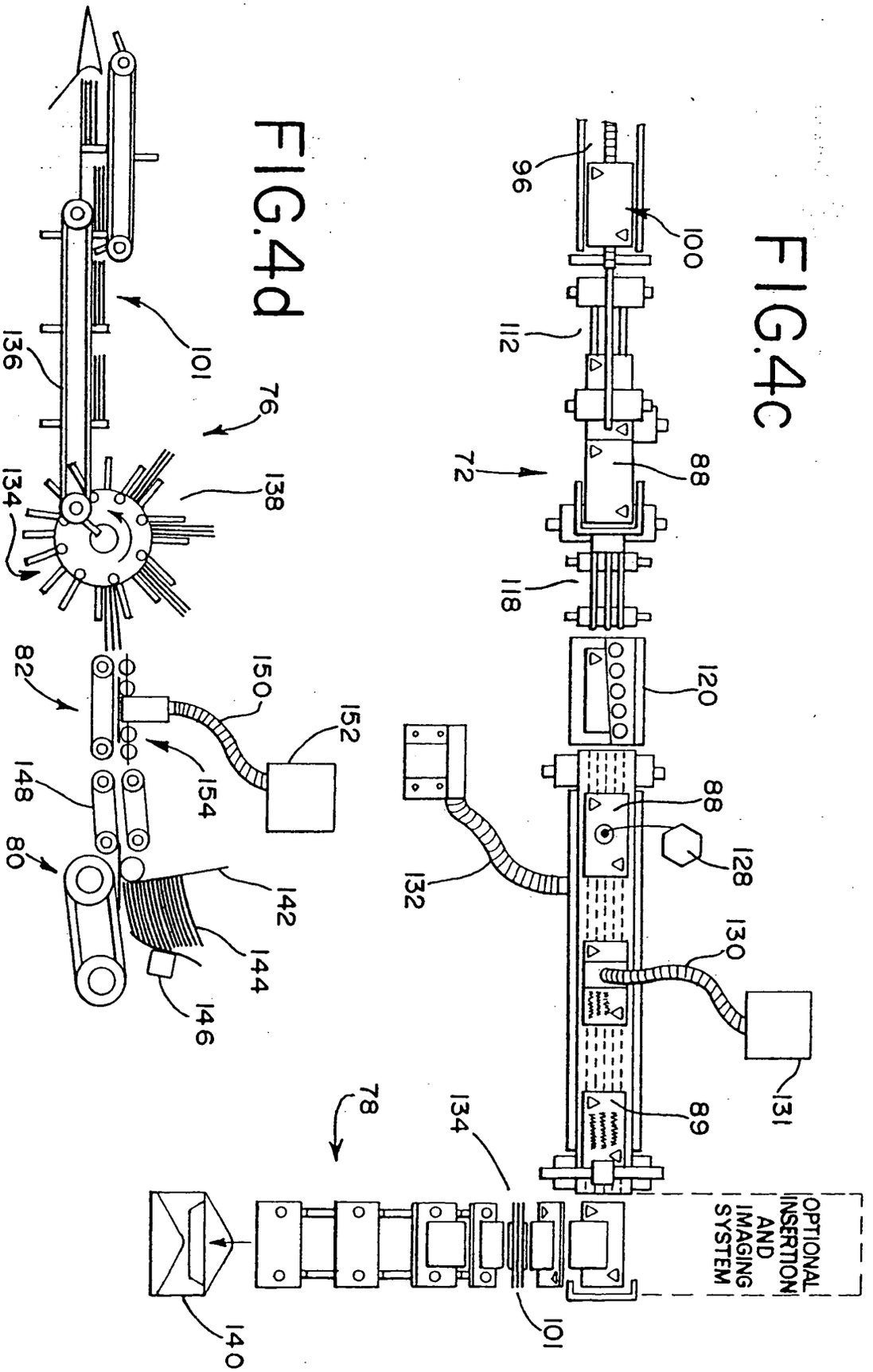


FIG.4c
FIG.4d
OPTIONAL INSERTION AND IMAGING SYSTEM
96
100
112
72
88
118
120
88
128
132
130
131
89
78
134
101
140
136
76
101
138
134
82
150
152
154
148
80
142
144
146

FIG.5

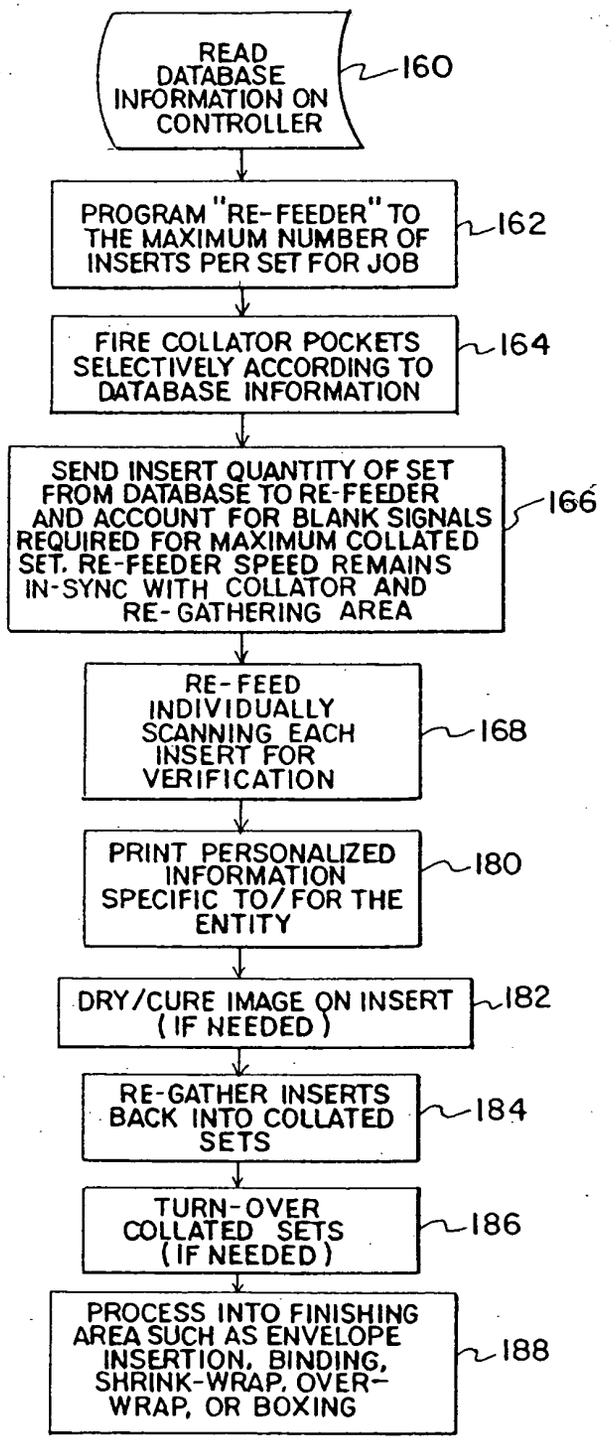

READ DATABASE INFORMATION ON CONTROLLER
160
PROGRAM "RE-FEEDER" TO THE MAXIMUM NUMBER OF INSERTS PER SET FOR JOB
162
FIRE COLLATOR POCKETS SELECTIVELY ACCORDING TO DATABASE INFORMATION
164
SEND INSERT QUANTITY OF SET FROM DATABASE TO RE-FEEDER AND ACCOUNT FOR BLANK SIGNALS REQUIRED FOR MAXIMUM COLLATED SET. RE-FEEDER SPEED REMAINS IN-SYNC WITH COLLATOR AND RE-GATHERING AREA
166
RE-FEED INDIVIDUALLY SCANNING EACH INSERT FOR VERIFICATION
168
PRINT PERSONALIZED INFORMATION SPECIFIC TO/FOR THE ENTITY
180
DRY/CURE IMAGE ON INSERT (IF NEEDED)
182
RE-GATHER INSERTS BACK INTO COLLATED SETS
184
TURN-OVER COLLATED SETS (IF NEEDED)
186
PROCESS INTO FINISHING AREA SUCH AS ENVELOPE INSERTION, BINDING, SHRINK-WRAP, OVER-WRAP, OR BOXING
188

FIG.6

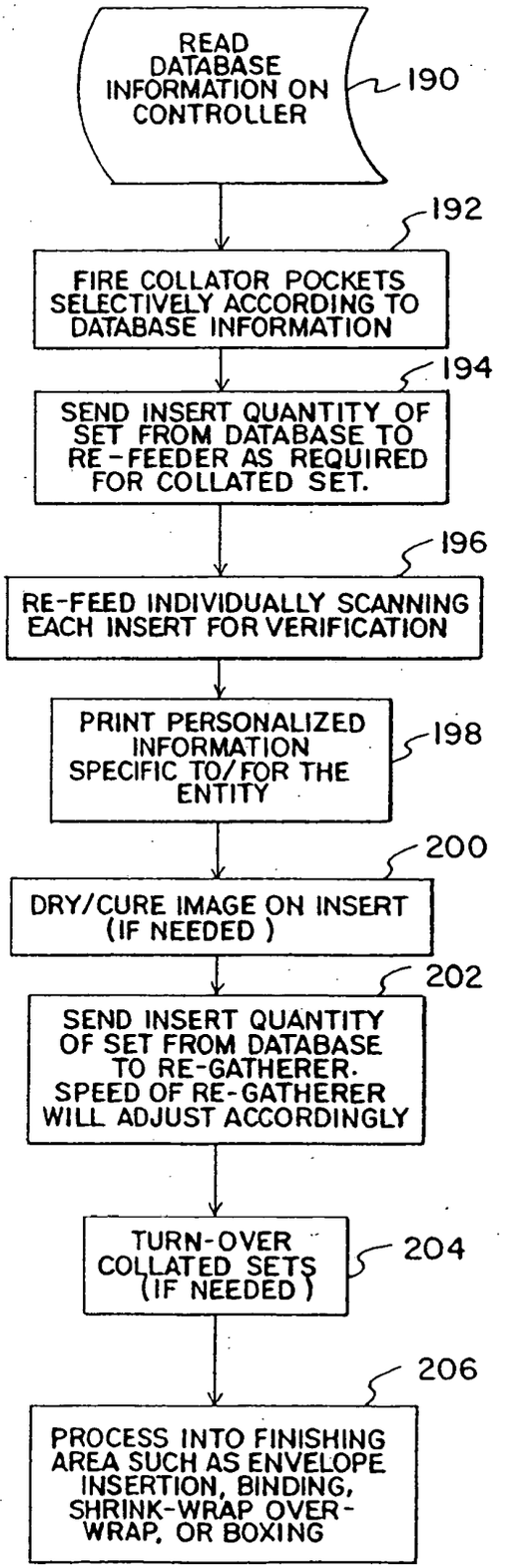

READ DATABASE INFORMATION ON CONTROLLER
190
FIRE COLLATOR POCKETS SELECTIVELY ACCORDING TO DATABASE INFORMATION
192
SEND INSERT QUANTITY OF SET FROM DATABASE TO RE-FEEDER AS REQUIRED FOR COLLATED SET.
194
RE-FEED INDIVIDUALLY SCANNING EACH INSERT FOR VERIFICATION
196
PRINT PERSONALIZED INFORMATION SPECIFIC TO/FOR THE ENTITY
198
DRY/CURE IMAGE ON INSERT (IF NEEDED)
200
SEND INSERT QUANTITY OF SET FROM DATABASE TO RE-GATHERER. SPEED OF RE-GATHERER WILL ADJUST ACCORDINGLY
202
TURN-OVER COLLATED SETS (IF NEEDED)
204
PROCESS INTO FINISHING AREA SUCH AS ENVELOPE INSERTION, BINDING, SHRINK-WRAP OVER-WRAP, OR BOXING
206

FIG. 7

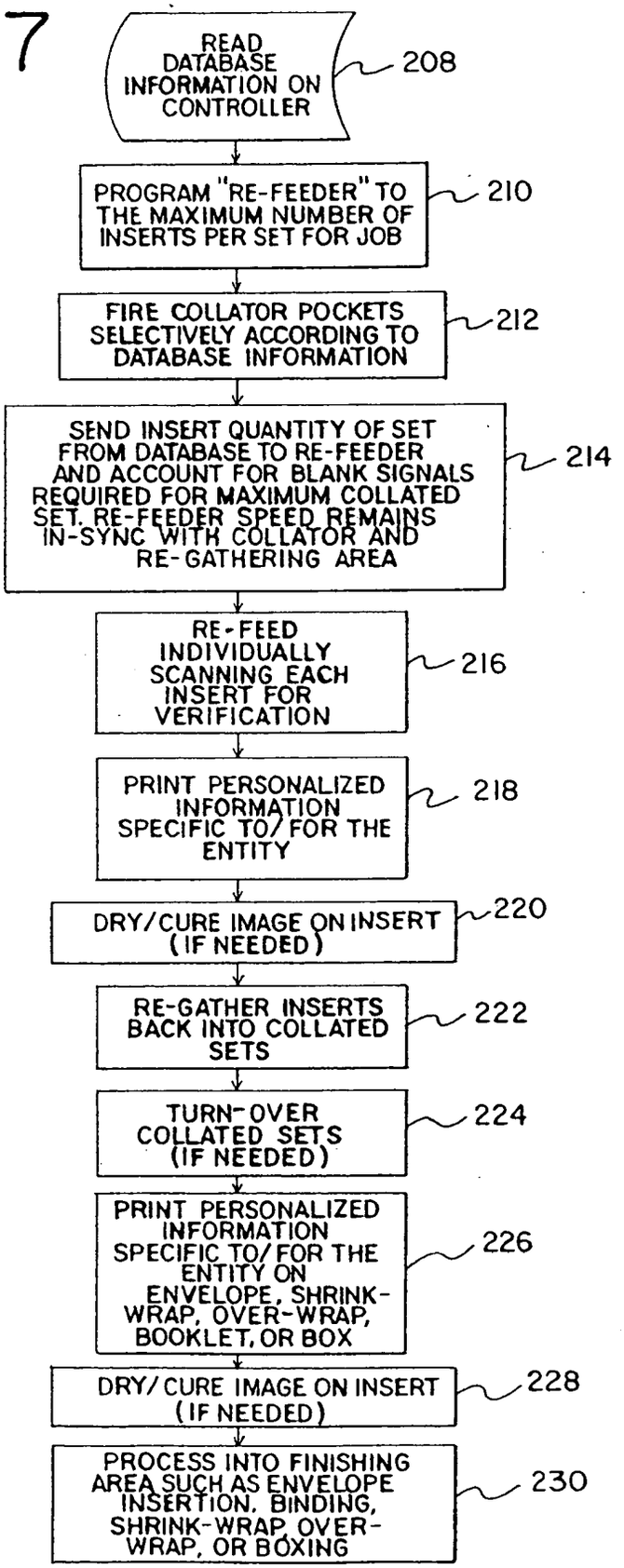

READ DATABASE INFORMATION ON CONTROLLER
208
PROGRAM "RE-FEEDER" TO THE MAXIMUM NUMBER OF INSERTS PER SET FOR JOB
210
FIRE COLLATOR POCKETS SELECTIVELY ACCORDING TO DATABASE INFORMATION
212
SEND INSERT QUANTITY OF SET FROM DATABASE TO RE-FEEDER AND ACCOUNT FOR BLANK SIGNALS REQUIRED FOR MAXIMUM COLLATED SET. RE-FEEDER SPEED REMAINS IN-SYNC WITH COLLATOR AND RE-GATHERING AREA
214
RE-FEED INDIVIDUALLY SCANNING EACH INSERT FOR VERIFICATION
216
PRINT PERSONALIZED INFORMATION SPECIFIC TO/FOR THE ENTITY
218
DRY/CURE IMAGE ON INSERT (IF NEEDED)
220
RE-GATHER INSERTS BACK INTO COLLATED SETS
222
TURN-OVER COLLATED SETS (IF NEEDED)
224
PRINT PERSONALIZED INFORMATION SPECIFIC TO/FOR THE ENTITY ON ENVELOPE, SHRINK-WRAP, OVER-WRAP, BOOKLET, OR BOX
226
DRY/CURE IMAGE ON INSERT (IF NEEDED)
228
PROCESS INTO FINISHING AREA SUCH AS ENVELOPE INSERTION, BINDING, SHRINK-WRAP, OVER-WRAP, OR BOXING
230

FIG.8

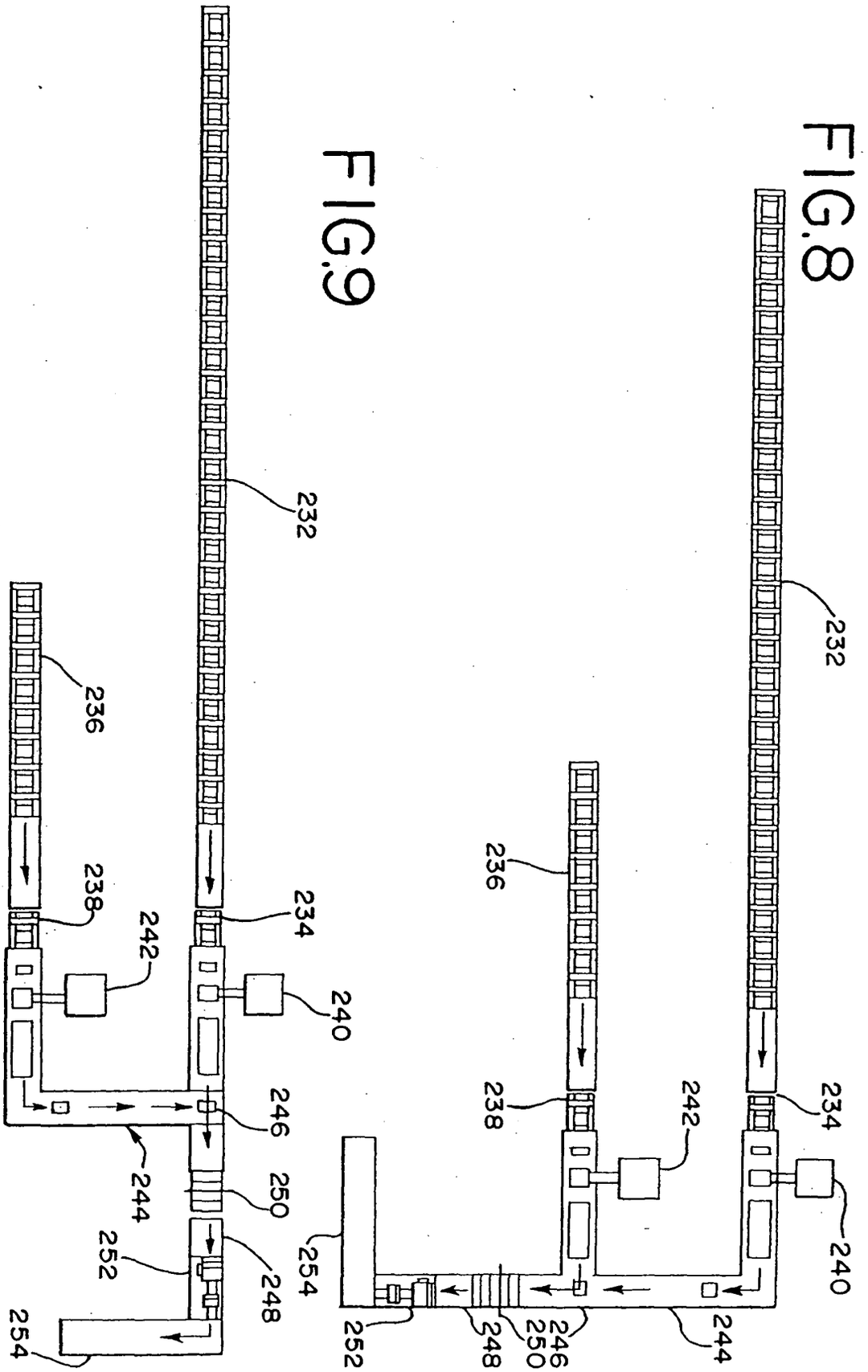

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FIG.9

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FIG. 10

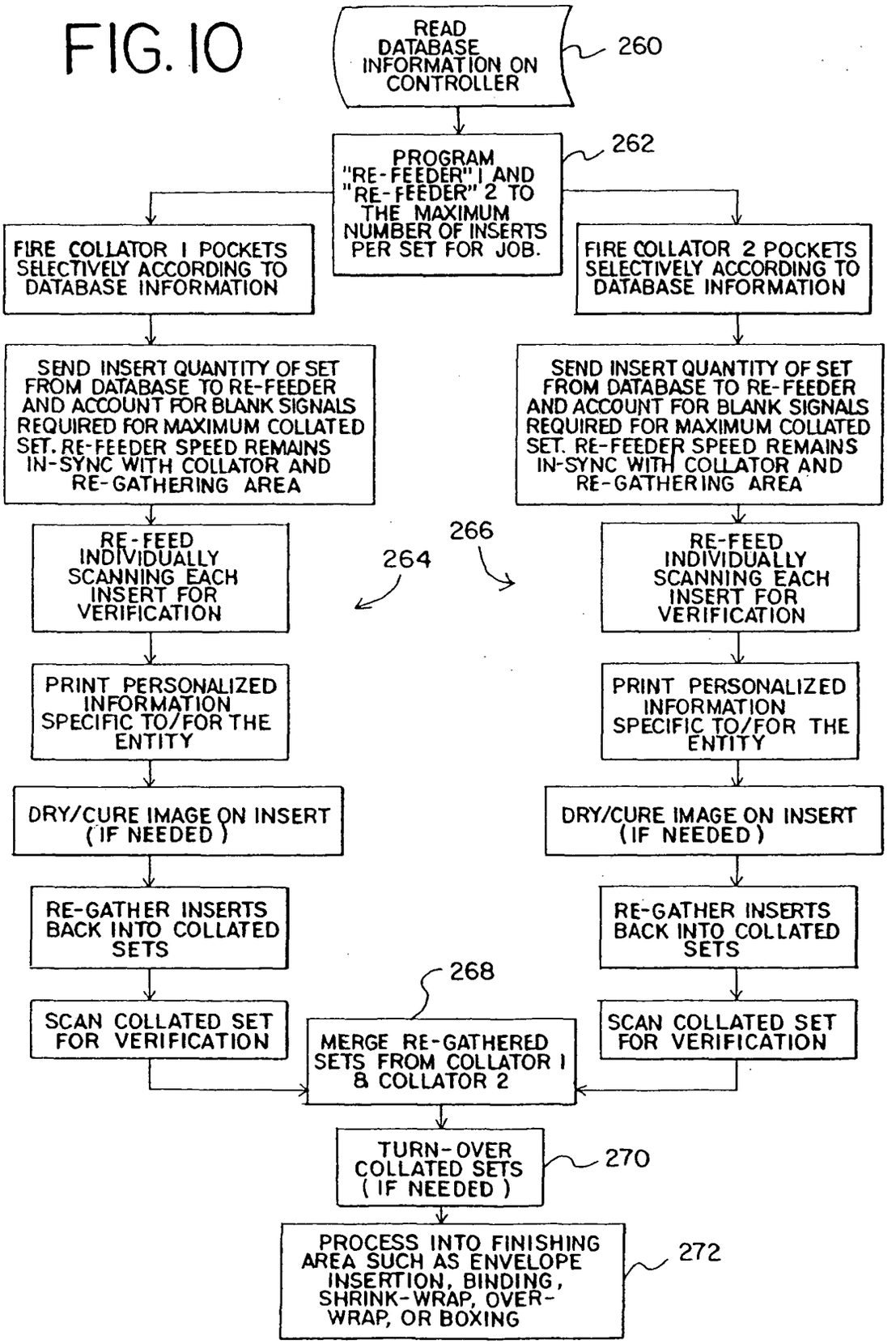
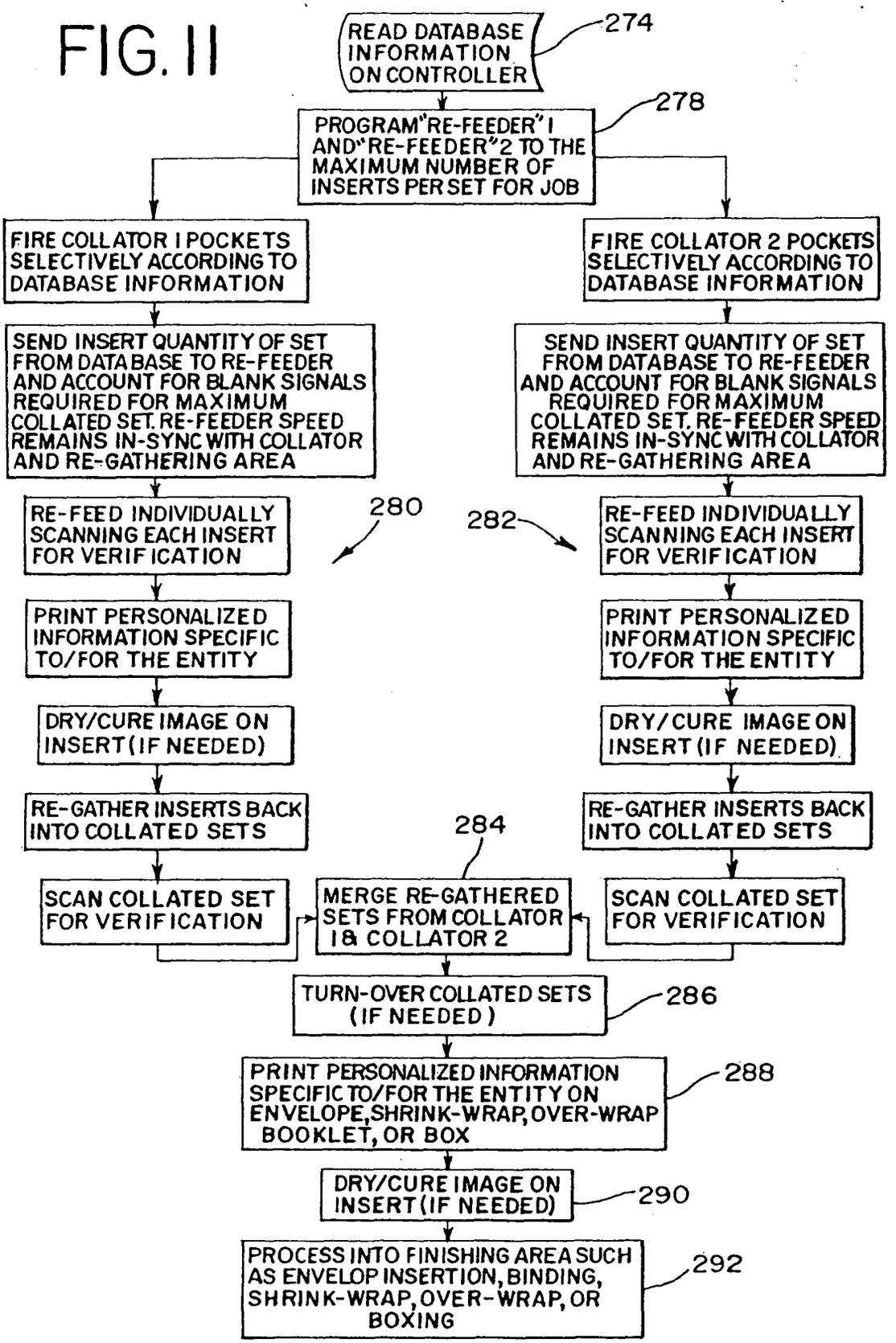

READ DATABASE INFORMATION ON CONTROLLER
260
PROGRAM "RE-FEEDER" 1 AND "RE-FEEDER" 2 TO THE MAXIMUM NUMBER OF INSERTS PER SET FOR JOB.
262
FIRE COLLATOR 1 POCKETS SELECTIVELY ACCORDING TO DATABASE INFORMATION
FIRE COLLATOR 2 POCKETS SELECTIVELY ACCORDING TO DATABASE INFORMATION
SEND INSERT QUANTITY OF SET FROM DATABASE TO RE-FEEDER AND ACCOUNT FOR BLANK SIGNALS REQUIRED FOR MAXIMUM COLLATED SET. RE-FEEDER SPEED REMAINS IN-SYNC WITH COLLATOR AND RE-GATHERING AREA
SEND INSERT QUANTITY OF SET FROM DATABASE TO RE-FEEDER AND ACCOUNT FOR BLANK SIGNALS REQUIRED FOR MAXIMUM COLLATED SET. RE-FEEDER SPEED REMAINS IN-SYNC WITH COLLATOR AND RE-GATHERING AREA
264
266
RE-FEED INDIVIDUALLY SCANNING EACH INSERT FOR VERIFICATION
RE-FEED INDIVIDUALLY SCANNING EACH INSERT FOR VERIFICATION
PRINT PERSONALIZED INFORMATION SPECIFIC TO/FOR THE ENTITY
PRINT PERSONALIZED INFORMATION SPECIFIC TO/FOR THE ENTITY
DRY/CURE IMAGE ON INSERT (IF NEEDED)
DRY/CURE IMAGE ON INSERT (IF NEEDED)
RE-GATHER INSERTS BACK INTO COLLATED SETS
RE-GATHER INSERTS BACK INTO COLLATED SETS
268
SCAN COLLATED SET FOR VERIFICATION
SCAN COLLATED SET FOR VERIFICATION
MERGE RE-GATHERED SETS FROM COLLATOR 1 & COLLATOR 2
TURN-OVER COLLATED SETS (IF NEEDED)
270
PROCESS INTO FINISHING AREA SUCH AS ENVELOPE INSERTION, BINDING, SHRINK-WRAP, OVER-WRAP, OR BOXING
272

FIG. 11


READ DATABASE INFORMATION ON CONTROLLER
274
PROGRAM "RE-FEEDER" 1 AND "RE-FEEDER" 2 TO THE MAXIMUM NUMBER OF INSERTS PER SET FOR JOB
278
FIRE COLLATOR 1 POCKETS SELECTIVELY ACCORDING TO DATABASE INFORMATION
FIRE COLLATOR 2 POCKETS SELECTIVELY ACCORDING TO DATABASE INFORMATION
SEND INSERT QUANTITY OF SET FROM DATABASE TO RE-FEEDER AND ACCOUNT FOR BLANK SIGNALS REQUIRED FOR MAXIMUM COLLATED SET. RE-FEEDER SPEED REMAINS IN-SYNC WITH COLLATOR AND RE-GATHERING AREA
SEND INSERT QUANTITY OF SET FROM DATABASE TO RE-FEEDER AND ACCOUNT FOR BLANK SIGNALS REQUIRED FOR MAXIMUM COLLATED SET. RE-FEEDER SPEED REMAINS IN-SYNC WITH COLLATOR AND RE-GATHERING AREA
RE-FEED INDIVIDUALLY SCANNING EACH INSERT FOR VERIFICATION
280
282
RE-FEED INDIVIDUALLY SCANNING EACH INSERT FOR VERIFICATION
PRINT PERSONALIZED INFORMATION SPECIFIC TO/FOR THE ENTITY
PRINT PERSONALIZED INFORMATION SPECIFIC TO/FOR THE ENTITY
DRY/CURE IMAGE ON INSERT (IF NEEDED)
DRY/CURE IMAGE ON INSERT (IF NEEDED)
RE-GATHER INSERTS BACK INTO COLLATED SETS
RE-GATHER INSERTS BACK INTO COLLATED SETS
284
SCAN COLLATED SET FOR VERIFICATION
MERGE RE-GATHERED SETS FROM COLLATOR 1 & COLLATOR 2
SCAN COLLATED SET FOR VERIFICATION
TURN-OVER COLLATED SETS (IF NEEDED)
286
PRINT PERSONALIZED INFORMATION SPECIFIC TO/FOR THE ENTITY ON ENVELOPE, SHRINK-WRAP, OVER-WRAP BOOKLET, OR BOX
288
DRY/CURE IMAGE ON INSERT (IF NEEDED)
290
PROCESS INTO FINISHING AREA SUCH AS ENVELOP INSERTION, BINDING, SHRINK-WRAP, OVER-WRAP, OR BOXING
292

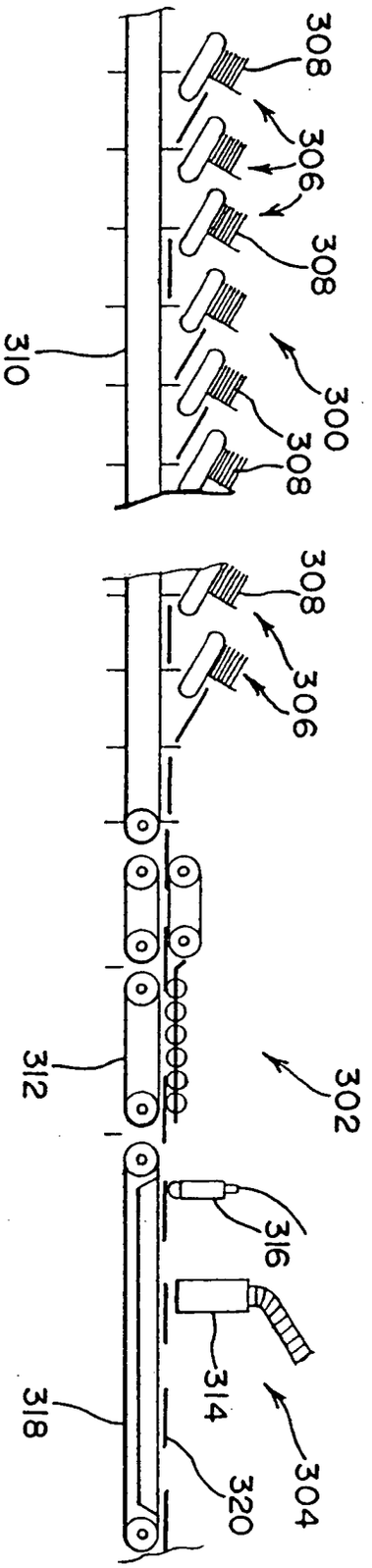

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FIG.12

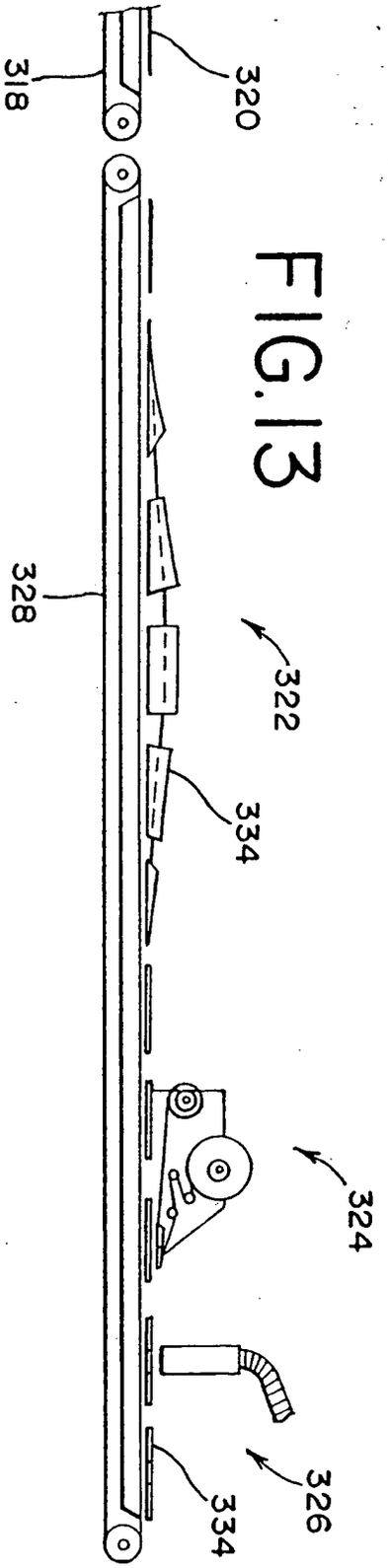
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FIG.13

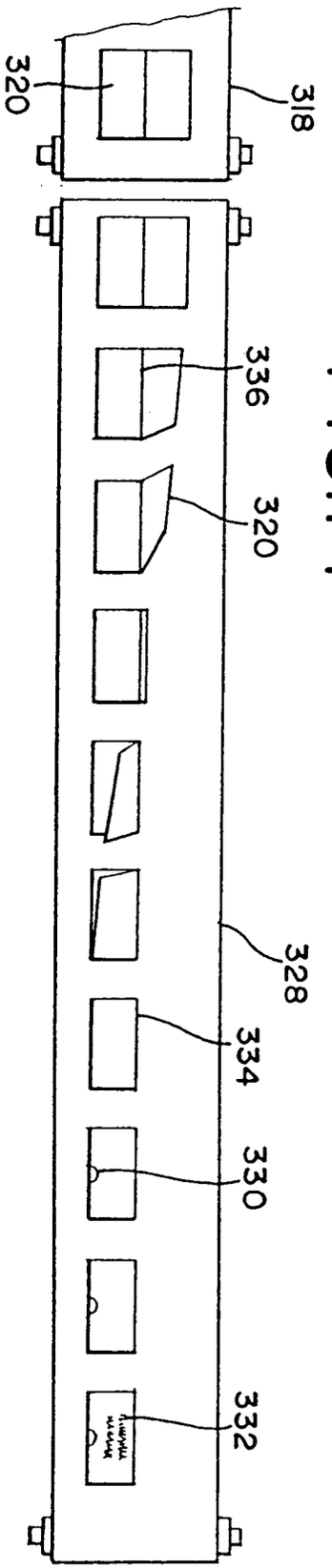
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FIG.14

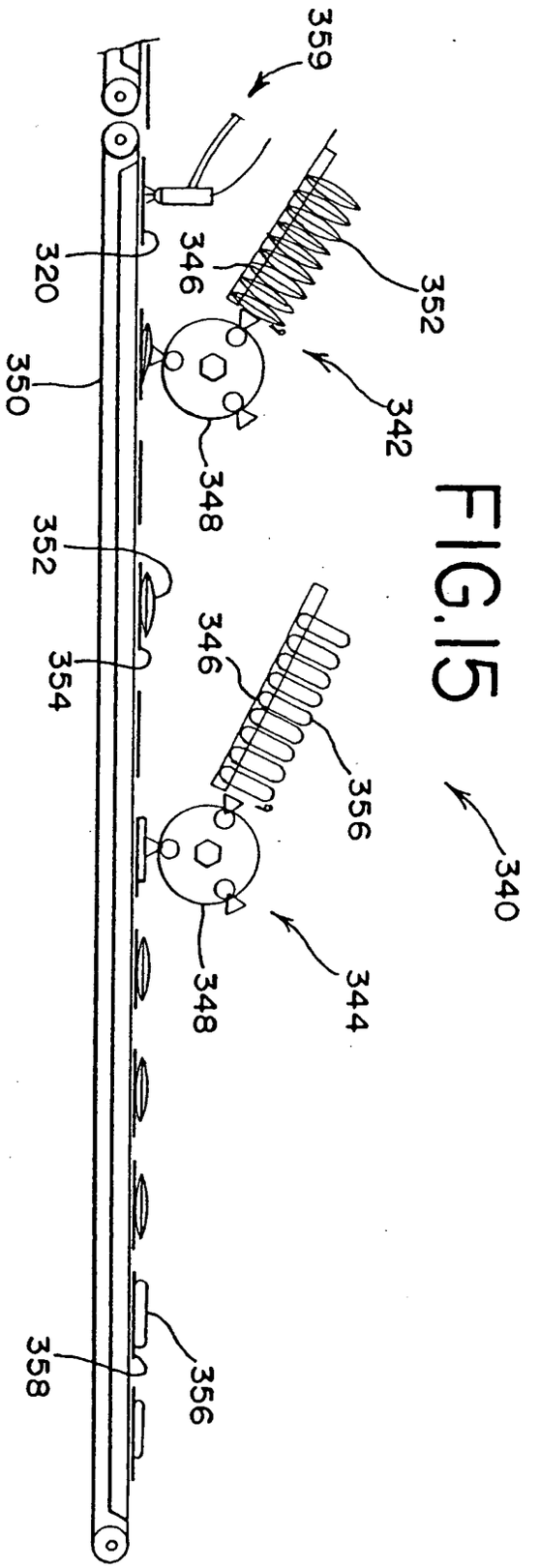
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FIG.15

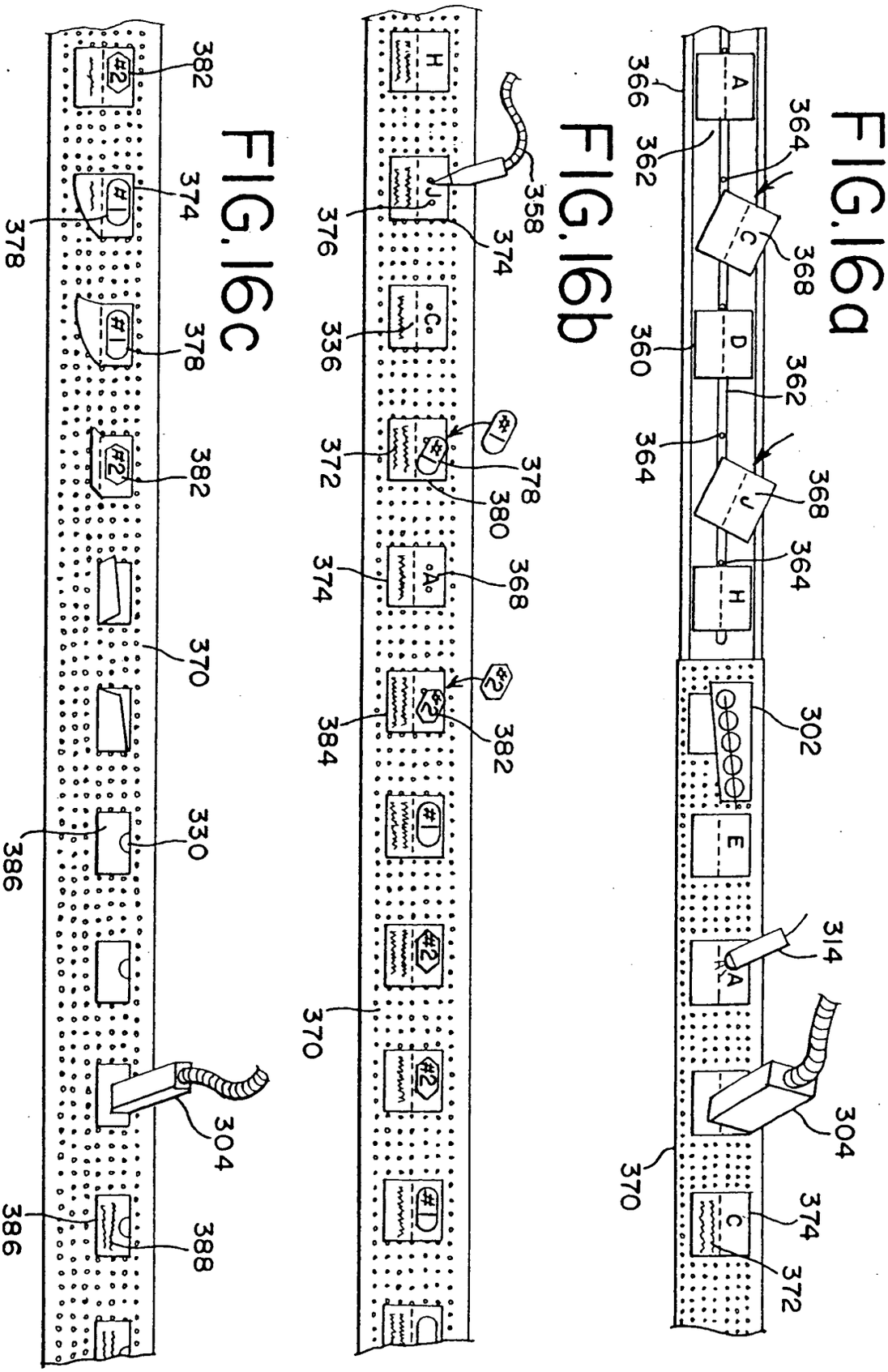
FIG.16a
FIG.16b
FIG.16c
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EUROPEAN SEARCH REPORT

Application Number
EP 04 25 6925

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 395 295 A (LONG, JOHN ALBERT) 31 October 1990 (1990-10-31) * column 5; claim 1; figure *	1-12, 27-35	B41J13/10 B41J13/08 B41J11/50 B65H39/055
X	DE 199 29 316 A1 (EASTMAN KODAK CO., ROCHESTER) 28 December 2000 (2000-12-28) * column 8, paragraph 2; figure 3 *	1-12, 31-35	
A	US 5 025 610 A (GRAUSHAR ET AL) 25 June 1991 (1991-06-25) * column 8, line 22 - line 37 *	1-13,20, 27,31	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B41J
B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 February 2005	Wehr, W

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18-02-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0395295 A	31-10-1990	US 4903600 A	27-02-1990
		EP 0395295 A1	31-10-1990
DE 19929316 A1	28-12-2000	NONE	
US 5025610 A	25-06-1991	WO 9108953 A1	27-06-1991

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