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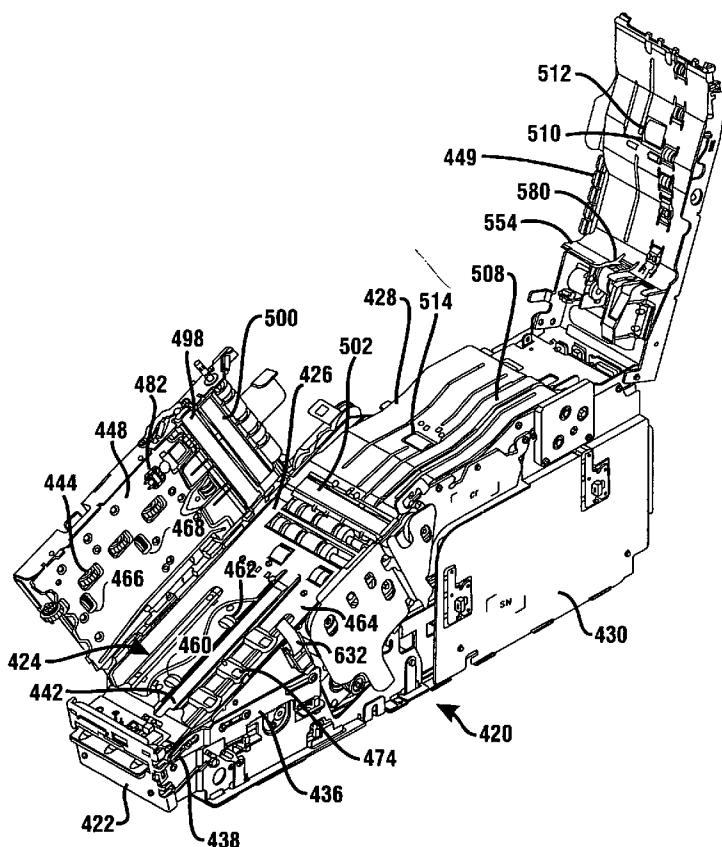
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(54) Title: SYSTEM CONTROLLED BY DATA BEARING RECORDS INCLUDING AUTOMATED BANKING



(57) Abstract: A system controlled by a data bearing record includes a card reader that is operative to read data from user cards including identifying data and to authorize operation of an automated banking machine responsive to the identifying data. The automated banking machine includes a deposit accepting device. The deposit accepting device is operative to receive a stack of sheets and to separate each sheet from the stack through operation of a picker. Each sheet is aligned with the sheet path and analyzed by analysis devices including at least one magnetic read head, an imager and/or a validation device. Sheets determined not to have at least one property of a genuine sheet are returned to a user of the machine. Sheets determined to have at least one property of genuine sheets are processed and stored in the machine.

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SYSTEM CONTROLLED BY DATA BEARING RECORDS INCLUDING
AUTOMATED BANKING

TECHNICAL FIELD

This invention pertains to systems controlled by data bearing records
5 and which enable an individual to use specific equipment which may be
classified in U.S. Class 235, Subclass 382. In exemplary embodiments the
specific equipment includes an automated banking machine that operates
responsive to data included on user cards. This invention also pertains to
holding devices for coded records that may be classified in U.S. Class 235,
10 Subclass 486.

BACKGROUND ART

Automated banking machines are known in the prior art. Such
automated banking machines operate responsive to data read from coded
records. Automated banking machines are commonly used to carry out
15 transactions such as dispensing cash, checking account balances, paying bills
and/or receiving deposits from users. Other types of automated banking
machines may be used to purchase tickets, to issue coupons, to present checks,
to print scrip and/or to carry out other functions either for a consumer or a
service provider. For purposes of this description any device which is used for
20 carrying out transactions involving transfers of value shall be referred to as an
automated banking machine.

Automated banking machines may benefit from improvements.

DISCLOSURE OF INVENTION

It is an object of an exemplary embodiment to provide a system
25 controlled by data bearing records.

It is a further object of an exemplary embodiment to provide a coded
record sensing device and method.

It is a further object of an exemplary embodiment to provide an
automated banking machine.

It is a further object of an exemplary embodiment to provide a record controlled calculating apparatus.

It is a further object of an exemplary embodiment to provide a deposit accepting apparatus which can be used to accept, image and verify the authenticity of items.

Further objects of exemplary embodiments will be made apparent in the following Best Modes for Carrying Out Invention and the appended claims.

In an exemplary embodiment an automated banking machine includes a card reader. The card reader is operative to read data included on user cards. The data read from user cards is used to identify authorized users who may perform transactions at the machine. The exemplary embodiment operates to accept documents. These documents may include checks, currency bills and/or other types of documents. A single deposit accepting device may accept multiple types of documents. In this embodiment a document such as a check is received through an opening in the housing of the banking machine and moved in a transport path therein in a first direction by a first transport. Sensors are operative to sense the document has moved into a suitable location within the device. The document is then disengaged from the first transport and engaged with a pair of second transports which are disposed from one another in the first direction. The second transports engage the document and are operative to move the document in the transport path a direction transverse of the first direction. The first transport disengages from the document such that the second transports can move the document and align an edge thereof extending along the first direction with a plurality of non-contact sensors. At least one processor operates in accordance with its programming to control the second transports and controls movement of the document in the second direction such that an edge of the document is aligned with the non-contact sensors which serve as a "virtual wall" for purposes of positioning the document.

Once the document is aligned such that an edge extends along the first direction in the desired orientation, the first transport reengages the document while the second transports disengage. The document is then moved again in the first direction past one or more appropriate sensing devices. In the
5 exemplary embodiment because the document is aligned along the first direction, documents which are checks may have magnetic indicia such as the micr line or other portion thereof, read through operation of one or more magnetic sensors such as a magnetic read head. Alternatively or in addition when the document is moved in a first direction, the magnetic properties of the
10 document may be read or otherwise sensed in a plurality of locations by one or more magnetic sensors which are operative to read magnetic properties of the document, including indicia thereon such as the micr line and/or other features.

In this exemplary embodiment the check is moved in a first direction
15 past a pair of scanning sensors. The scanning sensors are operative to read optical indicia on each side of the check and to produce image data corresponding thereto. The data corresponding to the optical indicia may be processed such that data corresponding to images of the front and rear of the check or portions thereof are generated and stored through operation of the
20 processor in one or more data stores of the banking machine. The indicia on the check may also be analyzed for purposes of determining information regarding on the check so that it can be used in conducting a transaction.

In this embodiment once a check has been moved past the sensors which capture data corresponding to optical indicia, the check is moved in
25 generally the first direction into an area which may serve as an escrow area for checks. In some embodiments the escrow area may be of sufficient length so that multiple checks or other documents may be temporarily stored therein. In the exemplary embodiment, the machine operates to determine whether the check is to be accepted or returned to the customer while the check is held in
30 the escrow area. For example in some embodiments one or more processors in

the banking machine may operate to determine if the check can be sufficiently accurately read, redeemed for cash or otherwise processed while the check is stored in the escrow area. If it is determined that the check cannot be accepted, one or more transports are operative to move the check out of the banking machine so that the check is returned to the customer.

Alternatively if the check is found to be suitable for acceptance, the check is moved from the escrow area past one or more stamper printers. The stamper printer is operative to apply ink marks to one or more surfaces of the check so as to indicate that the check has been cancelled or otherwise processed. In an exemplary embodiment the check is thereafter moved into a vertically extending transport. As the check enters the vertical transport, printing is conducted on the check through operation of a suitable inkjet or other printer. Appropriate printing is applied to the check to indicate it has been cancelled or otherwise processed as the check moves past the inkjet printer. Of course printing of various indicia may be applied when other types of documents are processed.

In the exemplary embodiment the inkjet printer has aligned on an opposed side of the transport therefrom, an ink catcher mechanism. The ink catcher mechanism of the exemplary embodiment includes a movable head. The movable head includes an opening therein such that the opening may be aligned with the ink spraying nozzles on the head of the inkjet printer so as to receive ink therein that is not deposited on the check or other document. The exemplary embodiment of the movable head also includes a wiper. The head is moved through operation of a motor or other moving device at appropriate times so that the wiper engages the head of the inkjet printer so as to minimize the buildup of ink and contaminants thereon. This facilitates accurate printing and helps to minimize the risk of potential damage to checks by the accumulation of excess ink within the machine.

Checks or other documents that move past the printer in the vertical transport are moved downward in the exemplary embodiment into a storage

area. Once the documents have moved adjacent a lower surface of the storage area a transversely movable plunger mechanism is operative to engage the check and move it out of the vertical transport. In an exemplary embodiment the plunger mechanism is operative to be movable such that the check can be
5 either moved into a storage location on either transverse side of the vertical transport. Once the check is moved out of the transport by the plunger mechanism the check or other document may be held in intermediate relation between a pair of wall surfaces and a spring biased backing plate. As a result checks or other documents may be selectively moved by the plunger
10 mechanism for storage in a selected one of the locations in the storage area.

Various approaches may be taken in the operation of automated banking machines for storing documents that are received by the document accepting mechanism. For example in some embodiments the mechanism may only accept checks. In such embodiments the machine may operate in
15 accordance with its programming to segregate checks that are drawn on the particular institution owning the banking machine that receives the check, from checks that are drawn on other institutions. Alternatively the banking machine may be programmed to store valid checks in one compartment and suspect checks in another compartment. Alternatively in some other
20 embodiments the document accepting mechanism may store multiple types of documents. For example in a banking machine that accepts currency bills and checks through the mechanism, bills may be stored in one compartment while checks are stored in another. Various approaches may be taken based on the programming of the particular automated banking machine.

25 In an alternative embodiment the automated banking machine includes a sheet access area which is operative to accept a stack including a plurality of sheets from a machine user. The sheet access area is bounded by a first sheet driver member and an opposed second sheet driver member. At least one divider plate extends vertically intermediate of the first and second sheet
30 driver members. The at least one divider plate and second sheet driver

member are relatively movable with respect to the first sheet driver member. The at least one divider plate is operative to separate a first side from a second side of the sheet access area.

5 In the exemplary embodiment, a first side of the sheet access area is operative to receive a stack of sheets from the machine user. The first side is in operative connection with a sheet picker that separates each sheet individually from the stack. The picker delivers each individual sheet to a transport in the sheet processing device which is alternatively referred to herein as a deposit accepting device. The sheet processing device is operative
10 in conjunction with the machine to determine whether each of the sheets is acceptable, and if so acceptable sheets are accepted and stored in the machine. If not, the sheets are moved back toward the sheet access area. In the exemplary embodiment, a diverter moves and/or directs sheets to be delivered out of the machine from the at least one sheet processing device to the second
15 side of the divider plate. In the exemplary embodiment the first sheet driver member and the second sheet driver member are operative to act through at least one opening in the at least one divider plate to move sheets both on the first side and the second side of the divider plate. Sheets to be returned to the ATM user are moved by the first and second sheet driving members out of the
20 sheet opening of the machine for delivery to the user.

In still other embodiments, radiation type sheet detectors are used in conjunction with the at least one divider plate to detect sheets on the first side and on the second side. A further radiation type sheet detector is used to detect sheets that may be present on either the first side or the second side.
25 This is accomplished in an exemplary embodiment through the use of an angularly reflective piece in operative supported connection with at least one divider plate. The angularly reflective piece is operative to reflect radiation. The radiation in the exemplary embodiment is received and reflected at an acute angle relative to the divider plate. This enables a sensor including an
30 emitter and receiver combination to be positioned transversely away from the

divider plate. This enables successfully determining whether sheets are present on a particular side of the divider plate.

Further in the exemplary embodiment the at least one divider plate includes at least one aperture. At least one sensor includes a radiation emitter on a first side of the aperture and a radiation receiver on a second side of the aperture. Signals from this sensor are used by at least one processor in the machine to determine if sheets are present in the sheet access area either on the first side or the second side of the divider plate. As can be appreciated, in this embodiment at least one processor is operative to determine the presence of sheets and where they are in the sheet access area. This is possible because the sensor that senses radiation through the aperture is operative to determine if any sheets are present in the sheet access area regardless of whether they are on the first side or the second side of the divider plate. Further the radiation sensor is operative to sense radiation reflected from the radiation reflective piece. The signals corresponding to the magnitude of radiation sensed are used by at least one processor in the machine to determine if sheets are present on the side associated with the radiation reflective piece. As a result this exemplary arrangement enables determining if sheets are present and where they are located. Further in other exemplary embodiments the reflective piece may be used in connection with sheet engaging pieces in each of the first side and the second side. Further additional sensors may be used of the reflective or through type to determine sheet position in alternative embodiments.

In still other exemplary embodiments a sheet storage and retrieval device such as a belt recycler device may be used. The sheet storage and retrieval device may be used to store sheets that are being held pending determination whether they are suitable for storage in the machine, or should be returned to the customer. The first sheet storage and retrieval device may be used to selectively deliver sheets either to the sheet access area for return to the customer or for delivery to a sheet storage area.

In other exemplary embodiments a second sheet storage and retrieval device is positioned in operatively intermediate relation of the first sheet storage and retrieval device and the sheet access area. In some exemplary embodiments sheets stored in escrow in the first sheet storage and retrieval device are moved in a sheet path toward the sheet access area. A divider in operative connection with the sheet path is operative to divert sheets that are determined to have at least one property which indicates they should be stored in the machine, for storage in the second sheet storage and retrieval device. Those sheets that are to be returned to the customer are moved in the sheet path and are directed by the diverter to the second storage area for return to the customer. Sheets to be retained in the machine stored on the second sheet storage and retrieval device can be then moved therefrom into suitable storage areas in the machine. This may include for example in some embodiments, check storage areas or note storage areas. In some exemplary embodiments the first sheet storage and retrieval device and the second sheet storage and retrieval device may each comprise a belt recycling device. Of course in other embodiments other devices operative to store and deliver sheets may be used. Further in some embodiments note storage areas in the machine may be in operative connection with recycling devices which are operative to selectively deliver notes stored therein. Such recycling devices may be part of the cash dispenser device in the automated banking machine.

In still other exemplary embodiments the sheet processing device in the machine may include in combination with a device for aligning sheets with the sheet path, at least one transversely movable magnetic read head. In the exemplary embodiment, the device includes one relatively fixed magnetic read head and one magnetic read head that are selectively movable. The sheet processing device further includes at least one sensor that is operative to sense the width of each check that is received in the machine. The at least one sensor is operative to sense the width after the check has been positioned and aligned relative to the direction of the sheet path. In the exemplary

embodiment the alignment of the check in the sheet path is operative to position the check so that if the check is in a first physical orientation, magnetic characters in the micr line will pass adjacent the fixed magnetic read head. Further in the exemplary embodiment, based on the sensed width of the check, the movable magnetic read head is positioned through operation of a positioning device to move transversely in the sheet path to a selected transverse position in the sheet path. If the check is in a second orientation indicia included in the micr line of the check will pass adjacent the second magnetic read head. As a result in the exemplary embodiment, the magnetic read heads are positioned for each check regardless of the facing position of the check such that at least one of the magnetic read heads will be positioned to capture signals corresponding to micr line indicia on the check. In other exemplary embodiments both magnetic read heads may be selectively movable so as to assure reading of indicia.

Numerous types of novel systems and methods are taught by the disclosure hereof.

BRIEF DESCRIPTION OF DRAWINGS

Figure 1 is an isometric view of an exemplary deposit accepting apparatus shown in an open condition for servicing.

Figure 2 is an opposite hand isometric view of the deposit accepting apparatus shown in Figure 1.

Figure 3 is a schematic view of the devices included in the deposit accepting apparatus.

Figure 4 is a top isometric view of a portion of an upper platen including elements of a first transport which moves documents in a first longitudinal direction in the deposit accepting apparatus and second transports which move documents in a direction transverse to the first direction.

Figure 5 is a side view of the platen and first and second drives shown in Figure 4.

Figure 6 is a bottom view corresponding to Figures 4 and 5 showing the platen with rolls of the first and second transports extending therethrough.

Figure 7 is a top plan view of an upper platen and a lower platen of a transport mechanism of the exemplary deposit accepting apparatus.

5 Figure 8 is a front view showing the positions of the first and second transports corresponding to Figure 7.

Figure 9 is a view similar to Figure 7 with the transports operating to move a document in a first direction.

10 Figure 10 is a front view of the first and second transports corresponding to Figure 9.

Figure 11 is a view similar to Figure 9 with the document moved further into the deposit accepting apparatus.

Figure 12 is a front plan view showing the positions of the first and second transports.

15 Figure 13 is a view similar to Figure 11 showing the document moved in a second direction transverse to the first direction.

Figure 14 is a front plan view showing the relative positions of the first and second transports when a document is moved in a transverse direction.

20 Figure 15 is a view similar to Figure 13 showing an edge of the document aligned with the non-contact sensors.

Figure 16 corresponds to Figure 15 and shows the positions of the first and second transports.

Figure 17 is a view similar to Figure 15 but showing an alternative document including a folded edge.

25 Figure 18 is a front view of the first and second transports corresponding to Figure 17.

Figure 19 is an isometric view showing the movable mounting of the exemplary magnetic read head of the embodiment.

30 Figure 20 is a partially sectioned view corresponding to Figure 19 further showing the movable mounting for the magnetic read head.

Figure 21 is a cross-sectional side view of the mounting for the magnetic read head as shown in Figure 19.

Figure 22 is an isometric view showing an ink catcher mechanism of an exemplary embodiment.

5 Figure 23 is a partially exploded view showing the movable head disposed from the body of the ink catcher.

Figure 24 is an exploded isometric view showing the body of the ink catcher of Figure 22.

10 Figure 25 is a partially exploded view of an exemplary form of the stamper printer used in the exemplary embodiment.

Figure 26 is another exploded view of the exemplary stamper printer.

Figure 27 is a side view showing the eccentric profile of the exemplary embodiment of the printing roll of the stamper printer.

15 Figure 28 is an isometric view of the storage compartment of the alternative deposit accepting mechanism shown with the storage compartment having its access door in an open position.

Figure 29 is an isometric view of the guide of the vertically extending transport that extends in the storage area.

20 Figure 30 is a side view of the vertically extending transport that extends in the storage area of the exemplary deposit accepting apparatus.

Figure 31 is an isometric view of the apparatus shown accepting a document into the vertically extending transport.

25 Figures 32 through 35 show the sequential movement of an exemplary plunger member as it operates to move a document held in the vertically extending transport into a storage location positioned on the left side of the storage mechanism as shown.

Figure 36 is an isometric view similar to Figure 31 showing the vertical transport of the accepting a document therein.

Figures 37 through 40 show the sequential movement of the exemplary plunger member to move a document in the vertical transport to a storage location on the right side of the vertical transport as shown.

5 Figure 41 is a schematic view showing an automated banking machine with an alternative exemplary deposit accepting device.

Figure 42 is a schematic view of an exemplary deposit accepting device of the type shown in the automated banking machine of Figure 41.

Figure 43 is a plan view of an exemplary platen in a document alignment area of the alternative deposit accepting device.

10 Figure 44 is a view similar to Figure 43 but including portions of a check therein showing the location of the indicia included in the micr line in the four possible orientations of a check in the document alignment area.

Figure 45 is an isometric view showing an exemplary movable micr read head.

15 Figures 46 and 47 are schematic views of an exemplary sheet access area in a position prior to accepting a stack of sheets.

Figures 48 and 49 are views of the sheet access area receiving the stack of sheets.

20 Figures 50 and 51 show the sheet access area while moving the stack of sheets toward a picker.

Figures 52 and 53 show the sheet access area after the stack of sheets is accepted therein and a gate mechanism is closed.

Figures 54 and 55 show the stack of documents while the stack is moving into a position adjacent the picker.

25 Figures 56 and 57 show the sheet access area with the upper sheet driving member disposed away from the stack.

Figures 58 and 59 show the sheet access area receiving a rejected sheet while still holding some sheets from the original input stack.

Figures 60 and 61 show the sheet driver members operating to move sheets out of the sheet access area in which the sheets are positioned on both sides of the divider plate.

5 Figures 62 and 63 show sheets on each side of the divider plate that have been presented to the customer in a position being returned into the machine, which may be done for example in response to the machine user not taking the sheets.

Figures 64 and 65 show retracted sheets being picked for storage in the machine through operation of the picker.

10 Figures 66 and 67 show the sheet access area operating to deliver a stack of sheets to a user such as a stack of rejected checks.

Figure 68 shows an exemplary sensor arrangement of the sheet access area.

Figure 69 is a plan view of an exemplary divider plate.

15 **BEST MODE FOR CARRYING OUT THE INVENTION**

U.S. Patent No. 6,474,548 the disclosure of which is incorporated herein by reference, discloses an exemplary deposit accepting device of a card activated cash dispensing automated banking machine. For purposes of this disclosure a deposit accepting device shall be construed to encompass any
20 apparatus which senses indicia on documents input to an automated banking machine.

A deposit accepting device 420 of an exemplary embodiment and having the features described hereafter is shown in Figure 1. The deposit accepting device is shown with the mechanism open so as to enable more readily describing its components. The deposit accepting mechanism would
25 be open in the manner shown in Figures 1 and 2 only when the device is not in operation. Rather the device would be placed in the open condition for servicing activities such as clearing jams, cleaning, adjusting or replacing components. This can be readily done in this exemplary embodiment by a
30 servicer as later described.

The deposit accepting device includes a document inlet opening 422. In the exemplary embodiment during operation the inlet opening is in communication with the outside of the housing of the automated banking machine. Documents received through the inlet opening travel along a transport path in the device. The transport path in the device further includes a document alignment area 424 in which documents are aligned to facilitate the processing thereof. The exemplary form of the unit further includes a document analysis area 426. The exemplary document analysis area includes scanning sensors and magnetic sensors for purposes of reading indicia from the documents.

The exemplary form of the device further includes an escrow area 428 along the transport path. In the escrow area documents that have been received are stored pending determination to either accept the documents or return them to the user. The exemplary deposit accepting device further includes a storage area 430 which operates to store documents that have been accepted for deposit within the deposit accepting device. Of course it should be understood that this structure is exemplary of arrangements that may be used.

In the exemplary embodiment documents are received through the opening and the presence of a document is sensed by at least one sensor 432. Sensing a document at the opening at an appropriate time during ATM operation (such as at a time when a user indicates through an input device of the machine that they wish to input a document) causes at least one processor to operate so as to control a gate 434. The processor operates upon sensing the document to cause the gate to move from the closed position to the open position. This is accomplished in the exemplary embodiment by a drive such as an electric motor or solenoid moving an actuator member 436 as shown in Figure 1. The actuator member 436 includes a cam slot 438 which causes corresponding movement of the gate 434 to the desired position. In some embodiments the at least one sensor 432 or other sensor in the device is

operative to sense properties that would indicate whether the document being inserted is a double or other multiple document. At least one processor in the banking machine may operate in accordance with its programming to not accept multiple documents and to cause the banking machine to provide at least one output to advise the user to insert a single document.

Responsive to the sensing of the document and other conditions as determined by at least one processor, a first transport 440 operates to move the document into the document alignment area. In the exemplary embodiment the document is moved in engaged relation between a belt flight 442 and rollers 444. As best shown in Figures 1 and 4, rollers 444 extend in openings 446 in an upper platen 448 to engage or at least move in very close proximity to belt flight 442. As shown in Figure 4, rollers 444 are mounted on a movable carriage 450. Carriage 450 is movable rotationally about a shaft 452. Movement of the carriage 450 enables selectively positioning of the rollers 444 to be in proximity to the surface of belt flight 442 or to be disposed away therefrom for reasons that are later discussed. After the document is sensed as having moved into the device the processor operates to cause the gate to be closed. Alternatively if a user has provided inputs through input devices on the machine indicating that they will be depositing more documents in the machine, the gate may remain open until the last document is deposited.

As shown in Figure 4 through 6, platen 448 in the operative position is in adjacent relation with a lead in guide 454. Guide portion 454 and platen 448 include corresponding contoured edges 456, 458. The contoured edges of the exemplary embodiment are of a toothed contoured configuration. This configuration is used in the exemplary embodiment to reduce the risk that documents will become caught at the adjacent edges of the platen and the guide. The toothed contoured configuration of the adjacent surfaces helps to minimize the risk that documents catch or are folded or damaged as they pass the adjacent surfaces. Of course it should be understood that this approach is exemplary and in other embodiments other approaches may be used.

In the exemplary embodiment the document alignment area includes transverse transport rolls 460 and 462. The transverse transport rolls extend through apertures in the platen 464 that supports belt flight 442. The transverse transport rolls of the exemplary embodiment are configured to have axially tapered surfaces extending in each longitudinal direction from the radially outermost extending portion of the roll so as to minimize the risks of documents being caught by a surface thereof. In alternative embodiments transverse transport rolls may have simple or compound curved surfaces to minimize the risk of catching transversely moving documents, which configurations shall also be referred to as tapered for purposes of this disclosure. In the exemplary embodiment the upper surface of the transverse transport rolls are generally at about the same level as the upper surface of belt flight 442. In addition each of the transverse transport rolls are in operative connection with a drive device. The drive device of the exemplary embodiment enables the transverse transport rolls to move independently for purposes of aligning documents as later discussed.

In supporting connection with platen 448 are a pair of transverse follower rolls 466 and 468. The transverse follower rolls each extend in a corresponding opening in the platen 448. Transverse follower roll 466 generally corresponds to the position of transverse transport roll 460. Likewise transverse follower roll 468 corresponds to the position of transverse transport roll 462. As shown in Figure 4, rolls 466 and 468 are supported on a movable carriage 470. Carriage 470 is rotatably movable about shaft 452. A drive 472 is selectively operative responsive to operation of one or more processors in the banking machine to cause the movement of carriage 470 and carriage 450. The drive may be a suitable device for imparting movement, such as a motor or a solenoid. As a result, drive 472 of the exemplary embodiment is selectively operative to dispose rollers 444 adjacent to belt flight 442 or dispose the rollers therefrom. Likewise drive 472 is selectively operative to place transverse follower rolls 466 and 468 in adjacent relation

with transverse transport rolls 460 and 462. These features are useful for purposes of aligning documents as will be later discussed. Of course this approach to a transverse transport for documents is exemplary and in other embodiments other approaches may be used.

5 The document alignment area 424 further includes a plurality of alignment sensors 474. In the exemplary embodiment non-contact sensors are used, which can sense the document without having to have any portion of the sensor contact the document. The exemplary alignment area includes three alignment sensors that are disposed from one another along the transport
10 direction of belt flight 442. In the exemplary embodiment one sensor is aligned transversely with each of rolls 460 and 462 and a third sensor is positioned intermediate of the other two sensors. The alignment sensors of the exemplary embodiment are radiation type and include an emitter and a receiver. The sensors sense the documents that move adjacent thereto by
15 detecting the level of radiation from the emitter that reaches the receiver. It should be understood that although three alignment sensors are used in the exemplary embodiment, other embodiments may include greater or lesser numbers of such sensors. Further while the alignment sensors are aligned along the direction of document transport path in the exemplary embodiment,
20 in other embodiments other sensor arrangements may be used such as a matrix of sensors, a plurality of transversely disposed sensors or other suitable arrangement.

 The operation of the document alignment area will now be described with reference to Figures 8 through 18. In the exemplary embodiment when a
25 document is sensed entering the device, carriage 450 which is controlled through the drive 472 is positioned such that rollers 444 are positioned in adjacent relation to belt flight 442. This position is shown in Figure 8. In this document receiving position carriage 470 is moved such that the transverse follower rolls 466 and 468 are disposed away from the transverse transport
30 rolls 460 and 462.

In response to sensing a document 476 being positioned in the inlet opening 422 and other appropriate conditions, the at least one processor is operative to cause the first transport 440 to move belt flight 442. If a double or other multiple document is sensed the first transport may not run or may run and then return the document to the user as previously discussed. Moving belt flight 442 inward causes the first document to be moved and engaged with the transport in sandwiched position between the rollers 444 and the belt flight as shown in Figure 9. In this position the transverse transport and transverse follower rolls are disposed away from one another so that the document 476 can move in engagement with the first transport into the document alignment area. The tapered surfaces of the transverse transport rolls 460,462 facilitate the document moving past the rolls without snagging. It should also be noted that projections on the surface of platen 464 operate to help to move the document by minimizing the risk of the document snagging on various component features. Further the projections on the platen help to minimize the effects of surface tension that might otherwise resist document movement and/or cause damage to the document. Of course these approaches are exemplary, and other embodiments may employ other approaches.

Position sensors for documents are included in the document alignment area and such sensors are operative to sense when the document has moved sufficiently into the document alignment area so that the document can be aligned. Such sensors may be of the radiation type or other suitable types. When the document 476 has moved sufficiently inward, the first transport is stopped. In the stopped position of the transport, the drive 472 operates to move carriage 470 as shown in Figure 12. This causes the transverse transport and follower rolls to move adjacent with the document 476 positioned therebetween so as to engage the document.

Thereafter as shown in Figures 13 and 14 the drive 472 is operative to move the carriage 450. This causes the rollers 444 to be disposed from belt flight 442 which disengages this transport with respect to the document.

Thereafter the one or more drives which are operative to move the transverse transport rolls, operate responsive to at least one processor so as to move document 476 in a direction transverse to the direction of prior movement by belt flight 442 as well as to deskew the document. As shown in Figure 15, the document 476 is moved sideways until a longitudinal edge 478 is aligned with the alignment sensors 474. In the exemplary embodiment the alignment sensors 474 provide a virtual wall against which to align the longitudinal edge of the document. The sensing of the document by the alignment sensors 474 of the edge of the document enables precise positioning of the document and aligning it in a desired position which facilitates later reading indicia therefrom. In an exemplary embodiment in which the documents are checks, the precise alignment of the longitudinal edge enables positioning of the document and its micr line thereon so as to be in position to be read by a read head as later discussed. Of course in other embodiments other approaches may be used.

In some exemplary embodiments the alignment sensors are in operative connection with one or more processors so that the transports are controlled responsive to the sensors sensing a degree of reduction in radiation at a receiver from an associated emitter of a sensor as the document moves toward a blocking position relative to the sensor. The exemplary embodiment may be configured such that a drive operating the transverse transport roll may cease to further move the sheet transversely when the alignment sensor which is transversely aligned with the transport roll senses a certain reduction in the amount of radiation reaching the sensor from the emitter. Thereafter the other drive operating the other transverse transport roll may continue to operate until the alignment sensor that corresponds to that transport roll senses a similar degree of reduction. In this way the processor operating the independently controlled transverse transport rolls cause the longitudinal edge of the document to be aligned with the virtual wall produced through use of the sensors.

In alternative embodiments the apparatus may operate in accordance with its programming to cause the respective transverse transport rolls to move the document transversely such that a reduction in radiation from the respective emitter is sensed reaching the corresponding receiver until no
5 further reduction occurs. This corresponds to a condition where the document fully covers the corresponding receiver. Thereafter the respective drive for the transverse transport roll may be reversed in direction to a desired level such as, for example, fifty percent of the total reduction which would indicate that the transverse edge is positioned to cover approximately fifty percent of the
10 receiver. In this way this alternative embodiment may be able to align documents that have relatively high radiation transmissivity or transmissivity that is variable depending on the area of the document being sensed by the sensor. Alternatively a transverse linear array of sensors, such as CCDs may be used to determine the transverse position of a particular portion of the edge
15 of the sheet. Alternatively a plurality of transversely extending arrays of sensors may be used to sense the positions of one or more portions of one or more edges of the sheet. A plurality of spaced arrays may be used to sense the position of the sheet. Of course these approaches are exemplary and in other embodiments other approaches may be used.

20 Once the document has been aligned and moved to the position shown in Figure 15, the drive 472 operates to move the carriage 450 such that the rollers 444 are again moved adjacent to belt flight 442. Thereafter the drive moves the carriage 470 so as to dispose the transverse follower rolls 466 and 468 away from the transverse transport rolls. This position is shown in Figure
25 8. Thereafter the now aligned document can be further moved along the transport path through movement of the first transport out of the document alignment area of the device to the document analysis area.

Figures 17 and 18 disclose an operational feature of the exemplary embodiment where a document 480 has a folded edge. In this exemplary
30 situation the folded edge is configured so that the alignment sensor 474 which

corresponds to transverse transport roll 462 cannot sense a longitudinal edge of the document until the document is unduly skewed. However, in this situation the middle alignment sensor will be operative to sense the middle portion of the longitudinal edge as will the alignment sensor that corresponds to transverse transport roll 460 before sensor 474 senses the edge of the document. In the exemplary embodiment the at least one processor that controls the operation of the drives for the transverse transport rolls is operative to control movement of the document transversely when the middle alignment sensor senses the edge of the document even through one of the end sensors has not. This is true even for a folded document or a document that has been torn. The at least one processor controls each transverse roll to move the document transversely until two of the three sensors detect an edge of the document in the desired aligned position. In this way even such an irregular document is generally accurately aligned in the longitudinal direction from the transport.

It should be understood that the exemplary embodiment uses radiation type sensors for purposes of aligning the document in the alignment section. In other embodiments other types of sensors such as sonic sensors, inductance sensors, air pressure sensors or other suitable sensors or combinations thereof, may be used.

Once the document has been aligned in the document alignment area of the transport path, the deposit accepting device operates responsive to the programming associated with one or more processors, to cause the document to be moved along the transport path by the first transport into the document analysis area. In the exemplary embodiment the document analysis area includes at least one magnetic sensing device which comprises the magnetic read head 482. Magnetic read head 482 is in supporting connection with platen 448 and in the exemplary embodiment is movable relative thereto. The alignment of the document in the document alignment area is operative in the exemplary embodiment to place the micr line on the check in corresponding

relation with the magnetic read head. Thus as the document is moved by the first transport into the document analysis area, the micr line data can be read by the magnetic read head. Of course in some alternative embodiments micr or other magnetic indicia may be read through other magnetic sensing elements such as the type later discussed, or optically, in the manner shown in U.S. Patent No. 6,474,548, for example.

Figures 19 through 21 show an exemplary form of the movable mounting for the magnetic read head 482. In the exemplary embodiment the magnetic read head is positioned in a retainer 484. Retainer 484 includes a first projection 486 that extends in and is movable in an aperture 488. Retainer 484 also includes a projection 490 which is movable in an aperture 492. A tension spring 494 extends through a saddle area 496 of the housing 484. The saddle area includes two projections which accept the spring 494 therebetween. This exemplary mounting for the magnetic read head provides for the head to float such that it can maintain engagement with documents that are moved adjacent thereto. However, the movable character of the mounting which provides both for angular and vertical movement of the read head reduces risk of snagging documents as the documents move past the read head. Further the biased spring mounting is readily disengaged and enables readily replacing the magnetic read head in situations where that is required. Of course this approach is exemplary and in other embodiments other approaches may be used.

The exemplary document analysis area includes in addition to the read head a magnetic sensing element 498. The magnetic sensing element in some exemplary embodiments may read magnetic features across the document as the document is moved in the document analysis area. In some embodiments the magnetic reading device may be operative to read numerous magnetic features or lines so as to facilitate the magnetic profile of the document as discussed herein. In some embodiments the magnetic sensing element may sense areas of the document in discrete elements which provide a relatively

complete magnetic profile of the document or portions thereof. In some embodiments the magnetic sensing capabilities may be sufficient so that a separate dedicated read head for reading the micr line of checks is not required. Of course these approaches are exemplary and may vary depending
5 on the type of documents which are being analyzed through the system.

The exemplary document analysis area further includes a first scanning sensor 500 and a second scanning sensor 502. The scanning sensors are operative to sense optical indicia on opposed sides of the document. The scanning sensors in combination with at least one processor are operative to
10 produce data which corresponds to a visual image of each side of the document. This enables analysis of visual indicia on documents through operation of at least one processor in the ATM. In the case of checks and other instruments the scanning sensors also enable capturing data so as to produce data which corresponds to image of a check which may be used for
15 processing an image as a substitute check, and/or other functions.

In some embodiments, the data corresponding to images of the documents may be used by the ATM to provide outputs to a user. For example, an image of a check may be output through a display screen of the ATM so a user may be assured that the ATM has captured the image data. In
20 some cases at least one processor in the ATM may apply digital watermarks or other features in the data to minimize the risk of tampering. In some embodiments at least one processor may operate in accordance with its programming to indicate through visual outputs to a user with the image that security features have been applied to the image data. This may include
25 outputs in the form of words and/or symbols which indicate a security feature has been applied. This helps to assure a user that the ATM operates in a secure manner in processing the accepted check. Of course, this approach is exemplary of things that may be done in some embodiments.

In alternative embodiments the programming of one or more
30 processors associated with the ATM may enable the scanning sensors,

magnetic sensors and other sensing elements to gather data which is usable to analyze other types of documents. Other types of sensing elements may include, for example, UV, IR, RFID, fluorescence, RF and other sensors that are capable of sensing properties associated with document. Documents may include for example receipts, certificates, currency, vouchers, gaming materials, travelers checks, tickets or other document types. The data gathered from the sensors in the analysis area may be processed for purposes of determining the genuineness of such items and/or the type and character thereof. Of course the nature of the sensors included in the analysis area may vary depending on the type of documents to be processed by the device. Also some embodiments may operate so that if a micr line or other magnetic characters on the document are not aligned with the magnetic read head, the document can nonetheless be analyzed and processed using data from other sensors.

It should also be noted that documents are moved in the document analysis area through engagement with a plurality of driving rolls 504. The driving rolls 504 operate in response to one or more drives that are controlled responsive to operation of one or more processors in the ATM. The drives are operative to move documents into proximity with and past the sensors so as to facilitate the reading of indicia thereon. The document may be moved in one or more directions to facilitate the reading and analysis thereof.

Once a document has been moved through the document analysis area, the document passes along the transport path into escrow area 428. Escrow area 428 includes a third transport 506. Transport 506 includes an upper belt flight 508. The plurality of cooperating rollers 510 supported through platen 449 are positioned adjacent to belt flight 508 in the operative position. Documents entering the escrow area are moved in engagement with belt flight 508 and intermediate to belt flight and the rollers.

In the exemplary embodiment documents that have been passed through the document analysis area are moved in the escrow area where the

documents may be stopped for a period of time during which decisions are made concerning whether to accept the document. This may include for example, making a determination through operation of the ATM or other connected systems concerning whether to accept an input check. If it is
5 determined that the check should not be accepted, the direction of the transports are reversed and the check is moved from the escrow area through the document analysis area, the document alignment area and back out of the ATM to the user. Alternatively if the decision is made to accept the document into the ATM, the document is moved in a manner later discussed from the
10 escrow area to the document storage area of the device.

In some exemplary embodiments the escrow area may be sufficiently large to hold several checks or other documents therein. In this way a user who is conducting a transaction involving numerous checks may have all those checks accepted in the machine, but the programming of the machine may
15 enable readily returning all those checks if the user elects to do so or if any one or more of the documents is determined to be unacceptable to the machine. Alternatively or in addition, storage devices such as belt storage mechanisms, transports or other escrow devices may be incorporated into the transport path of a deposit accepting device so that more numerous documents may be stored
20 therein and returned to the user in the event that a transaction is not authorized to proceed. Of course these approaches are exemplary.

It should be noted that the exemplary escrow area includes a lower platen with a plurality of longitudinal projections which extend thereon. The longitudinal projections facilitate movement of the document and reduce
25 surface tension so as to reduce the risk of the document being damaged.

In the exemplary embodiment the escrow area further includes a stamper printer 512. In the exemplary embodiment the stamper printer is supported through platen 449 and includes an ink roll type printer which is described in more detail in Figures 25 through 27. The escrow area further

includes a backing roll 514 which operates to assure that documents move in proximity to the stamper printer so that indicia can be printed thereon.

The exemplary form of the stamper printer is shown in greater detail in Figures 25 through 27. The exemplary printer includes an eccentric ink bearing roll 518 shown in Figure 27. The eccentric shape of the ink bearing roll in cross section includes a flattened area 520 which is disposed radially closer to a rectangular opening 522 which extends in the roll, than a printing area 524 which is angularly disposed and in opposed relation thereof. The flattened area is generally positioned adjacent to documents when documents are moved through the escrow area and printing is not to be conducted thereon by the stamper printer. In the exemplary embodiment the ink roll 518 is encapsulated in plastic and is bounded by a plastic coating or cover about its circumference. Apertures or openings are cut therethrough in the desired design that is to be printed on the documents. As can be appreciated, the apertures which are cut in the plastic which encapsulates the outer surface of the ink bearing roll enables the ink to be transferred from the ink holding roll material underlying the plastic coating, to documents in the shape of the apertures. For example in the embodiment shown a pair of angled lines are printed on documents by the stamper printer. Of course this approach is exemplary and in other embodiments other types of inking mechanisms and/or designs may be used.

In the exemplary embodiment the ink roll 518 is supported on a first shaft portion 526 and a second shaft portion 528. The shaft portions include rectangular projections that are generally rectangular in profile 523, that extend in the opening 522 of the ink roll. The shaft portions include flanged portions 530 and 532 that are disposed from the radial edges of the roll. Shaft portions 526 and 528 include an interengaging projection 525 and access 527, as well as a tab 529 and recess that engage and serve as a catch, which are operative to engage and be held together so as to support the roll.

Shaft portion 526 includes an annular projection 534. Annular projection 534 is adapted to engage in a recess which is alternatively referred to as a slot (not separately shown) which extends generally vertically in a biasing tab 536 as shown in Figure 25. Biasing tab 536 is operative to accept the projection in nested relation and is operative to provide an axial biasing force against shaft portion 526 when the first shaft portion is positioned therein. This arrangement enables holding the shaft portion in engaged relation with the biasing tab. However, when it is desired to change the stamper printer and/or the ink roll therein, the biasing tab may be moved such that the annular projection may be removed from the interengaging slot by moving the projection 534 upward in the recess so as to facilitate removal of the printer and ink roll. The biasing tab is supported on a bracket 538 that is in supporting connection with the platen which overlies the escrow area.

Second shaft portion 528 includes an annular projection 540. Projection 540 includes on the periphery thereof an angled radially outward extending projection 542. Projection 542 has a particular contour which is angled such that the transverse width of the projection increases with proximity to the flange portion 542. This configuration is helpful in providing a secure method for moving the ink roll but also facilitates changing the ink roll and stamper printer when desired.

In the exemplary embodiment the ink roll 518 is housed within a housing 544. Housing 544 is open at the underside thereof such that the printing area 524 can extend therefrom to engage a document from the escrow area. Housing 544 also includes two pairs of outward extending ears 546. Ears 546 include apertures therein that accept housing positioning projections 545 on the associated mounting surface of the device and are operative to more precisely position the housing and the ink roll on the supporting platen and to facilitate proper positioning when a new ink roll assembly is installed. Housing 544 also includes apertures 543 through which the shaft portions extend. A flange portion is positioned adjacent to each aperture.

In the exemplary embodiment shaft portion 528 is driven through a clutch mechanism 548. Clutch mechanism 548 of the exemplary embodiment is a wrap spring clutch type mechanism which is selectively actuatable through electrical signals. The clutch is driven from a drive through a gear 550. The clutch 548 outputs rotational movement through a coupling 552. Coupling 552 includes the annular recess that corresponds to projection 540 and a radial recess which corresponds in shape to projection 542. Thus in the exemplary embodiment the force of the biasing tab enables the coupling 552 to solidly engage shaft portion 528.

During operation gear 550 which is operatively connected to a drive provides a mechanical input to the clutch 548. However, the ink roll generally does not rotate. Transport 506 is operative to move a document in the transport in the escrow area responsive to signals from a processor. Sensors such as radiation sensors in the escrow area are operative to indicate one or more positions of the document to the processor. When the document is to be marked with the stamper printer it is positioned adjacent to the ink roll by operation of a processor controlling the transport in the escrow area. A signal is sent responsive to the processor to the clutch 548. This signal is operative to engage the coupling 552 which causes the shaft portions 528 and 526 to rotate the ink roll 518. As the ink roll rotates the printing area 524 engages the surface of the document causing ink markings to be placed thereon. The ink roll rotates in coordination with movement of the document. The clutch is operative to cause the coupling to carry out one rotation such that after the document has been marked, the printing area is again disposed upward within the housing. The flattened portion 520 of the ink roll is again disposed in its initial position facing the document. Thus documents are enabled to pass the stamper printer 512 without having any unwanted markings thereon or without being snagged by the surfaces thereof.

It should be understood that when it is desired to change the stamper printer ink roll because the ink thereon has become depleted or alternatively

because a different type of marking is desired, this may be readily accomplished. A servicer does this by deforming or otherwise moving the biasing tab 536 and moving the shaft portion 526 upward such that the annular projection 534 no longer extends in the slot in the biasing tab. This also
5 enables projection 534 to be moved upward and out of a stationary slot 554 in the bracket 538. As the annular projection 534 is moved in this manner the annular projection 540 and radial projection 542 are enabled to be removed from the corresponding recesses in the coupling 552. This enables the housing 544 to be moved such that the ears 546 on the housing can be separated from
10 the positioning projections which help to assure the proper positioning of the ink roll when the housing is in the operative position. Thereafter a new housing shaft and ink roll assembly can be installed. This may be accomplished by reengaging the projections 540 and 542 with the coupling 552 and engaging the projection 534 in the slot of biasing tab 536. During
15 such positioning the positioning projections are also extended in the ears 546 of the housing, to locate the housing and reliably position the ink roll.

It should further be understood that although only one ink roll is shown in the exemplary embodiment, alternative embodiments may include multiple ink rolls or multiple stamper printers which operate to print indicia on checks.
20 Such arrangements may be used for purposes of printing varied types of information on various types of documents. For example in some situations it may be desirable to return a document that has been processed through operation of the device to the user. In such circumstances a stamper printer may print appropriate indicia on the document such as a "void" stamp or other
25 appropriate marking. Of course the type of printing that is conducted may vary as is appropriate for purposes of the particular type of document that is being processed. In other embodiments alternative approaches may be used.

In the exemplary embodiment a document that is to be moved from the escrow area can be more permanently stored in the machine by moving the
30 document to a storage area 430. Documents are moved from the escrow area

toward the storage area by moving the document in engagement with belt flight 508 so that the document engages a curved deflector 554. Deflector 554 causes the document to engage a vertical transport 556 that extends in the storage area 430. As best shown in Figure 30 vertical transport 556 includes
5 two continuous belts that are driven by a drive 558. The transport 556 includes a pair of disposed belts, each of which has a belt flight 560. Each belt flight 560 extends in generally opposed relation of a corresponding rail 562 of a vertical guide 564. As shown in Figure 29 guide 564 of the exemplary embodiment is constructed so that the rails 562 are biased toward the belt
10 flights by a resilient material. This helps to assure the document can be moved between the belt flights and the rails in sandwiched relation. Such a document 568 is shown moving between the rails and the belt flights in Figure 30. Alternatively in some embodiments a single belt flight, rollers or other sheet moving members may be used.

15 It should also be noted that in the exemplary embodiment the drive 558 includes a spring biasing mechanism 568. The biasing mechanism acts on lower rolls 570 to assure proper tension is maintained in the belt flights 560.

Further in the exemplary embodiment the transport belts are housed within a housing which includes a pair of spaced back walls 572. As later
20 discussed, back walls 572 serve as support surfaces for stacks of documents that may be stored in a first section or location of the storage area of the device. Similarly guide 564 includes a pair of transversely disposed wall surfaces 574. Wall surfaces 574 provide support for a stack of documents disposed in a second section or location of the storage area. Also as shown in
25 Figure 30, the vertical transport 556 moves documents to adjacent a lower surface 576 which bounds the interior of the storage area. Document sensing devices are provided along the path of the vertical transport so that the drive 558 can be stopped through operation of at least one processor once the document has reached the lower surface. This helps to assure that documents

are not damaged by movement in the drive. Of course these approaches are exemplary and in other embodiments other approaches may be used.

In the exemplary embodiment when at least some documents are moved from the escrow area into the vertical transport, the device operates to print indicia thereon. This may be indicia of various types as described herein, as would be appropriate for the types of documents being processed. In the exemplary embodiment printing on the documents is carried out through operation of an inkjet printer 578. The inkjet printer includes a removably mounted printhead that is adjacent to documents as they are moved in the vertical transport portion of the sheet path. The inkjet printer includes nozzles which are operative to selectively expel ink therefrom toward the sheet path and shoot ink onto the adjacent surface of the document. The nozzles of the inkjet printer operate in accordance with the programming of a processor which is operative to drive the inkjet printer to expel ink selectively therefrom to produce various forms of characters on the documents as may be desired. For example in an exemplary embodiment the printer may be operative to print indicia on checks so as to indicate transaction information and/or the cancellation of such checks. In the exemplary embodiment the print head is releasably mounted through moveable members to enable ready installation and removal.

The exemplary embodiment further includes an ink catching mechanism 580 which is alternatively referred to herein as an ink catcher. In the exemplary embodiment the ink catching mechanism is operative to capture ink that may be discharged from the printhead at times when no document is present. This may occur for example if a document is misaligned in the transport or if the machine malfunctions so that it attempts printing when no document is present. Alternatively the inkjet printer may be operated responsive to at least one processor at times when documents are not present for purposes of conducting head cleaning activities or other appropriate activities for assuring the reliability of the inkjet printer. Further the

exemplary embodiment of the ink catcher mechanism is operative to tend the printhead by wiping the nozzles so as to further facilitate reliable operation. Of course it should be understood that the exemplary ink catcher shown and described is only one of many ink catcher configurations that may be used.

5 An exemplary form of the ink catching mechanism is shown in Figures 22 through 24. The ink catching mechanism includes an ink holding body 582 with an ink holding area therein. Body 582 has thereon an annular projecting portion 584. Projecting portion 584 has an opening 586 therein. Opening 586 of the projecting portion is in fluid communication with the ink holding
10 interior area of the main portion of the body. Of course this body configuration is merely exemplary.

 A head portion 588 is comprised of a body portion configured to extend in overlying relation of the projecting portion 584. Head portion 588 of the exemplary embodiment comprises a generally annular body member that
15 includes a flattened area 590 which has an opening 592 therein. Head portion 588 also has in supporting connection therewith a resilient wiper member 594 extending radially outward therefrom in an area disposed angularly away from the opening 592.

 As shown in Figure 24 the exemplary embodiment of body 582 is of a
20 generally clamshell construction and includes a lower portion 596 and an upper portion 598. The upper and lower portions fit together as shown to form the body, including the annular projecting portion. Also housed within the interior of the exemplary embodiment of the body is an ink absorbing member 600. The ink absorbing member is operative to absorb ink which passes into
25 the interior of the body through opening 586. The body is releasibly mounted in the machine through a mounting portion 601 which accepts suitable fasteners or other holding devices.

 In the operative condition the head portion 588 extends in overlying generally surrounding relation of the projecting portion 584. The head portion
30 is enabled to be selectively rotated through operation of a drive 602 that is

operatively connected therewith. A disk member 604 and sensor 606 are operative to sense at least one rotational position of the head portion 588.

In operation of the exemplary form of the device, the head portion 588 is generally positioned as shown in Figure 22 with the opening 592 of the head portion in aligned relation with the opening 586 in the projecting portion of the body. The projecting portion extends within an interior area of the rotatable head portion. In this position ink expelled from the inkjet printhead which does not strike a document, passes into the interior of the body through the aligned openings. Thus for example if the programming of the machine calls for the machine to periodically conduct a head cleaning operation in which the nozzles of the inkjet printhead are fired, the ink can be transmitted through sheet path in the area of the transport where documents are normally present and into the body of the ink catcher mechanism. Thereafter or periodically in accordance with the programming of the machine, a processor in operative connection with the drive is operative to cause the drive 602 to rotate the head portion 588. Rotation of the head portion is operative to cause the flexible wiper member 594 to engage the print head and wipe over the openings of the inkjet nozzles. This avoids the buildup of ink which can prevent the efficient operation of the inkjet printer. Once the wiper has moved across the nozzles the head returns to the position so that excess ink is accepted within the body. This is done in the exemplary embodiment by having the head portion rotate in a first rotational direction about a full rotation. In this way the head portion rotates from the position where the openings in the head portion and projecting portion are aligned with the print head. The head portion is rotated so the openings are no longer aligned and the flexible wiper member engages the print head and wipes across the nozzles thereof. The head portion continues to rotate until the openings are again aligned.

In the exemplary embodiment the drive operates responsive to the at least one processor to rotate the head portion in the first rotational direction about 360 degrees and then stops. In other embodiments the drive may reverse

direction and/or operate the head portion to undergo multiple rotations. In other embodiments the movable member may include multiple openings and wiper members and may move as appropriate based on the configuration thereof. In other embodiments the movable member may include multiple openings and wiper members and may move as appropriate based on the configuration thereof.

In some embodiments the at least one processor may operate the print head periodically to clean or test the print head, and may operate the ink catcher to wipe the nozzles only after such cleaning or test. In some alternative embodiments wiping action may be done after every print head operation or after a set number of documents have been printed upon. Various approaches may be taken in various embodiments.

In exemplary embodiments suitable detectors are used to determine when the print head needs to be replaced. At least one processor in operative connection with the print head may operate to provide an indication when the print cartridge should be changed. Such an indication may be given remotely in some embodiments, by the machine sending at least one message to a remote computer. In the exemplary embodiment a servicer may readily remove an existing print cartridge such as by moving one or more fasteners, tabs, clips or other members. A replacement cartridge may then be installed, and secured in the machine by engaging it with the appropriate members. In the exemplary embodiment electrical contacts for the print head are positioned so that when the cartridge is in the operative position the necessary electrical connections for operating the print head are made. The new cartridge is installed with the print head thereof positioned in aligned relation with the opening in the head portion of the ink catcher so that ink from the print head will pass into the ink catcher and be held therein if there is no document in the sheet path between the print head and the ink catcher at the time ink is expelled therefrom.

In the exemplary embodiment after a new ink cartridge has been installed, a servicer may test the operation of the printer. This is accomplished by providing appropriate inputs to the machine. A servicer moves a sheet into the sheet path. This may be done in some cases manually and in other cases by providing and moving a sheet in the sheet path through one or more transports. One or more inputs from the servicer to input devices of the machine cause the processor to operate the printer to expel ink from the print head toward the sheet path. If the sheet is present ink impacts the sheet to print thereon. In some cases the processor operates the print head to print an appropriate pattern such as one that tests that all the nozzles are working. In other embodiments other indicia may be printed. Of course if no sheet is present in the sheet path, the ink from the print head passes into the body of the ink catcher through the opening in the head portion. Of course this approach is exemplary, and in other embodiments other approaches and processes may be used.

In some embodiments after printing is conducted the machine may operate to wipe the nozzles of the print head. This may be done in response to the programming associated with the processor and/or in response to an input from a servicer. In such a situation the drive operates to rotate the head portion 588 about the projecting portion 584 so that the flexible wiper member engages the print head. In the exemplary embodiment the wiper member wipes across the print head as the head portion of the ink catcher makes about one rotation from its initial position. The head portion rotates responsive to the drive until the head portion is again sensed as having the opening therein aligned with the print head. This is sensed by the sensor 606 sensing the rotational position of the disk member 604. In response to sensing that one head portion is in the position for capturing ink from the print head, the processor is operative to cause the drive to cease operation. Of course these approaches are exemplary and in other embodiments other approaches may be used.

In an exemplary embodiment when the ink catching mechanism has become filled with ink it is possible to replace the body by disengaging one or more fasteners that hold it in position and install a new one in the operative position. Alternatively in some embodiments the body may be opened and the
5 ink absorbing member 600 removed and replaced with a new member.

In the exemplary embodiment the body is disengaged from the machine by disengaging the one or more fasteners or other devices that hold the mounting portion 601 to the adjacent housing structure of the document accepting device. Once this is done, the body 580 is moved so that the
10 projecting portion 584 no longer extends within the interior area of the movable head portion 588. Once this is done, the body can be discarded. Alternatively, the body may be opened, the ink absorbing member 600 removed, a new ink absorbing member installed and the body again closed.

A new body or one with a new ink absorbing member is installed by
15 extending the projection portion 584 thereof within the interior area of the head portion 588. The body is then fastened in place through the mounting portion. In response to appropriate inputs to an input device of the machine from a servicer, the processor operates to cause the drive 602 to rotate the head portion 588. The processor may operate in accordance with its programming
20 to rotate the head portion 588 only as necessary to align the opening 592 with the print head. Alternatively the processor may operate the drive to make one or more rotations before stopping the rotation of the head portion. In some embodiments the processor may operate the printer to test its operation as previously discussed, and may then rotate the head portion to wipe the nozzles
25 of the print head. Of course these approaches are exemplary and in other embodiments other approaches may be used.

Thus as can be appreciated the exemplary embodiment of the ink catching mechanism provides an effective way for the printer to be operated so as to avoid the deposition of excess ink within the ATM as well as to enable

the print nozzles to be maintained in a suitable operating condition so that printing may be reliably conducted.

In the exemplary embodiment documents such as checks are moved into the storage area 430 through the vertical transport 556. Such documents
5 are held initially between the rails 562 of the guide 564 and the belt flights 560 of the vertical transport. In the exemplary embodiment such documents may be selectively stored in one of two available sections (alternatively referred to herein as locations) of the storage area. These include a first storage location
10 608 positioned on a first side of the vertical transport and a second storage location 610 positioned on an opposed transverse side of the vertical transport. Selective positioning of documents into the storage locations is accomplished through use of a movable plunger member 612 which operates responsive to one or more processors to disengage documents from the vertical transport and move the documents into either the first storage location or second storage
15 location of the storage area.

Figures 31 through 35 show the operation of the exemplary plunger member to move a document 614 into storage location 608. As shown in Figure 32 when the document 614 has moved downward into the storage area, the plunger 612 has been positioned to the right of the document as shown in
20 storage location 610. In the exemplary embodiment movement of the plunger member is accomplished through use of a suitable drive and movement mechanism such as a rack drive, worm drive, tape drive or other suitable movement device. Such a drive is represented schematically by drive 616 in Figure 3.

25 Once the document has been moved to the proper position and the vertical transport is stopped, the plunger 612 moves from the position shown in Figure 32 to the left so as to engage the document. Such engagement with the document deforms the contour of the document as shown and begins to pull the document transversely away from engagement with the belt flights and
30 the guide rails or other document moving structures. A spring biased backing

plate 618 which may have additional documents in supporting connection therewith, is moved by the action of the plunger as shown in Figures 33 and 34. Backing plate 618 is biased by a spring or other suitable device so that documents in supporting connection with the backing plate are generally
5 trapped between the backing plate and the wall surfaces 574 of the guide.

As represented in Figures 34 and 35 as the plunger 612 moved further toward the storage location 608, the document disengages from the rails and belts so that the document is eventually held in supported relation with the backing plate 618 by the plunger. Once the document 614 has reached this
10 position as shown in Figure 35 the plunger may be moved again to the right as shown such that the document 614 is integrated into the document stack supported on backing plate 618. Further as the plunger 612 returns toward its original position, the documents supported on the backing plate are held in sandwiched relation between the wall surfaces 574 of the guide and the
15 backing plate. Thus the document 614 which was moved into the storage area has been selectively moved through operation of the plunger into the storage location 608.

Figures 36 through 40 show operation of the plunger member to store a document in storage location 610. As shown in Figure 37 a document 620 is
20 moved into the vertical transport and because this document is to be stored in storage location 610 the plunger member 612 is positioned responsive to operation of the processor to the left of the document as shown. As shown in Figures 38 and 39 movement of the plunger member 612 toward the right as shown disengages the document from the transport and brings it into
25 supporting connection with a spring loaded backing plate 622. Backing plate 622 is biased by a spring or other suitable biasing mechanism toward the left as shown in Figures 39 and 40.

Movement of the plunger 612 to the extent shown in Figure 40 causes the document 620 to be supported in a stack on the backing plate 622. In this
30 position the plunger may be again moved to the left such that the documents in

the stack in storage location 610 are held in sandwiched relation between the back walls 572 of the vertical transport and the backing plate.

As can be appreciated in the exemplary embodiment documents can be selectively stored in a storage location of the device by positioning and moving the plunger so that the document is stored in the storage location as desired. This enables documents to be segregated into various document types. For example in some embodiments the ATM may be operated such that checks that are drawn on the particular institution operating the machine are stored in one storage location of the storage area 430 while others that are not drawn on that institution are stored in the other storage location. Alternatively in some embodiments where the mechanism is used to accept checks and currency bills, bills which have been validated may be stored in one storage location while bills that have been determined to be counterfeit or suspect may be stored in another storage section. In still further alternative embodiments where the device is operated to accept checks and bills, currency bills may be stored in one storage location while checks are stored in another. Of course this approach is exemplary.

In alternative embodiments additional provisions may be made. For example in some embodiments one or more aligned vertical transports may be capable of transporting documents through several vertically aligned storage areas. In such situations a document may be moved to the vertical level associated with a storage area that is appropriate for the storage of the document. Once at that level a plunger may move transversely so as to place the document into the appropriate storage location on either side of the vertical transport. In this way numerous types of documents can be accepted and segregated within the ATM.

In still other alternative embodiments the storage mechanism may be integrated with a document picker mechanism such as shown in U.S. Patent No. 6,331,000 the disclosure of which is incorporated by reference. Thus documents which have been stored such as currency bills may thereafter be

automatically removed through operation of the picker mechanism and dispensed to users of the ATM machine. Various approaches may be taken utilizing the principals of the described embodiments.

As shown in Figure 2 exemplary storage area 440 is generally held in a closed position such that the items stored therein are not accessible even to a servicer who has access to the interior of the ATM. This is accomplished through use of a sliding door 624 which in the exemplary embodiment is constructed of collapsible sections. The door is enabled to be moved such that access to documents stored in the storage area can be accessed such as is shown in Figure 28. In an exemplary embodiment the ability to open door 624 is controlled by a lock 626. In the exemplary embodiment lock 626 comprises a key lock such that authorized persons may gain access to the interior of the storage area if they possess an appropriate key.

In some exemplary embodiments the deposit accepting device may be mounted in movable supporting connection with structures in the interior of the housing of the banking machine. This may be done in the manner shown in U.S. Patent No. 6,010,065 the disclosure of which is incorporated herein by reference. In some exemplary embodiments a servicer may access the interior of the banking machine housing by opening one or more external doors. Such doors may require the opening of one or more locks before the interior of the housing may be accessed. With such a door open the servicer may move the deposit accepting device 420 while supported by the housing so that the storage area of the device extends outside the housing. This may make it easier in some embodiments to remove documents from the storage area.

In the exemplary embodiment persons authorized to remove documents from the storage area may open the lock and move the door 624 to an open position so as to gain access to the interior of the storage area. Documents that have been positioned in the storage locations can be removed by moving the backing plates 622 and 618 against the spring biasing force of the respective springs or other biasing mechanisms 617, 619, that holds the stacks of stored

documents in sandwiched relation. Manually engageable tabs 628 and 630 are provided in the exemplary embodiment so as to facilitate the servicer's ability to move the backing plates against the respective biasing force. With the respective backing plate moved horizontally away from the vertical transport, the stack of documents between the backing plate and vertical transport can be removed. Each backing plate can be moved to remove document stacks on each horizontal side of the vertical transport. Once the stored documents have been removed, the backing plates can return automatically to the appropriate position to accept more documents due to the biasing force. Likewise the door 624 can be closed and the lock returned to the locked position. If the deposit accepting device is movably mounted so that the storage area is outside the machine, it can be moved back into the interior of the housing. The housing can then be secured by closing the doors and locks thereon. This construction of the exemplary embodiment not only facilitates the removal of checks, currency or other documents, but is also helpful in clearing any jams that may occur within the vertical transport.

The exemplary embodiment also provides advantages in terms of clearing jams within the document alignment, analysis and/or escrow areas. For example as shown in Figures 1 and 2, the device may be opened such that the entire transport path for documents up to the point of the vertical transport may be readily accessed. As a result in the event that the document should become jammed therein, a servicer may unlatch a latch which holds a platen in position such as for example latch 632 shown in Figure 1 and move the platen 448 rotationally and the components supported thereon to the position shown so as to enable exposing the document alignment area and document analysis area. As can be appreciated platen 448 is mounted through hinges which enable the platen to rotate about an axis through the hinges so as to facilitate the opening thereof. Likewise the portions of the platen 449 supporting the mechanisms overlying the escrow area can be opened as shown to expose that area of the document transport path so as to facilitate accessing documents

therein. As shown in Figures 1 and 2, platen 449 is rotatable about an axis that extends generally perpendicular to the axis about which platen 448 is rotatable. Further in the exemplary embodiment, platens 448 and 449 are configured so that platen 448 must be moved to the open position before platen 449 can be opened. Likewise platen 449 must be closed before platen 448 is closed. This exemplary construction enables the use of a single latch to secure the platens in the operative positions, and to enable unsecuring the single latch so that the platens can both be moved to expose the document alignment, document analysis and escrow areas of the document transport path in the device. Of course, this approach is exemplary and in other embodiments other approaches may be used.

In servicing the exemplary embodiment of the deposit accepting device 420 which for purposes of this service discussion will be described with regard to checks, a servicer generally begins by opening a door or other access mechanism such as a fascia or panel that enables gaining access to an interior area of the housing of the ATM. In an exemplary embodiment the check accepting device 420 is supported on slides, and after unlatching a mechanism that normally holds the device in operative position, the device can be moved, while supported by the housing to extend outside the ATM. Of course in some situations and depending on the type of service to be performed, it may not be necessary to extend the device outside the ATM housing. Alternatively in some situations a servicer may extend the device outside the housing and then remove the device from supporting connection with the ATM housing completely. This may be done for example, when the entire device is to be replaced with a different device.

The servicer may disengage the latch 632 and rotate platen 448 about the axis of its hinges. This exposes the areas of the transport path through the device in the document alignment area 424 and document analysis area 426. It should be noted that when the platen 448 is moved to the open position the toothed contoured edges 456, 458 shown in Figure 4, are moved apart.

With the platen 448 moved to expose the document alignment and document analysis areas, any checks which have become caught or jammed therein can be removed by the servicer. The servicer can also conduct other activities such as cleaning the scanning sensors or the magnetic read head.

5 Such cleaning may be done using suitable solvents, swabs or other materials. The servicer may also clean, align, repair or replace other items in the exposed areas of the transport path.

With platen 448 in the open position a servicer may also move platen 449 from the closed position to the open position shown in Figures 2 and 3.

10 Rotating platen 449 about the axis of its supports to the open position, exposes the escrow area 428 of the transport path. A servicer may then clear any jammed documents from the escrow area. The servicer may also clean, align, repair or replace other components that are exposed or otherwise accessible in the escrow area.

15 Upon completion of service the platen 449 is rotated to the closed position. Thereafter the platen 448 is rotated to the closed position. This brings the contoured edges 456, 458 back into adjacent alignment. With platen 448 in the closed position the latch 632 is secured to hold both platens in the closed positions, the check accepting device can then be moved back
20 into the operating position and secured therein. The servicer when done, will then close the door or other device to close the interior of the ATM housing. Of course these approaches are exemplary.

Upon closing the housing the ATM may be returned to service. This may include passing a test document through the transport path through the
25 deposit accepting device 420 and/or reading indicia of various types from one or more test documents. It may also include operating the machine to image the document that was jammed in the device to capture the data therefrom so that the transaction that cause the ATM malfunction can be settled by the system. Of course it should be understood that these approaches are
30 exemplary and in other embodiments other approaches may be used.

Figure 41 shows an alternative exemplary embodiment of an automated banking machine 640. Banking machine 640 includes a housing 642. Housing 642 of the machine includes a chest portion 644 and an upper housing portion 646. Chest portion 644 provides a secure storage area in an interior portion thereof. The interior of the chest portion may be used for example to store valuable sheets such as currency notes, travelers checks, scrip, checks, tickets or other valuable sheets that have been received by and/or that are to be dispensed from the machine. The chest portion includes a suitable chest door and lock for providing authorized access thereto. The upper housing portion 646 of the exemplary embodiment also includes suitable access doors or other mechanisms to enable authorized persons to obtain access to items therein. Examples of chest portions are shown in U.S. Patent No. 7,000,830 and U.S. Application No. 60/519,079, the disclosures of which are incorporated herein by reference.

The exemplary automated banking machine 640 includes output devices including a display 648. Other output devices may include for example speakers, touchpads, touchscreens or other items that can provide user receivable outputs. The outputs may include outputs of various types including for example, instructions related to operation of the machine. The exemplary automated banking machine further includes input devices. These may include for example a card reader 650. The card reader may be operative to read indicia included on cards that are associated with a user and/or a user's account. Card readers may be operative to read indicia for example, indicia encoded on a magnetic stripe, data stored in an electronic memory on the card, radiation transmitted from an item on the card such as a radio frequency identification (RFID) chip or other suitable indicia. User cards represent one of a plurality of types of data bearing records that may be used in connection with activating the operation of exemplary machines. In other embodiments other types of data bearing records such as cards, tokens, tags, sheets or other types of devices that include data that is readable therefrom, may be used.

In exemplary embodiments data is read from a card through operation of a card reader. The card reader may include features such as those disclosed in U.S. Patent No. 7,118,031 the disclosure of which is incorporated herein by reference. The exemplary automated banking machine is operative responsive to at least one processor in the machine to use data read from the card to activate or allow operation of the machine by authorized users so as to enable such users to carry out at least one transaction. For example the machine may operate to cause data read from the card and/or data resolved from card data and other inputs or data from the machine, to be compared to data corresponding to authorized users. This may be done for example by comparing data including data read from the card to data stored in or resolved from data stored in at least one data store in the machine. Alternatively or in addition, the automated banking machine may operate to send one or more messages including data read from the card or data resolved therefrom, to a remote computer. The remote computer may operate to cause the data received from the machine to be compared to data corresponding to authorized users based on data stored in connection with one or more remote computers. In response to the positive determination that the user presenting the card is an authorized user, one or more messages may be sent from the remote computer to the automated banking machine so as to enable operation of features thereof. This may be accomplished in some exemplary embodiments through features such as those described in U.S. Patent Nos. 7,284,695 and/or 7,266,526 the disclosures of each of which are incorporated herein by reference. Of course these approaches are exemplary and in other embodiments other approaches may be used.

The exemplary automated banking machine further includes a keypad 652. Keypad 652 provides a user input device which includes a plurality of keys that are selectively actuatable by a user. Keypad 652 may be used in exemplary embodiments to enable a user to provide a personal identification number (PIN). The PIN data may be used to identify authorized users of the

machine in conjunction with data read from cards so as to assure that machine operation is only carried out for authorized users. Of course the input devices discussed herein are exemplary of numerous types of input devices that may be used in connection with automated banking machines.

5 The exemplary automated banking machine further includes other transaction function devices. These may include for example, a printer 654. In the exemplary embodiment 654 is operative to print receipts for transactions conducted by users of the machine. Other embodiments of automated banking machines may include other types of printing devices such as those suitable for
10 printing statements, tickets or other types of documents. The exemplary automated banking machine further includes a plurality of other devices. These may include for example, a sheet dispensing device 656. Such a device may be operative to serve as part of a cash dispenser device which selectively dispenses sheets such as currency notes from storage. It should be understood
15 that for purposes of this disclosure, a cash dispenser device, is one or more devices that can operate to cause currency stored in the machine to be dispensed from the machine. Other devices may include a recycling device 658. The recycling device may be operative to receive sheets into a storage location and then to selectively dispense sheets therefrom. The recycling
20 device may be of a type shown in U.S. Patent Nos. 6,302,393 and 6,131,809, the disclosures of which are incorporated herein by reference. It should be understood that a recycling device may operate to recycle currency notes and may in some embodiments, a cash dispenser may include the recycler device. Further the exemplary embodiment may include sheet storage devices 660 of
25 the type previously described herein which are operative to selectively store sheets in compartments.

 The exemplary ATM 640 includes a deposit accepting device 662 which is described in greater detail hereafter. The deposit accepting device of an exemplary embodiment is operative to receive and analyze sheets received
30 from a machine user. The exemplary deposit accepting device is also

operative to deliver sheets from the machine to machine users. It should be understood that in other embodiments additional or different deposit accepting devices may be used. Further for purposes of this disclosure a deposit accepting device may alternatively be referred to as a sheet processing device.

5 The exemplary automated banking machine 640 further includes at least one processor schematically indicated 664. The at least one processor is in operative connection with at least one data store schematically indicated 666. The processor and data store are operative to execute instructions which control and cause the operation of the automated banking machine. It should
10 be understood that although one processor and data store are shown, embodiments of automated banking machines may include a plurality of processors and data stores which operate to control and cause operation of the devices of the machine.

 The at least one processor 664 is shown in operative connection with
15 numerous transaction function devices schematically indicated 668. Transaction function devices include devices in the machine that the at least one processor is operative to cause to operate. These may include devices of the type previously discussed such as the card reader, printer, keypad, deposit accepting device, sheet dispenser, recycler and other devices in or that are a
20 part of the machine.

 In the exemplary embodiment the at least one processor is also in operative connection with at least one communication device 670. The at least one communication device is operative to enable the automated banking machine to communicate with one or more remote servers 672, 674 through at
25 least one network 676. It should be understood that the at least one communication device 670 may include various types of network interfaces suitable for communication through one or more types of public and/or private networks so as to enable the automated banking machine to communicate with a server and to enable ATM users to carry out transactions. Of course it
30 should be understood that this automated banking machine is exemplary and

that automated banking machines may have numerous other types of configurations and capabilities.

Figure 42 shows in greater detail the exemplary deposit accepting device 662. The exemplary deposit accepting device is in operative
5 connection with a sheet opening 678 that extends through the housing of the machine. In the exemplary embodiment the sheet opening is configured to enable the sheets to be provided thereto into the machine from users, as well as to deliver sheets from the machine to users. Access through the sheet opening is controlled in the exemplary embodiment by a movable gate 680. Gate 680
10 is selectively moved between the opened and closed positions by a drive 682. The drive 682 selectively opens and closes the gate responsive to operation of the at least one processor 664. Therefore in operation of the exemplary automated banking machine the gate is moved to the open position at appropriate times during transactions such as when sheets are to be received
15 into the machine from users and when sheets are to be delivered from the machine to users.

The exemplary device further includes a sheet access area generally indicated 684. The exemplary sheet access area is an area in which sheets are received in as well as delivered from the machine. The exemplary sheet
20 access area includes a first sheet driver member 686. The exemplary sheet driver member 686 includes a belt flight of a continuous belt that is selectively driven by a drive (not separately shown). The drive operates responsive to operation of the at least one processor. The sheet access area is further bounded upwardly by a sheet driver member 688 which in the exemplary
25 embodiment also comprises a belt flight of a continuous belt. In the exemplary embodiment the lower belt flight which comprises the sheet driver member 688 is vertically movable relative to the upper belt flight which comprises sheet driver member 686 such that a distance between them may be selectively varied. It should be understood however that although the
30 exemplary embodiment uses belt flights as the sheet driver members, in other

embodiments rollers, tracks, compressed air jets or other devices suitable for engaging and moving sheets may be used. In the exemplary embodiment a single upper belt flight and lower belt flight are used to move sheets in the sheet access area. However, it should be understood that in other
5 embodiments other numbers and configurations of sheet driving members may be used.

 The exemplary sheet access area includes a divider plate 690. The exemplary divider plate comprises a pair of divider plate portions with an opening thereinbetween. The opening extends parallel to the belt flights and
10 enables the belt flights to engage sheets therethrough. Of course this approach is exemplary. The exemplary divider plate divides the sheet access area into a first side 692 which is below the plate in the exemplary embodiment, and a second side 694 which is above the divider plate. It should be understood that although in the exemplary embodiment only one split divider plate is used, in
15 other embodiments a plurality of divider plates may be employed so as to divide an area into multiple subcompartments.

 In the exemplary embodiment the divider plate 690 and upper sheet driving member 688 are selectively relatively movable vertically with respect to the lower sheet driving member 686. This is done in a manner later
20 explained so as to selectively enable the sheet driving members to engage and move sheets in either the first side or the second side. This is done through operation of drives schematically indicated 696. Such drives can include suitable motor, levers, solenoids, lead screws and other suitable structures to impart the movement described herein. The drives operate responsive to
25 instructions executed by the at least one processor. It should further be understood that although in the exemplary embodiment the lower sheet driving member is generally in fixed vertical position relative to the housing, in other embodiments the lower sheet driving member may be movable and other components may be fixed.

In the exemplary embodiment the sheet access area further includes a movable stop 698. The stop is operative to extend at appropriate times to limit the inward insertion of documents into the sheet access area by a user. The stop operates to generally positively position inserted sheets that are going to be received and processed by the deposit accepting device. The stop is selectively movable by at least one drive (not separately shown) which moves the stop in response to operation of the at least one processor. The inner ends of sheet driver members 686 and 688 bound an opening 699 through which sheets can move either inwardly or outwardly in the deposit accepting device 662.

The exemplary sheet access area is operatively connected to a picker 700. The picker is operative to separate individual sheets from a stack in the sheet access area. In the exemplary embodiment the picker may operate in a manner like that described in U.S. Patent Nos. 6,634,636; 6,874,682; and/or 7,261,236 the disclosures of which are incorporated herein by reference. The picker operates generally to separate each sheet from the inserted stack of sheets. At least one sensor 702 operates in the exemplary embodiment to sense thickness and enable at least one processor to determine if the picker has failed to properly separate each individual sheet. In response to sensing of a double or other multiple sheet in the area beyond the picker, the at least one processor operates in accordance with its programming to reverse the picking function so as to return the sensed multiple sheets to the stack. Thereafter the picker may attempt to pick a single sheet and may make repeated attempts until a single sheet is successfully picked. Further as later explained, in the exemplary embodiment the picker is operative to pick sheets that may be located in either the first side 692 or the second side 694 of the divider plate in the sheet access area.

In the exemplary embodiment the picker 700 is operative to deliver individual sheets that have been separated from the stack to a sheet path indicated 704. Sheets are moved in the sheet path through operation of a

transport 706 which engages the sheets. It should be understood that although a single transport of a belt type is shown, in other embodiments other numbers and types of transports may be employed for moving sheets.

5 In the exemplary embodiment the area of the sheet path includes a document alignment area which may operate in the manner similar to that previously described or in other suitable ways, to align sheets relative to the direction that sheets are moved along the transport path. For example in the exemplary embodiment the transverse transport includes transverse transport rolls 710 that operate in a manner like that previously discussed to engage a
10 sheet and move it into alignment with the transport path by sensing an edge of the sheet with a plurality of spaced sensors which form a "virtual wall." The transverse movement of the sheet by the transverse transport is operative to align the sheet relative to the movement of sheets along sheet path in the device. As discussed in more detail below, in this exemplary embodiment the
15 alignment area includes devices operative to align the sheet as well as to determine a width dimension associated with the sheet so as to facilitate the analysis of magnetic indicia thereon.

In some embodiments it may be desirable to use sheet transports that move sheets in sandwiched relation between a driving member such as a roll
20 or belt flight, and a follower member that extends on an opposed side of the sheet from the driving member. The follower member may be operative to assure engagement of the sheet with the driving member to assure sheet movement therewith. In some embodiments movable rolls or belts may operate as suitable follower members. However, in some embodiments it may
25 be desirable to use stationary resilient members as biasing members. This may include, for example, a resilient member with a low friction sheet engaging surface to facilitate sheet movement thereon. For example such a suitable member may comprise a compressible resilient foam body with a low friction plastic cover. Such a foam member can be used to provide biasing force to
30 achieve sheet engagement with a driving member. In still other embodiments

the foam body may be operatively supported on a further resilient member, such a leaf spring which can provide a further biasing force. Such a structure for a follower member may be useful in sheet transports in providing more uniform force distribution on moving sheets to minimize the risk of sheet damage. Further such a sheet follower structure may be useful in providing the follower function for one or more transports that move sheets in multiple directions, at least some of which are transverse to one another in a particular sheet transport area. As a result such follower structures may be used in the area in which sheets are aligned. Of course this approach is exemplary.

In the exemplary embodiment the transport 706 is operative to move sheets to engage a further transport schematically indicated 712. The transport is also operative to move sheets past magnetic indicia reading devices 714, 716 which are alternatively referred to herein as magnetic read heads. The exemplary embodiment further includes analysis devices for analyzing documents. These include for example, an imager 718. Imager 718 may be of the type previously discussed that is operative to generate data corresponding to the visual image of each side of the sheet. Further in the exemplary embodiment an analysis device includes a currency validator 720 is used to analyze properties of notes. For example in some embodiments currency validators employing the principles described in U.S. Patent No. 5,923,413 which is incorporated herein by reference may be used for purposes of determining whether sheets have one or more property associated with valid notes. The at least one processor may be operative to determine whether notes received are likely valid, invalid and/or of suspect authenticity. Other devices may be included which sense for other properties or data which can be used to analyze sheets for properties that are associated with authenticity. Based on determining whether sheets have at least one property, the exemplary automated banking machine is operative to store, return or otherwise process notes in a manner that is later described. Of course it should be understood that some of the principles may be used by the at least one processor to make a

determination if at least one property associated with checks analyzed through devices in the machine, have one or more properties that suggest that they are valid or invalid checks. Similarly analysis devices in a machine may be used to assess validity of other types of sheets.

5 In the exemplary embodiment the deposit accepting device includes a sheet storage and retrieval device 722. In the exemplary embodiment the sheet storage and retrieval device includes a belt recycler. The belt recycler may be of the type shown in U.S. Patent No. 6,270,010 the disclosure of which is incorporated herein by reference. The sheet storage and retrieval device is
10 selectively operative to store sheets that are directed thereto from the transport 712 by a diverter 724. The diverter is selectively operated responsive to a drive which moves responsive to instructions from the at least one processor to cause sheets to be directed for storage in the sheet storage and retrieval device 722.

15 In the exemplary embodiment the sheet accepting device further includes a sheet storage and retrieval device 726. The sheet storage and retrieval device 726 of the exemplary embodiment may be similar to device 722. Sheets are directed to the sheet storage and retrieval device 726 from the transport 712 through selective operation of a diverter 728. It should be
20 understood that although in the exemplary embodiment the sheet storage and retrieval devices include belt recyclers, other forms of devices that are operative to accept and deliver sheets may be used.

 In exemplary embodiments the transports 712 and 706 are selectively operated responsive to respective drives. The drives operate responsive to
25 operation of the at least one processor to move sheets therein. The transports of the exemplary embodiment are operative to move sheets both away from and toward the sheet access area. Further in the exemplary embodiment a diverter 730 is positioned adjacent to the sheet access area. The diverter 730 operates in the manner later described to direct sheets moving toward the sheet

access area onto the second side of the diverter plate. Of course this approach is exemplary.

Further in the exemplary embodiment the automated banking machine includes a plurality of transports as shown, which enable sheets to be
5 selectively moved to and from the storage area 660, the sheet dispenser device 656, the recycling device 658 and other devices or areas, to or from which sheets may be delivered and/or received. Further in the exemplary embodiment appropriate gates, diverters and/or other devices may be positioned adjacent to the transports so as to selectively control the movement
10 of sheets as desired within the machine. It should be understood that the configuration shown is exemplary and in other embodiments other approaches may be used.

Figure 43 shows an alternative exemplary embodiment of a document alignment area 708. The document alignment area includes a platen 732. The
15 platen includes a plurality of document alignment sensors 734. The document alignment sensors 734 are similar to alignment sensors 474 previously discussed. As with the prior embodiment three document alignment sensors extend in spaced relation along the direction of sheet movement in the transport path. A plurality of rollers 736 operate in a manner similar to rollers
20 444 and are operative to move the sheet in the direction of the transport path. A transverse transport that is operative to move sheets in a direction generally perpendicular to the transport path includes transverse follower rolls 738. As in the case with the prior described embodiment, the transverse transport includes transverse rolls on an opposed side of the transport from the platen
25 732. As in the previously described embodiment the rollers 736 generally engage a sheet between the rollers and other driving members such as a belt. To align the sheet, the rollers 736 move away from the sheet and the transverse follower rolls 738 that were previously disposed away from the sheet move toward the sheet to engage the sheet in sandwiched relation between the
30 transverse transport roll and a corresponding follower roll. The sheet is moved

transversely until it is aligned with the direction of movement of sheets in the transport path based on the document alignment sensors 734. This is done in a manner like that previously discussed. The transverse transport rollers are then moved to disengage the sheet while the rollers 736 move to engage the sheet so that it now can be moved in its aligned condition in the transport path. Of course instead of rollers other types of sheet moving members may be used.

The exemplary deposit accepting device includes magnetic read heads 714 and 716. Magnetic read heads 714 may be mounted in a manner like that previously discussed. In the exemplary embodiment, magnetic read head 714 is in a fixed transverse position relative to the sheet path. Magnetic read head 714 is generally positioned in the exemplary embodiment relative to the sheet path so that a check that has been aligned in the document alignment area will generally have the micr line indicia on the check pass adjacent to the magnetic read head 714. This is true for two of the four possible facing positions of a check as it passes through the device. This is represented by the exemplary check segments 740 and 742 shown in Figure 44.

Magnetic read head 716 is mounted in operatively supported connection with a mount 744. Mount 744 is movable transversely to the sheet path as represented by arrow M in Figure 45. The position of read head 716 transversely relative to the sheet path is changeable through operation of a positioning device 746. The positioning device may include any number of movement devices such as a motor, solenoid, cylinder, shape memory alloy element or other suitable element that is operative to selectively position read head 716 relative to the sheet path.

As can be appreciated from Figure 44, read head 716 may be selectively positioned transversely so that when a check is in the two orientations where the micr line data would not pass adjacent to read head 714, such micr line indicia would pass adjacent to read head 716. This is represented by exemplary check segments 748 and 750 in Figure 44.

In the exemplary embodiment the document alignment area includes a width sensor 752. Width sensor 752 may include in some embodiments a plurality of aligned sensors, a linear array charge couple device (CCD) sensors or other sensor or groups of sensors that are operative to sense at least one dimension or property which corresponds to a width associated with a check. In the exemplary embodiment this is done once the check has been aligned with the transport path and the document alignment sensors 734. This capability of determining using signals from the sensor 752, the width of the aligned document enables at least one processor in the machine to cause the positioning device 746 to move the read head 716 to the appropriate transverse position for reading the micr line indicia on the check in the event that the check is in one of the two positions wherein the micr indicia is disposed on the opposite of the check from read head 714.

The at least one processor has associated programming in at least one data store that enables determination of the proper position for the read head 716 because check printing standards specify the location of the micr line indicia relative to a longitudinal edge of the check. As a result for a given check that has been aligned in the document alignment area, the at least one processor is operative to determine a width associated with the check responsive to signals from sensor 752. The width signals thereafter enable the processor to cause the read head 716 to be positioned in an appropriate transverse position for reading the micr data if the check is in two of the four possible check orientations.

It should be noted that as represented in Figure 44 the read heads are operative to read the micr indicia regardless of whether the indicia is on the check immediately adjacent to the read head or on an opposed side of the check from the read head. This is because the magnetic characters which comprise the micr indicia can be sensed through the paper. Further in the exemplary embodiment the magnetic read heads are positioned in a curved area of the transport path. This generally helps to assure in the exemplary

embodiment that the check is in contact or at least very close proximity with the read head. Further the exemplary embodiment of the mount 744 includes a plurality of vanes 754. Vanes 754 are curved and are operative to help guide the sheet through the area of the magnetic read heads without snagging. In an
5 exemplary embodiment the vanes 754 are operative to reduce surface tension so as to facilitate movement of sheets thereon. Of course it should be understood that these structures are exemplary and in other embodiments other approaches may be used.

In an exemplary embodiment at least one processor of the automated
10 banking machine has associated programming that enables decoding the micr line data regardless of the facing position of the check as it is moved past the magnetic read heads. As can be appreciated depending on the facing position of the check the micr data may be moving in any of the forward direction or the backward direction and right side up or upside down as it passes in
15 proximity to the one adjacent magnetic read head. Signals are generated by the magnetic read head responsive to the magnetic indicia which makes up the micr line data. The programming of the at least one processor is operative to receive and record these signals, and to determine the micr line characters that correspond thereto. In the exemplary embodiment this includes comparing the
20 data for at least some of the characters that correspond to the micr line, to data corresponding to one or more micr line characters so that it can be determined the orientation in which the micr line data has been read. The at least one processor may operate in accordance with its programming to conduct pattern matching of the sensed signals to signals corresponding to known micr
25 characters to determine the probable micr characters to which the signals correspond. This may be done for one or multiple characters to determine a probable orientation of the check data. This probable orientation may then be checked by comparing the data as read from the magnetic read head, to other data which corresponds to the micr data initially determined orientation. If the
30 orientation corresponds to an appropriate micr line character then it probable

that the orientation has been properly determined. If however the sensed data does not correspond appropriately to characters in the initially determined orientation, then it is probable that the orientation determined is incorrect. In some embodiments the at least one processor may operate to compare signals
5 corresponding to the magnetic indicia read from the check to data corresponding to micr line characters in multiple possible orientations. The results may then be compared to determine the number of unidentifiable characters in each of the orientations. Generally in at least one orientation which corresponds to the actual orientation of the check, the at least one
10 processor will determine that all of the characters correspond to identifiable micr line characters.

In still other embodiments character recognition analysis software routines may be operative to identify micr line characters in each of the possible orientations with a degree of confidence. This degree of confidence
15 would hopefully be much higher for one particular orientation which then indicates the facing position of the check as well as the micr line characters to which the data corresponds. In still other alternative embodiments other approaches may be used to determine the facing position of the check. This may include for example analysis of optical features to determine that the
20 check is in a particular orientation. The information on a facing position as determined from optical features may then be used to analyze or, as a factor in the analysis, of the magnetic indicia on the check as carried out by at least one processor.

Of course it should be understood that while the discussion of the exemplary embodiment has included a discussion of micr line data associated
25 with a check, in other embodiments other types of magnetic indicia may be analyzed and used. Further it should be understood that checks and other items which include magnetic indicia thereon serve as coded records on which magnetic data is encoded. Alternative approaches may also be used in other
30 embodiments for reading of magnetic recoded indicia on such records, and the

magnetic read heads described in connection with this particular embodiment are exemplary. Further it should be understood that while the coded records in the form of checks have the micr line data offset from the center line of the record and generally in a defined location relative to one or more edges of the document, other embodiments may operate to have magnetic indicia in other locations. Further some exemplary embodiments may also include provisions for sensing magnetic indicia on records in various locations and determining the nature of such indicia in various locations based on signals produced from sensing the record. Of course these approaches are exemplary and in other embodiments other approaches may be used.

The operation of an exemplary embodiment is now explained with reference to Figures 46 through 67. The exemplary automated banking machine is operated by a customer to perform at least one transaction involving acceptance of sheets. This may include for example, the user providing inputs to identify themselves or their account, as well as to indicate a transaction that they wish to conduct through operation of the machine. This may be done in response to instructions output through the display. The user indicates that they wish to conduct a sheet accepting transaction. The sheet accepting transaction may include in some embodiments, acceptance of checks, and other embodiments the sheets to be accepted may include notes. In still other embodiments the sheets to be accepted may include mixed notes from checks. In still other embodiments other types of sheets or items may be accepted depending on the capabilities of the machine.

With reference to Figure 46, in the conduct of an exemplary transaction the sheet access area 684 initially has external access thereto blocked by the gate 680. The user prepares a stack 756 comprising a plurality of sheets for receipt by the machine through the sheet opening 678. It should be noted that in the initial position the divider plate 690 and the belt flight 688 are disposed downward and are in generally supporting connection with the belt flight 686. Of course it should be appreciated that as shown in Figures 46 through 67, the

structures in the sheet acceptance area are shown in a sectional view taken through the middle of the sheet acceptance area.

Responsive to the at least one processor in the machine operating to cause the machine to carry out a sheet accepting transaction, the at least one processor is operative to cause the gate 680 to open as shown in Figure 48. The at least one processor is also operative to cause the stop 698 to move to a raised position. The processor is also operative to cause the divider plate and upper transport including the upper sheet driver member, to be disposed a greater distance away from the belt flight 686. This enables the user to insert the stack 756 inwardly into the area between the belt flight 768 and the divider plate 690, until the stack is in abutting relation with the stop. As shown in Figures 50 and 51 the at least one processor is thereafter operative to retract the stop 698 and to cause the belt flight 688 and divider plate 690 to be lowered. This provides for the stack 756 to be in sandwiched relation between the belt flight 686, belt flight 688 and divider plate 690. It should be remembered that the exemplary divider plate includes a pair of horizontally disposed plate portions including the central opening that extends parallel to each belt flight belt. This enables each of the belt flights to operatively engage the sheets in the stack. The divider plate is also movably mounted relative to the housing such that each divider plate portion can be moved vertically, responsive to at least one drive, and can also move angularly to maintain engagement with sheets. In the exemplary embodiment each of the portions of the divider plate are enabled to pivot generally about a horizontal axis that extends near the transverse center thereof. In the exemplary embodiment the extent that each portion of the divider plate is enabled to pivot is generally limited to a relatively small angle. This ability of the divider plate to pivot as well as to move vertically generally in the area of the axis about which the portion can pivot, facilitates the exemplary embodiment's capabilities to deliver and receive sheets from users as well as to deliver and receive sheets to and from the opening of the deposit accepting device.

The at least one processor causes at least one drive to move the belt flights so that the stack 756 moves inwardly from the sheet access area such that the ends of the sheet move inwardly past the gate 680. As shown in Figures 54 and 53 sensors 758 are positioned to sense the stack in the sheet access area. Responsive to the end of the stack having moved inward between the belt flights, the at least one processor is operative to cause the gate 680 to close as shown in Figures 52 and 53. The closing of the gate prevents persons who have deposited a stack of sheets from further accessing such sheets after they have moved in the machine.

As represented in Figures 54 and 55 the sheets are moved inwardly through operation of the belt flights so that the sheets move in the opening 699 past the inward end of the divider plate and into contact with the picker 700.

As shown in Figures 56 and 57 the processor then operates to cause the upper belt flight 688 to move upwardly and away from the lower belt flight 686. The divider plate 690 remains disposed above and in contact with the stack 756. In this position the leading edge of the stack extends inward in the machine beyond the inward edge of the divider plate and the stack moves adjacent to the picker 700. The picker then operates generally in the manner of the incorporated disclosures to pick sheets one at a time to separate them from the stack.

In the exemplary embodiment the divider plate acts to hold the stack positioned against the driver member 686 and adjacent a registration plate portion 687 to facilitate reliable picking of sheets by the picker. During picking, a thumper member 764 also acts on the bottom sheet in the stack to urge the bottom sheet to move toward the picker. The thumper member 764 moves rotationally responsive to a drive and also provides an upward and inward directed force on the bottom sheet. The downward force applied on the top of the stack by the divider plate increases the effective force applied by the thumper member urging the sheet at the bottom of the stack to move toward

the picker. Of course this approach is exemplary and in other embodiments other approaches may be used.

In the operation of the exemplary embodiment the deposit accepting device operates in accordance with the programming of the at least one processor, to move the sheets into the document alignment area 708. Each
5 picked sheet is aligned in the manner discussed, and moved in the sheet path past the analysis devices such as the magnetic read heads 714, 716; imager 718; currency validator 720; and/or other sheet analysis devices. Of course it should be understood that in some embodiments other or different sheet
10 analysis devices may be present. For example in a device which only accepts checks, a currency validator and associated sensors may not be present. Likewise depending on the nature of the sheets being accepted, other or additional analysis devices may be included.

In the exemplary embodiment sheets that have been moved past the
15 analysis devices are moved in the transport 712 and are directed through operation of the diverter 724 for storage in the sheet storage and retrieval device 722. In the exemplary embodiment the at least one processor is operative responsive to the signals regarding each sheet from the analysis devices to analyze each sheet for at least one characteristic or property. These
20 may include image properties, magnetic properties, color properties, patterns, watermarks, data or other characteristics that are usable to identify a sheet as an acceptable sheet for acceptance by the machine.

In some embodiments for example, the at least one processor of the machine may operate responsive to data received from the analysis devices to
25 determine that sheets input to the machine include valid currency notes of a given denomination or type. The at least one processor may operate responsive to determining that such valid currency notes have been input to cause the automated banking machine to operate to cause an account associated with the user whose card data was read by a machine to be credited
30 for an amount corresponding to such valid notes. This may be done by the at

least one processor causing the automated banking machine to communicate with one or more remote computers that have data stores which include data corresponding to a user's account and the funds allocated thereto. In still other embodiments the at least one processor may operate in the case of received documents which are checks, to determine whether such checks appear to be valid and a user is authorized to be given credit for such checks. This may include for example analyzing the checks in accordance with the incorporated disclosure of U.S. Patent No. 7,284,695 for example. The automated banking machine may operate using data read from the checks such as the micr line data, image data and/or other data, to cause the automated banking machine to determine that the user of the machine is to be provided value for one or more checks received by the machine. Of course the at least one processor may operate in other embodiments to analyze data read by analysis devices from other types of items which have been received by the machine and make determinations as to whether such items are acceptable and/or whether a user is to be provided with credit therefor.

Further, in some embodiments it should be understood that the at least one processor may also operate to identify certain items as unacceptable to the machine. These may include for example items which cannot be identified as valid currency notes, checks or other items that the machine is programmed to accept. The at least one processor in the machine may operate in accordance with its programming and/or data received by communication with remote computers to determine that the items the user has input cannot be accepted by the machine. Of course these approaches are exemplary.

In an exemplary embodiment after sheets have been received in the machine the at least one processor is then operative to cause the sheet storage and retrieval device 722 to deliver the sheets one by one to the transport 712. The transport operates to move each of the sheets toward the sheet access area. The diverter 724 is operative to direct the sheets as appropriate toward the sheet access area. As each of the sheets move in the transport 712, the diverter

728 is operative to selectively direct sheets that have been determined to include the at least one property associated with acceptable sheets, to the sheet storage and retrieval device 726. Device 726 is operative to store acceptable sheets while the unacceptable sheets continue in the sheet path toward the sheet access area. In the transport 706 sheets are engaged by the diverter 730 and are directed through the opening 699 onto the second side 794 of the sheet access area. The rejected sheets which are positioned on the second side of the divider plate 690 can be delivered to the machine user in a manner later discussed.

In operation of the exemplary embodiment, the at least one processor is then operative to cause the sheet storage and retrieval device 726 to deliver the acceptable sheets therefrom. The transport 712 is operative to move each sheet to an appropriate storage area in the machine. For example sheets which are checks may be stored in the storage device 660. Sheets which are notes may be stored in connection with the sheet recycler device 658 or in another suitable sheet storage area. It should be understood that a plurality of different types of sheet storage areas may be included in the machine for storage of one or more types of sheets.

Although in the exemplary embodiment sheets received in the machine are aligned with the sheet path before being analyzed and stored on the sheet storage and retrieval device 722, there is a risk that sheets may be come misaligned as they are attempted to be moved out of the machine and through the opening 699 to the user. The exemplary embodiment includes features operative to minimize the risk of sheets becoming jammed or otherwise rendering the deposit accepting device inoperative because of such misalignment. The exemplary embodiment includes sheet sensors 735 and 737 as schematically represented in Figure 43. The sheet sensors 735 and 737 are disposed in a first direction inwardly relative to the opening 699 through which sheets pass in and out of the machine. Each of the sensors 735 and 737 are disposed transversely relative to the area where sheets normally move in

the sheet path. Each of these sensors is also in operative connection with at least one processor through appropriate interfaces.

If during operation of the machine, when sheets are being returned to the sheet access area, a sheet is sensed by one of the sensors, it is an indication to the at least one processor that a sheet is substantially out of alignment with the opening 699 and may present a problem if it is continued to be moved toward the sheet access area. In the exemplary embodiment responsive to the sensing of the sheet by either sensor 735 or 737, the at least one processor is operative to cause the transport to stop the movement of the sheet in the outward direction toward the opening. The at least one processor then operates to cause the transport to move the sheet into the sheet alignment area. This is done by moving the sheet inward into the machine from the area of the sensor 735 or 737 which sensed the sheet. The at least one processor then causes the devices in the sheet alignment area to engage the sheet and align it with the transport path. This is done in a manner like that previously described by moving the sheet transversely such that an edge of the sheet is aligned with the virtual wall formed by sensors 734. Once the sheet is aligned the at least one processor then causes the sheet to be reengaged with the transport which attempts to move the sheet outward through the opening 699 and into the sheet access area. In the exemplary embodiment the fact that the sheet has been aligned and is in a proper orientation is determined responsive to the fact that the sheet is not sensed by either of sensors 735 or 737. Of course it should be understood that this approach is exemplary and in other embodiments other approaches may be used. This may include for example having a plurality of sensors spaced transversely or in other locations in the sheet path which can be used to determine the location and/or orientation of the document.

Further in the exemplary embodiment if an attempt is made to align a sheet with the sheet path so it can be returned through the opening, and despite this effort the sheet is again sensed as out of alignment, the at least one

processor will operate in accordance with its programming to make a further attempt to align the sheet with the sheet path. This second attempt in the exemplary embodiment again involves engaging the sheet with the transverse transports and aligning it with the sheet path. If after this second attempt when the machine operates to try to return the sheet to the sheet access area and there is again sensed an indication that the sheet is misaligned, the at least one processor will thereafter operate in accordance with its programming to cause at least one message to be sent from the automated banking machine to a remote computer to indicate that there is a probable jam and malfunction of the deposit accepting device. Alternatively or in addition in some embodiments the at least one processor may operate to take other remedial actions. These may include for example attempting to realign the sheet additional times. Alternatively or in addition the at least one processor may operate to again accept the sheet into a storage device in the machine, or the at least one processor may cause the sheet to move the sheet in the transport to a location in the machine for such sheets that cannot be processed. Of course these approaches are exemplary and in other embodiments other approaches may be used.

Rejected sheets that have been moved to the second side of the divider plate are returned to the banking machine user in a manner shown in Figures 66 and 67. The rejected sheets 760 are held in a stack on the upper side of the divider plate. The at least one processor is operative to cause belt flight 688 and divider plate 690 to move downward such that the rejected sheets are in sandwiched relation between belt flight 688 and belt flight 686. The at least one processor is then operative to open the gate 680. The processor operates to cause at least one drive to move the belts so as to extend the sheets in the stack 670 outward through the opening in the housing of the machine.

It should be understood that in exemplary embodiments the rejected sheets may be returned to the user while the accepted sheets are being moved to other storage locations in the machine. Alternatively in some embodiments

the user may be given the option by the banking machine to have all of the sheets that they have deposited, returned. This may be accomplished in the exemplary embodiment by the sheets in the sheet storage and retrieval device 726 being moved through the sheet path to the sheet access area. Alternatively or in addition, in some embodiments the user may be offered the opportunity to retry the unacceptable sheets. In still other embodiments the machine may operate to hold in storage unacceptable sheets which the at least one processor has determined may be associated with the user attempting to perpetrate a fraud. Of course these approaches are exemplary and in other embodiments other approaches may be used.

In still other alternative embodiments sheets may be determined as unacceptable relatively quickly, and may be identified as sheets that should be returned to a user before all of the sheets in the stack input by the user to the sheet access area have been picked. Alternatively or in addition a user may provide one or more inputs indicating that they wish to abort a transaction prior to all of the sheets in the input stack being picked. These situations may be associated with the configurations of the exemplary deposit accepting device shown in Figures 58 and 59. For example a rejected sheet 762 may be returned to the sheet access area prior to all the sheets from the sheet stack having been picked. This may be the result of the rejected sheet 762, having been analyzed and determined to be unacceptable. Alternatively in some embodiments the rejected sheet may be the result of the user indicating that they wish to abort the transaction. As shown in Figures 58 and 59, such a rejected sheet is diverted through operation of the diverter 730 into the second side 694 such that the sheet is supported on the upper side of the divider plate 690.

The return of sheets to the banking machine user is represented in Figures 60 and 61. The at least one processor is operative to cause the divider plate 690 and belt flight 688 to move downward such that the sheets which are on each side of the divider plate are in sandwiched relation between the belt

flights 686 and 688. The at least one processor is operative to open the gate 680 and to move the belt flights as shown such that the sheets on each side of the divider plate are moved outward through the opening 678 in the housing. The user may then take the sheets from the machine.

5 Figures 62 through 65 represent an exemplary operation that can be carried out by the machine if the user does not take the checks or other sheets that have been presented to the user by the machine. As shown in Figure 62 the sheets which are positioned on both sides of the diverter plate 690 are moved through operation of the belt flights toward the picker. Upon the stacks
10 of sheets reaching the picker, the gate 680 is closed. The picker 700 is then operated to pick the sheets. The sheets are picked from the area 692 below the diverter plate and then from the side 694 above the diverter plate. This is achieved because in the area adjacent the picker, the sheets regardless of whether they are above or below the diverter plate generally form a continuous
15 sheet stack which enables all the sheets to be picked regardless of whether they are above or below the divider plate.

 In the exemplary embodiment the at least one processor is operative to cause the retracted sheets to be stored in a suitable area of the machine. The machine is further operative to record the fact that the user did not take the
20 presented sheets. This enables the sheets to eventually be traced to and/or returned to the particular user. Of course this approach is exemplary and in other embodiments other approaches to operation of the machine may be used. It should be understood however that in this exemplary embodiment the machine operates to clear the sheet access area so that transactions can be
25 conducted for subsequent banking machine users even though a user did not take their presented sheets.

 A further aspect of the exemplary embodiment is the use of a thumper member 764 in connection with picking sheets from the stack. In the exemplary embodiment the thumper member 764 is a rotating member
30 including a raised area. It is aligned with the opening in the divider plate. The

raised area is operative to displace the sheet and urge the sheet bounding the lower end of the stack to move into engagement with the picker 700. The bouncing movement of the stack of sheets is operative to help break the forces associated with surface tension and to help to separate the lowermost sheet from the stack. As previously discussed, when the divider plate acts on top of a stack of sheets, or a driver member acts on top of a stack of sheets, the force applied by the thumper member to the sheets is enhanced. Of course this approach is exemplary and in other embodiments other approaches may be used.

In a further aspect of an exemplary embodiment, sensors are provided for determining the positions of sheets in this sheet access area. As can be appreciated in the exemplary embodiment one pair of opposed belt flights are operative to operatively engage and move sheets both above and below the divider plate. In operating the exemplary banking machine the at least one processor is operative to determine the location of sheets, and specifically whether sheets are present on the first side 692 below the divider plate 690 or in the second side 694 above the divider plate.

This is accomplished in an exemplary embodiment through an arrangement shown in Figures 68 and 69. Figure 69 shows a plan view of a portion that corresponds to half of the divider plate 690. In the exemplary embodiment the divider plate 690 includes reflective pieces 766 and 768 thereon. In the exemplary embodiment reflective pieces 766 and 768 comprise a piece of tape that is operative to reflect radiation therefrom. In an exemplary embodiment the tape may be an adhesive backed tape although in other embodiments other materials and pieces may be used. Further the exemplary embodiment of the portion of the divider plate 690 includes apertures 770 and 772 therein.

Further in the exemplary embodiment the reflective pieces are angular reflective pieces. This includes in the exemplary embodiment material with angular reflective properties such that radiation striking the reflective piece at

an acute angle is reflected from the reflective piece back at the same or almost the same acute angle. This is accomplished in an exemplary embodiment due to the orientation of reflective elements within the reflective piece. Thus for example as shown in Figure 68 a sensor 774 which includes a radiation emitter and a radiation receiver is enabled to sense whether reflective piece 766 is covered by at least one adjacent sheet. Further the sensor 774 is enabled to sense that reflective piece 766 is covered or uncovered from a position that is laterally disposed from the side 694 in which sheets may be positioned. Likewise a similar sensor 776 is operative to sense whether a sheet is covering reflective piece 768 in a position disposed laterally from the divider plate. As can be appreciated these sensors enable the sensing of whether sheets are present, as well as their position on the second side 694 above the divider plate 690.

Also in this exemplary embodiment the sensor 778 includes emitter 780 and a receiver 782. The emitter 780 and receiver 782 are disposed from one another and aligned with aperture 770. As a result the ability of the receiver 782 to sense radiation from the emitter 780 indicates that sheets are not present either on the first side 692 or the second side 694 in the area of aperture 770. Similarly a sensor 784 which includes an emitter 786 and a receiver 788 is operative to determine if sheets are present either on the first side 692 or on the second side 694 in the area of aperture 772.

Further in an exemplary embodiment, a sheet support plate 790 is positioned in generally parallel relation with belt flight 686 and extends laterally on each transverse side thereof. A reflective piece 792 supported thereon operates in conjunction with the sensor 794. Sensor 794 is of a type similar to sensor 774 and includes an emitter and adjacent receiver. Similarly a reflective piece 796 operates in conjunction with a sensor 798. Such reflective pieces and sensors may be used to independently sense the presence and/or location of sheets on the first side 692. Further as can be appreciated, support plate 790 includes apertures 800 and 802 which are aligned with

sensors 788 and 784 respectively. Further in other embodiments a support plate may be positioned adjacent to belt flight 688. Such a support plate may also include apertures and/or reflective elements positioned thereon. Such a support plate may be of the type previously described or may be of a different construction. Further such a support plate may include angular reflective pieces so as to enable the sensing of sheets proximate thereto with a sensor that is positioned transversely of the area in which sheets may be positioned. As can be appreciated this ability to sense the sheets may include the positioning of the sensors transversely from the sheet holding areas and positions as may be convenient and where space is available within the given housing structure of the automated banking machine.

This exemplary arrangement of sensors enables the at least one processor to determine the presence and position of sheets on both the first side and the second side of the divider plate 690. The ability of the exemplary embodiment to sense in such areas through the use of sensors which are laterally disposed away from the area in which sheets must pass, provides benefits in terms of being able to position the sensors in ways that do not interfere with the movement of the device components. It should be understood however that these approaches are exemplary and in other embodiments the use of different types of sensors for the detection of sheets may be used.

It should be understood that in the exemplary embodiment the deposit accepting device may also operate as part of the cash dispenser of the machine. This may be accomplished for example, through operation of the processor which causes currency sheets to be picked from the sheet dispenser device 656 and/or the sheet recycling device 758 for delivery to an ATM user. Such sheets may be moved through the various transports and delivered to the sheet access area. Such sheets may be presented to the user through the opening in the ATM housing in the manner previously discussed. Of course while the exemplary embodiment enables the deposit accepting device to operate as part

of the currency dispenser, in other embodiments a separate device may be used for dispensing currency sheets while the deposit accepting device is operative only to accept and store sheets. Of course these approaches are exemplary and in other embodiments other approaches may be used.

5 In addition it should be understood that although in the exemplary embodiment particular structures are disclosed for the sheet moving devices, divider plate and other sheet handling mechanisms, in other embodiments other structures may be used. This may include for example additional numbers of divider plates and sheet moving devices. Alternatively or in
10 addition rather than using a split divider plate having two portions as in the exemplary embodiment, other embodiments may include divider plates with apertures which can accept rollers, balls or other types of sheet moving devices therein. In addition while the exemplary embodiment is described in connection with sheet handling devices that move belts and the divider plate
15 relatively vertically to one another, and in which the vertical position of the lower belt is fixed, other embodiments may include different arrangements. These arrangements may include transports and divider plates which move horizontally or angularly relative to one another to achieve the delivery and acceptance of sheets from a user. Further additional devices and structures
20 may be combined with or used in lieu of the structures and devices described in connection with the exemplary embodiments herein.

 Thus the exemplary embodiments achieve at least some of the above stated objectives, eliminate difficulties encountered in the use of prior devices and systems, and attain the useful results described herein.

25 In the foregoing description certain terms have been described as exemplary embodiments for purposes of brevity, clarity and understanding. However no unnecessary limitations are to be implied therefrom because such terms are used for descriptive purposes and are intended to be broadly construed. Moreover the descriptions and illustrations herein are by way of
30 examples and the invention is not limited to the features shown or described.

Further, in the following claims any feature described as a means for performing a function shall be construed as encompassing any means known to those skilled in the art as being capable of carrying out the recited function, and shall not be deemed limited to the particular means shown or described for performing the recited function in the foregoing description, or mere
5 equivalents thereof.

Having described the features, discoveries and principles of the invention, the manner in which it is constructed and operated, any of the advantages and useful results attained; the new and useful structures, devices,
10 elements, arrangements, parts, combinations, systems, equipment, operations, methods, processes and relationships are set forth in the appended claims.

CLAIMS

We claim:

1. Apparatus comprising:

a card reader operative to read identification information from
5 data-bearing user cards;

an automated banking machine including:

a housing;

at least one input device in operative supported connection with
the housing, wherein the at least one input device is operative

10 to receive inputs from users of the machine, wherein the at least
one input device includes the card reader, wherein the inputs
including the identification information are usable to identify at
least one of a respective user and a respective user's financial
account;

15 at least one output device in operative supported connection
with the housing, wherein the at least one output device is
operative to receive outputs including instructions concerning
machine usage;

20 at least one cash dispenser device in operative supported
connection with the housing, wherein the at least one cash
dispenser device is operative to cause cash to be delivered from
the machine;

at least one deposit accepting device in operative supported
connection with the housing, wherein the at least one deposit

accepting device is operative to read indicia on sheets received from machine users;

at least one processor in the housing, wherein the at least one processor is in operative connection with the at least one input

5 device, the at least one output device, the at least one cash dispenser device and the at least one deposit accepting device; wherein the at least one deposit accepting device includes:

at first sheet driver member;

at second sheet driver member;

10 wherein the first and second sheet driver members are movably mounted in operatively supported connection with the housing such that a distance between the first sheet driver member and the second sheet driver member is selectively variable responsive to operation of the at least one processor;

15 at least one divider plate positionable intermediate of the first sheet driver member and the second sheet driver member, wherein the at least one divider plate is movably mounted relative to the housing;

20 at least one drive, wherein the at least one drive is in operative connection with the at least one processor, wherein the at least one processor causes operation of the at least one drive to selectively relatively position the first sheet driver member, the second sheet driver member, and the at least one divider plate;

wherein the at least one deposit accepting device is operative to cause sheets to move from a first side of the at least one divider plate to a second side of the at least one divider plate;

wherein the first sheet driver member and the second sheet driver member are operative to move sheets positioned on the first side of the at least one divider plate and on the second side of the at least one divider plate.

2. The apparatus according to claim 1 wherein the housing includes a sheet opening, wherein the sheet opening is operative to receive and deliver sheets therethrough, wherein sheets received in the machine through the sheet opening are received in one of the first side and the second side, and sheets delivered from the machine are delivered from at least one of the first side and the second side.

3. The apparatus according to claim 2 wherein sheets received in the machine through the sheet opening are operatively engaged with both the first sheet driver member and the second sheet driver member.

4. The apparatus according to claim 3 wherein sheets delivered from the machine through the sheet opening are operatively engaged with both the first sheet driver member and the second sheet driver member.

5. The apparatus according to claim 4 wherein the at least one drive is operative to move the at least one divider plate relative to both the first sheet driver member and the second sheet driver member.

6. The apparatus according to claim 5 and further including at least one opening in the at least one divider plate, wherein the first sheet driver

member is operative to contact sheets on the second side through the at least one opening.

7. The apparatus according to claim 6 wherein the second sheet driver member is operative to contact sheets on the first side through the at least one opening.

8. The apparatus according to claim 7 wherein the at least one deposit accepting device includes a note validator.

9. The apparatus according to claim 7 wherein the at least one deposit accepting device includes a check imager.

10. The apparatus according to claim 9 wherein the at least one deposit accepting device includes a note validator.

11. The apparatus according to claim 9 wherein the first sheet driver member includes a first belt flight, and wherein the second sheet driving member includes a second belt flight, and wherein the at least one opening in the at least one divider plate includes an elongated opening extending parallel to both the first and second belt flights.

12. The apparatus according to claim 11 wherein the at least one deposit accepting device includes a picker, wherein the picker is operative to separate each sheet from a first stack of sheets on at least one of the first side and the second side.

13. The apparatus according to claim 12 wherein the picker is operative to separate each sheet from a first stack that includes sheets on both the first side and the second side of the at least one divider plate.

14. The apparatus according to claim 11 wherein the at least one divider plate comprises a pair of horizontally spaced divider plate portions,

and wherein the elongated opening extends horizontally between the divider plate portions of the pair.

15. The apparatus according to claim 14 wherein the at least one drive is operative to selectively relatively vertically position the pair of divider plate portions, the first sheet driving member and the second sheet driving member.

16. The apparatus according to claim 15 wherein each of the divider plate portions of the pair are each vertically moveable and rotatably movable.

17. The apparatus according to claim 15 wherein the at least one deposit accepting device includes a picker, wherein the picker is operative to separate each sheet from a stack of sheets, wherein the stack of sheets extends on at least one of the first side, the second side and both the first side and the second side.

18. The apparatus according to claim 17 and further comprising a first transport, wherein the first transport is operative to move sheets intermediate of the picker and the check imager, and further comprising a first diverter, wherein the first diverter is operative to divert sheets moving in the first transport toward the picker to the second side.

19. The apparatus according to claim 18 wherein the at least one deposit accepting device includes a first sheet storage and retrieval device, wherein sheets moved past the check imager are stored in the first sheet storage and retrieval device.

20. The apparatus according to claim 19 wherein the first sheet storage and retrieval device includes a first belt recycler.

21. The apparatus according to claim 14 wherein the at least one processor is operative to cause the deposit accepting device to selectively cause sheets in the first sheet storage and retrieval device to be moved to the second side and to a first storage area in the machine.

5 22. A method of operating a banking system responsive to a data bearing record, comprising:

- (a) reading data from a card presented by a user, through operation of a card reader in an automated banking machine;
- 10 (b) operating the automated banking machine to determine that the data read in (a) corresponds to stored data associated with an authorized machine user;
- (c) receiving a stack comprising a plurality of documents through a sheet opening in a housing of the machine, 15 wherein the stack is received intermediate of a first sheet driver member and a second sheet driver member, and wherein the stack is received on a first side of at least one divider plate, wherein the at least one divider plate is positioned intermediate of the first sheet driver member and the second sheet driver member.
- 20 (d) subsequent to (c) relatively moving the at least one divider plate, the first sheet driver member and the second sheet driver member, such that the first sheet driver member operatively engages a first side of the

stack and the second sheet driver member operatively engages a second side of the stack opposed of the first side of the stack, wherein the second sheet driver member operatively engages the second side of the stack through an opening in the at least one divider plate;

- (e) subsequent to (d), moving the stack within the machine in operative engagement with the first sheet driver member and the second sheet driver member.

23. The method according to claim 22, wherein in (e) the stack is moved inward in the machine relative to the sheet opening, into operative engagement with a picker; and further comprising:

- (f) subsequent to (e) moving each sheet separately from the stack through operation of the picker.

24. The method according to claim 23 and further comprising:

- (g) analyzing each sheet separated from the stack through operation of a sheet processor device in the machine.

25. The method according to claim 24 wherein in (g) the sheet processor device includes at least one of a check imager and a note validator.

26. The method according to claim 24 and further comprising:

- (h) storing each sheet analyzed in (g) in at least one storage and retrieval device in the machine.

27. The method according to claim 26 wherein in (h) the at least one storage and retrieval device comprises a belt recycler.

28. The method according to claim 26 and further comprising:

- 5 (i) subsequent to (f), relatively moving the first sheet driving member, second sheet driving member and at least one divider plate, wherein the second sheet driver member is disposed from the at least one divider plate on a second side of the divider plate, wherein the second side is opposed of the first side;
- 10 (j) subsequent to (i), moving at least one sheet stored on the at least one storage and retrieval device in (h), to the second side of the at least one divider member.

29. The method according to claim 28 and further comprising:

- 15 (k) subsequent to (j), relatively moving the first sheet driver member, second sheet driver member and at least one divider plate such that the at least one sheet on the second side is operatively engaged with both the first sheet driver member and the second sheet driver member, wherein the first sheet driver member
- 20 operatively engages the at least one sheet on the second side by extending through the opening in the at least one divider plate;
- 25 (l) subsequent to (k), moving the at least one sheet on the second side in engagement with the first and second sheet driver members.

30. The method according to claim 29 wherein in (l) the at least one sheet on the second side is moved toward the sheet opening in the housing.

31. The method according to claim 29 wherein in (l) the at least
5 one sheet on the second side is moved to operative engagement with the picker.

32. The method according to claim 31, and further comprising:

(m) subsequent to (l) separating each of the at least one
sheet on the second side from other sheets on the second
10 side through operation of the picker.

33. The method according to claim 32 and further comprising:

(n) storing each of the at least one sheet separated by the
picker in (m) in at least one storage location in the
automated banking machine.

15 34. The method according to claim 33 wherein the at least one divider plate comprises a pair of divider plate portions separated by an elongated opening, and wherein the first sheet driver member comprises a first belt flight and the second sheet driver member comprises a second belt flight, and wherein in (d) the second belt flight extends in the elongated opening to
20 engage the stack, and wherein in (k) the first belt flight extends in the elongated opening to engage the at least one sheet.

35. The method according to claim 34 wherein a path extends between the picker, the sheet processor device and the at least one sheet

storage and retrieval device, wherein during at least a portion of both (f) and (g), sheets move in a first direction in the path.

36. The method according to claim 35 wherein during at least a portion of (j) at least one sheet moves in a second direction opposed of the first direction in the path, and wherein (j) further includes engaging the at least one sheet and a diverter in the path, wherein the diverter directs the at least one sheet to the second side.

37. The method according to claim 36 wherein in (j) the diverter engages the at least one sheet prior to the at least one sheet reaching the picker when moving in the second direction in the path.

38. The method according to claim 37 and further comprising:
(o) granting the authorized user a credit corresponding to the at least one sheet received by the machine in (c) responsive to operation of the machine.

39. The method according to claim 22 wherein the at least one divider plate comprises a pair of disposed plate portions separated by an elongated opening, and wherein in (d) the second sheet driver member operatively engages the stack by extending in the elongated opening.

40. The method according to claim 39 wherein the second sheet driver member comprises a belt flight, and wherein in (d) the belt flight extends in the elongated opening.

41. The method according to claim 22 wherein in (d) the relative vertical positions of the at least one divider plate, first sheet driver member and second sheet driver member are changed.

42. Apparatus comprising:
- a card reader operative to read data-carrying records comprising user cards;
- an automated banking machine including:
- 5 a housing;
- at least one input device in operative supported connection with the housing, wherein the at least one input device is operative to receive inputs from users of the machine, wherein the at least one input device includes the card reader, wherein the inputs
- 10 are usable to identify at least one of a respective user and a respective user's financial account, and wherein the machine is operative responsive to information read from cards through operation of the card reader;
- at least one output device in operative supported connection
- 15 with the housing, wherein the at least one output device is operative to receive outputs including instructions concerning machine usage;
- at least one cash dispenser device in operative supported connection with the housing, wherein the at least one cash
- 20 dispenser device is operative to cause cash to be delivered from the machine;
- at least one deposit accepting device in operative supported connection with the housing, wherein the deposit accepting device is operative to read indicia on sheets received from
- 25 machine users;

at least one processor in the housing, wherein the at least one processor is in operative connection with the at least one input device, the at least one output device, the at least one cash dispenser device and the at least one deposit accepting device; wherein the at least one deposit accepting device includes:

at first sheet driver member;

at second sheet driver member;

wherein the first and second sheet driver members are movably mounted in operatively supported connection with the housing

such that a distance between the first sheet driver member and the second sheet driver member is selectively variable

responsive to operation of the at least one processor;

at least one divider plate positionable intermediate of the first sheet driver member and the second sheet driver member,

wherein the at least one divider plate is movably mounted relative to the housing;

at least one sensor;

at least one drive, wherein the at least one drive is in operative connection with the at least one processor, wherein the at least

one processor causes operation of the drive to selectively relatively position the first sheet driver member, the second sheet driver member, and the at least one divider plate;

wherein the at least one deposit accepting device is operative to cause sheets to move from a first side of the at least one divider plate to a second side of the at least one divider plate;

wherein the first sheet driver member and the second sheet driver member are operative to move sheets positioned on the first side of the at least one divider plate and on the second side of the at least one divider plate;

5 wherein the at least one sensor is in operative connection with the at least one processor, wherein the at least one sensor is operative to sense sheets positioned on at least one of the first side and the second side.

43. The apparatus according to claim 42 wherein the at least one
10 divider plate includes at least one first reflective piece facing one of the first side and the second side, and wherein the at least one sensor comprises at least one first radiation sensor disposed from the at least one divider plate, and wherein the at least one first radiation sensor is operative to detect sheets on one of the first side or the second side of the at least one divider plate.

15 44. The apparatus according to claim 43 wherein the at least one divider plate further includes at least one aperture, and wherein the at least one sensor includes at least one second radiation sensor, wherein the at least one second radiation sensor is operative to detect sheets on at least one of the first side and the second side of the at least one divider plate.

20 45. The apparatus according to claim 44 wherein the at least one first reflective piece comprises a first angularly reflective piece, and the at least one first radiation sensor comprises a first radiation emitter and a first radiation receiver, both transversely disposed of the at least one divider plate.

25 46. The apparatus according to claim 45 wherein the at least one first angular reflective piece comprises a tape.

47. The apparatus according to claim 45 wherein the at least one second radiation sensor comprises a second emitter and a second receiver, wherein the second emitter and the second receiver are disposed from one another on opposed sides of the at least one divider plate.

5 48. The apparatus according to claim 47 wherein the first angular reflective piece faces the second side, and further comprising a second sheet engaging plate, wherein the second sheet engaging plate extends generally parallel of the at least one divider plate, wherein the second sheet engaging plate includes at least one second angular reflective piece, wherein the at least
10 one second angular reflective piece faces the first side, and at least one third radiation sensor, wherein the at least one third radiation sensor is operative to sense radiation reflected from the at least one second angular reflective piece, wherein the at least one first radiation sensor is operative to detect sheets on only the second side of the at least one divider plate and the at least one third
15 radiation sensor is operative to detect sheets only on the first side of the at least one divider plate.

 49. The apparatus according to claim 48 wherein the second sheet engaging plate includes an aperture therein, wherein the aperture in the second sheet engaging plate is aligned with the aperture in the at least one divider
20 plate, and wherein the at least one divider plate and the second sheet engaging plate are positioned intermediate of the second emitter and the second receiver.

 50. The apparatus according to claim 49 wherein the at least one deposit accepting device includes at least one width sensor, wherein the at least one width sensor is operative to sense a width of a sheet therein, and
25 further including at least one first magnetic read head movably mounted

relative to the housing, and further including a positioning drive in operative connection with the first magnetic read head, wherein the positioning drive is operative to selectively position the at least one first magnetic read head responsive to the sensed width of the sheet.

5 51. The apparatus according to claim 50 wherein the at least one deposit accepting device includes a read area, wherein magnetic characters are read on sheets moving along a sheet direction in the read area, wherein the at least one first magnetic read head is movable transversely relative to the sheet direction, and wherein the at least one deposit accepting device further
10 includes at least one second magnetic read head, wherein the at least one second magnetic read head is in a fixed transverse position relative to the sheet direction in the read area.

 52. The apparatus according to claim 51 and further comprising at least one second transport, wherein the at least one second transport is
15 operative to move sheets along a sheet path past the at least one first magnetic read head and the at least one second magnetic read head, and further comprising a plurality of disposed alignment sensors and at least one transverse transport operative to move sheets generally transverse of the sheet path, wherein the at least one transverse transport is operative to move sheets
20 transversely and align sheets relative to the sheet path and relative to the at least one second magnetic read head responsive to the plurality of alignment sensors.

 53. The apparatus according to claim 52 wherein the at least one processor is operative to determine character data corresponding to characters

on each sheet responsive to signals from at least one of the at least one first magnetic read head and the at least one second magnetic read head.

54. The apparatus according to claim 53 wherein the at least one processor is operative to selectively cause sheets to be moved to the second side responsive to the character data.

55. The apparatus according to claim 53 wherein the at least one deposit accepting device includes a first sheet storage and retrieval device, and a second sheet storage and retrieval device, wherein the at least one processor is selectively operative responsive to the character data to cause sheets to be moved from the first sheet storage and retrieval device to the second sheet storage and retrieval device and to the second side of the at least one divider plate.

56. The apparatus according to claim 55 wherein at least one of the first sheet storage and retrieval device and the second sheet storage and retrieval device includes a belt recycler.

57. The apparatus according to claim 55 wherein the at least one processor is operative to cause sheets to be moved from the second sheet storage and retrieval device to at least one first storage area in the machine.

58. The apparatus according to claim 57 wherein the at least one processor is operative to cause sheets not determined to have at least one property, responsive to operation of the at least one deposit accepting device, to be moved to the second side of the at least one divider plate and out of the machine through the machine opening, and wherein the at least one processor is operative to cause sheets determined to have the at least one property, to be moved to the at least one first storage area.

59. The apparatus according to claim 58 wherein the at least one processor is operative to cause sheets having the at least one property and sheets not having the at least one property to be stored in the first sheet storage and retrieval device, and wherein the at least one processor is operative to
5 cause sheets having the at least one property stored in the first sheet storage and retrieval device to be moved and stored on the second sheet storage and retrieval device, and wherein the at least one processor is operative to cause sheets having the at least one property that have been stored on the second sheet storage and retrieval device to be thereafter moved to the at least one
10 first storage area in the machine.

60. The apparatus according to claim 59 wherein at least one cash dispenser device is in operative connection with at least one deposit accepting device, wherein cash from the at least one cash dispenser device is delivered to at least one of the first side and the second side of the at least one divider
15 plate.

61. A method of sensing coded records comprising:
(a) receiving a stack of sheets comprising a plurality of at least one of notes and checks, into a sheet access area within an automated banking machine, wherein the
20 sheet access area extends between a first sheet engaging member and second sheet engaging member;
(b) subsequent to (a), removing sheets in the stack from the sheet access area one at a time through operation of a picker in the machine;

- 5 (c) determining through operation of the machine if at least one sheet is present in the sheet access area using at least one radiation sensor, wherein the at least one radiation sensor is disposed transversely of and outside the sheet access area, and is operative to receive radiation reflected from an angular reflective piece operatively attached to one of the first sheet engaging member and second sheet engaging member;
- 10 (d) analyzing data included on the sheets through operation of at least one sheet processor device of the machine.

62. The method according to claim 61 wherein in (c) the at least one radiation sensor includes a radiation emitter and a radiation receiver, and wherein the angular reflective piece comprises a planar piece, and wherein radiation is received by the planar piece from the emitter at an acute angle and reflected from the planar piece to the receiver at the acute angle.

15

63. The method according to claim 62 wherein in (c) the planar piece comprises reflective adhesive tape.

64. The method according to claim 62 and further comprising:

20 (c) subsequent to (d), moving at least one sheet analyzed in (d) to a further sheet access area, wherein the further sheet access area extends between the second sheet engaging member and a third sheet engaging member;

(f) determining through operation of the machine if at least one sheet is present in the further sheet access area using at least one further radiation sensor, wherein the

25

at least one further radiation sensor is disposed transversely of and outside the further sheet access area, and receives radiation reflected from a further angular reflective piece operatively attached to one of the second sheet engaging member and the third sheet engaging member.

5

65. The method according to claim 64 wherein in (f) the at least one further radiation sensor includes a further radiation emitter and a further radiation receiver, and wherein the further angular reflective piece comprises a further planar piece, and wherein radiation is received by the further planar piece from the further radiation emitter at a further acute angle and reflected from the further planar piece to the further radiation receiver at the further acute angle.

10

66. The method according to claim 65 wherein in (f) the further planar piece comprises reflective adhesive tape.

15

67. The method according to claim 66 wherein (c) further includes sensing radiation that passes directly from an additional radiation emitter to an additional radiation receiver through at least one aperture that extends in at least one of the first sheet engaging member and the second sheet engaging member.

20

68. The method according to claim 61 wherein (c) further includes sensing radiation that passes directly from an additional radiation emitter to an additional radiation receiver through at least one aperture that extends in at least one of the first sheet engaging member and the second sheet engaging member.

25

69. The method according to claim 67 wherein (f) further includes sending radiation that passes directly from the additional radiation emitter to the additional radiation receiver through at least one aperture that extends in at least one of the second sheet engaging member and the third sheet engaging member.

70. The method according to claim according to claim 69 and further comprising:

(g) prior to (d) for each sheet, moving each sheet through operation of the machine to align the sheet in a transport path in the machine.

71. The method according to claim 70 and further comprising:

(h) prior to (d) for each sheet, determining a sheet width through operation of the machine, and moving a magnetic sensing device through operation of the machine responsive to the determined sheet width.

72. The method according to claim 71 wherein (d) includes at least one of determining through operation of the machine at least one of the authenticity of at least one note and the acceptability of at least one check by the machine.

73. The method according to claim 72 and further comprising:

(i) storing a plurality of sheets analyzed in (d) in at least one storage and retrieval device in the machine.

74. The method according to claim 73 wherein (e) includes moving the at least one sheet through operation of the machine from the at least one storage and retrieval device to the further sheet access area.

75. The method according to claim 74 and further comprising:

- (j) reading data from a user card through operation of a card reader in the machine;
- (k) determining responsive to operation of the machine that the data read in (j) corresponds to an authorized user of the machine.

76. The method according to claim 75 and further comprising:

- (l) crediting responsive to operation of the machine, the authorized user a value associated with at least one sheet analyzed in (d).

77. The method according to claim 76 and further comprising:

- (m) prior to (a), moving the second sheet engaging member relatively vertically away from the first sheet engaging member and a first belt flight in operatively supported connection with the first sheet engaging member, to provide the first sheet access area.

78. The method according to claim 77 and further comprising:

- (n) subsequent to (b) and prior to (e), moving the second sheet engaging member relatively vertically away from the third sheet engaging member and a second belt flight in operatively supported connection with the third sheet engaging member, to provide the second sheet access area.

79. The method according to claim 78 and further comprising:

- (o) prior to (b), moving the first and second belt flights vertically closer together and into operative engagement with

the stack, and moving the first and second belt flights to move the stack to operatively engage the stack and the picker.

80. The method according to claim 79 and further comprising:

(p) dispensing notes from the machine through operation of a cash dispenser of the machine.

81. Apparatus comprising:

a card reader operative to read data from a data carrying user card;

an automated banking machine adapted to allow operation

thereof by a user to carry out at least one transaction responsive to a computer determined comparison of data read from a user card by the card reader and identification information corresponding to at least one authorized user;

a housing;

at least one input device in operative supported connection with the housing, wherein the at least one input device is operative to receive inputs from users of the machine, wherein the at least one input device includes the card reader and wherein the inputs are usable to identify at least one of a respective user and a respective user's financial account;

at least one output device in operative supported connection with the housing, wherein the at least one output device is operative to provide outputs including instructions concerning machine usage;

at least one cash dispenser device in operative supported connection with the housing, wherein the at least one cash dispenser device is operative to cause cash to be dispensed from the machine;

5 at least one deposit accepting device in operative supported connection with the housing, wherein the at least one deposit accepting device is operative to read indicia on sheets received from machine users;

10 at least one processor in the housing, wherein the at least one processor is in operative connection with the at least one input device, the at least one output device, the at least one cash dispenser device, and the at least one deposit accepting device; wherein the at least one deposit accepting device includes:

15 a sheet path therein, wherein sheets move along the sheet path; a first magnetic read head operative to read magnetic indicia on checks in the sheet path;

a second magnetic read head operative to read magnetic indicia on checks in the sheet path;

20 a mount, wherein the mount is in operative connection with at least one of the first magnetic read head and the second magnetic read head, wherein the mount is movably mounted transversely relative to the sheet path;

a positioning device in operative connection with the mount; at least one sensor in the sheet path, wherein the at least one processor is operative responsive to the at least one sheet sensor

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sensing a check in the sheet path, to cause the positioning device to move at least one of the first magnetic read head and the second magnetic read head, wherein at least one of the first magnetic read head and the second magnetic read head is
5 operative to read magnetic indicia on the check.

82. The apparatus according to claim 81 wherein the positioning device is operative to cause the first magnetic read head and the second magnetic read head to be in positions to read magnetic indicia on the check regardless of check orientation in the sheet path, and wherein the at least one
10 processor is operative to cause the machine to interpret magnetic indicia that is read in any of forward, backward, right side up and upside down orientations.

83. The apparatus according to claim 82 wherein the at least one sensor includes a sheet width sensor, wherein the positioning device moves at least one of the first magnetic read head and the second magnetic read head
15 responsive to width of the check sensed through operation of the sheet width sensor.

84. The apparatus according to claim 83 wherein the at least one deposit accepting device includes at least one transverse transport operative to move the check transversely relative to the sheet path, and wherein the at least
20 one sensor includes a plurality of alignment sensors operative to sense at least one edge of the check, and the sheet width sensor, wherein the at least one transverse transport is operative to position the check transversely of the transport path responsive to the plurality of alignment sensors, wherein the positioning device is operative to position at least one of the first magnetic
25 read head and the second magnetic read head responsive to the sheet width

sensor sensing at least one side of the check after the check is transversely positioned in the sheet path responsive to operation of the at least one transverse transport.

85. The apparatus according to claim 84 wherein the first magnetic
5 read head is positioned in fixed transverse position relative to the sheet path, and the second magnetic read head is movably mounted transversely relative to the sheet path.

86. The apparatus according to claim 85 and further comprising at least one imager adjacent the sheet path, wherein the at least one imager is
10 operative to produce data corresponding to a visual image of at least one side of the check.

87. The apparatus according to claim 86 and further comprising a first sheet storage and retrieval device in operative connection with the sheet path, wherein the check is stored in the first sheet storage and retrieval device.

88. The apparatus according to claim 87 wherein the at least one
15 deposit accepting device includes a sheet access area, wherein the at least one deposit accepting device is operative to receive the check from a machine user, wherein the check is received in the sheet access area.

89. The apparatus according to claim 88 wherein the at least one
20 processor is operative responsive to data received from at least one of the first magnetic read head, the second magnetic read head and the at least one imager, to determine if the check has at least one property corresponding to a valid check.

90. The apparatus according to claim 89 wherein the at least one
25 processor is operative responsive to the check not having the at least one

property of a valid check to cause the check to move from the first sheet storage and retrieval device toward the sheet access area, whereby the check can be taken from the machine by the machine user from the sheet access area.

91. The apparatus according to claim 90 wherein the machine
5 includes a check storage area therein, wherein the at least one processor is operative responsive to the check having the at least one property of a valid check to cause the check to be moved from the first sheet storage and retrieval device to the check storage area.

92. The apparatus according to claim 91 and further comprising at
10 least one divider plate in the sheet access area, wherein the at least one divider plate separates a first side and a second side of the sheet access area, wherein the check is received in the machine on the first side, and wherein the check is moved from the first sheet storage and retrieval device to a second side of the at least one divider plate.

15 93. The apparatus according to claim 92 and further comprising a picker, wherein the picker is in operative connection with at least one of the first side and the second side, and wherein the picker is operative to separate each sheet included in a stack comprising a plurality of sheets on at least one of the first side and the second side, wherein the stack includes the check.

20 94. The apparatus according to claim 93 and further comprising a second sheet storage and retrieval device in operative connection with the sheet path, wherein the at least one processor is operative to cause each of a plurality of sheets to be evaluated for the at least one property, and to cause sheets having the at least one property to be moved and stored in a second

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sheet storage and retrieval device, and to cause sheets not having the at least one property to be moved to the second side of the at least one divider plate.

95. The apparatus according to claim 94 wherein the first sheet storage and retrieval device comprises a first belt recycler, and wherein the
5 second sheet storage and retrieval device comprises a second belt recycler.

96. The apparatus according to claim 95 wherein the stack includes both notes and checks, and further comprising a note validator in operative connection with the sheet path.

97. The apparatus according to claim 96 wherein the machine
10 further includes at least one note storage area, wherein the at least one processor is operative to cause notes to be moved from the second sheet storage and retrieval device to the at least one note storage area.

98. The apparatus according to claim 97 wherein the at least one processor is operative to cause a plurality of checks to be moved from the
15 second sheet storage and retrieval device to the check storage area.

99. The apparatus according to claim 97 and further comprising at least one note recycler, wherein the at least one note recycler is in operative connection with the at least one note storage area, wherein the at least one cash dispenser device includes the at least one note recycler.

20 100. The apparatus according to claim 81 wherein the at least one processor is operative to cause an authorized user presenting the check to the machine, to be credited an amount corresponding to the check.

101. A method of sensing magnetic indicia on coded records

including financial checks, comprising:

- 5 (a) receiving a check in an automated banking machine,
wherein the check includes magnetic indicia encoded in
a micr line thereon;
- (b) sensing through operation of at least one sensor in the
machine, a width associated with the check, wherein the
at least one sensor is in operative connection with at
least one processor in the machine;
- 10 (c) moving responsive to the width at least one of two
magnetic read heads in the machine, wherein the at least
one magnetic read head is moved responsive to
operation of the at least one processor, wherein the at
least one magnetic read head is moved such that the
15 micr line on the check is aligned with one of the heads
regardless of a facing position of the check;
- (d) moving the check past the two magnetic read heads in
the machine responsive to operation of the at least one
processor;
- 20 (e) sensing the micr line data on the check with one of the
two magnetic read heads.

102. The method according to claim 101 wherein (a) comprises
receiving a plurality of checks in the machine, wherein the plurality of checks
are received in a stack in a sheet access area of the machine, and further
25 comprising:

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- (f) prior to (b) separating the check from the stack through operation of a picker.

103. The method according to claim 102 and further comprising:

- (g) prior to (b) aligning the check with a transport path in which the check moves in the machine responsive to operation of the at least one processor.

104. The method according to claim 103 wherein (g) includes operatively engaging the check with at least one transverse transport, wherein the at least one transverse transport moves the check generally transverse of the sheet path.

105. The method according to claim 104 wherein a first magnetic read head is mounted in a fixed position relative to the sheet path, and wherein in (g) the at least one transverse transport is operative to align the micr line on the check on the first magnetic read head in two of four possible facing positions of the check.

106. The method according to claim 105, wherein a second magnetic read head is movably mounted transversely relative to the sheet path, and wherein in (c) the second magnetic read head is moved to align with the micr line on the check when the check is in two of four possible facing positions.

107. The method according to claim 106 and further comprising:

- (h) subsequent to (e) interpreting the micr line data on the check through operation of the at least one processor, wherein the at least one processor is operative to interpret the micr line data read by either the first or

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second magnetic read head in any of forward, backward,
right side up or upside down orientations.

108. The method according to claim 107 and further comprising:

- (i) subsequent to (a), repeating steps (b) through (h) for
each of the plurality of checks in the stack.

109. The method according to claim 108 wherein the sheet access
area includes a divider plate, and wherein in (a) the stack is received on a first
side of the divider plate.

110. The method according to claim 109 and further comprising:

- (i) subsequent to (h) returning at least one check to the
sheet access area, wherein the sheet is returned on a
second side of the divider plate opposed of the first side.

111. The method according to claim 110 and further comprising:

- (j) subsequent to (i) picking at least one check on the
second side of the divider plate through operation of the
picker.

112. The method according to claim 109 and further comprising:

- (i) prior to (b), reading data from a user card through
operation of a card reader in the machine;
(j) determining responsive to operation of the machine that
the data read in (i) corresponds to an authorized user;
(k) carrying out at least one of steps (b) through (h)
responsive to a determination in (j).

113. The method according to claim 112 and further comprising:

- (l) determining a value associated with at least one check received in (a);
- (m) crediting the authorized user with the value responsive to operation of the machine.

5 114. The method according to claim 113 and further comprising:

- (n) dispensing cash from the machine to the authorized user.

115. The method according to claim 112 and further comprising:

- (o) prior to (i), storing a plurality of checks in the machine in a first sheet storage and retrieval device;

10

wherein (i) includes moving at least one sheet from the first sheet storage and retrieval device to the sheet access area.

116. The method according to claim 115 wherein the machine includes a second sheet storage and retrieval device, and further comprising:

15

moving at least one sheet from the first sheet storage and retrieval device to the second sheet storage and retrieval device.

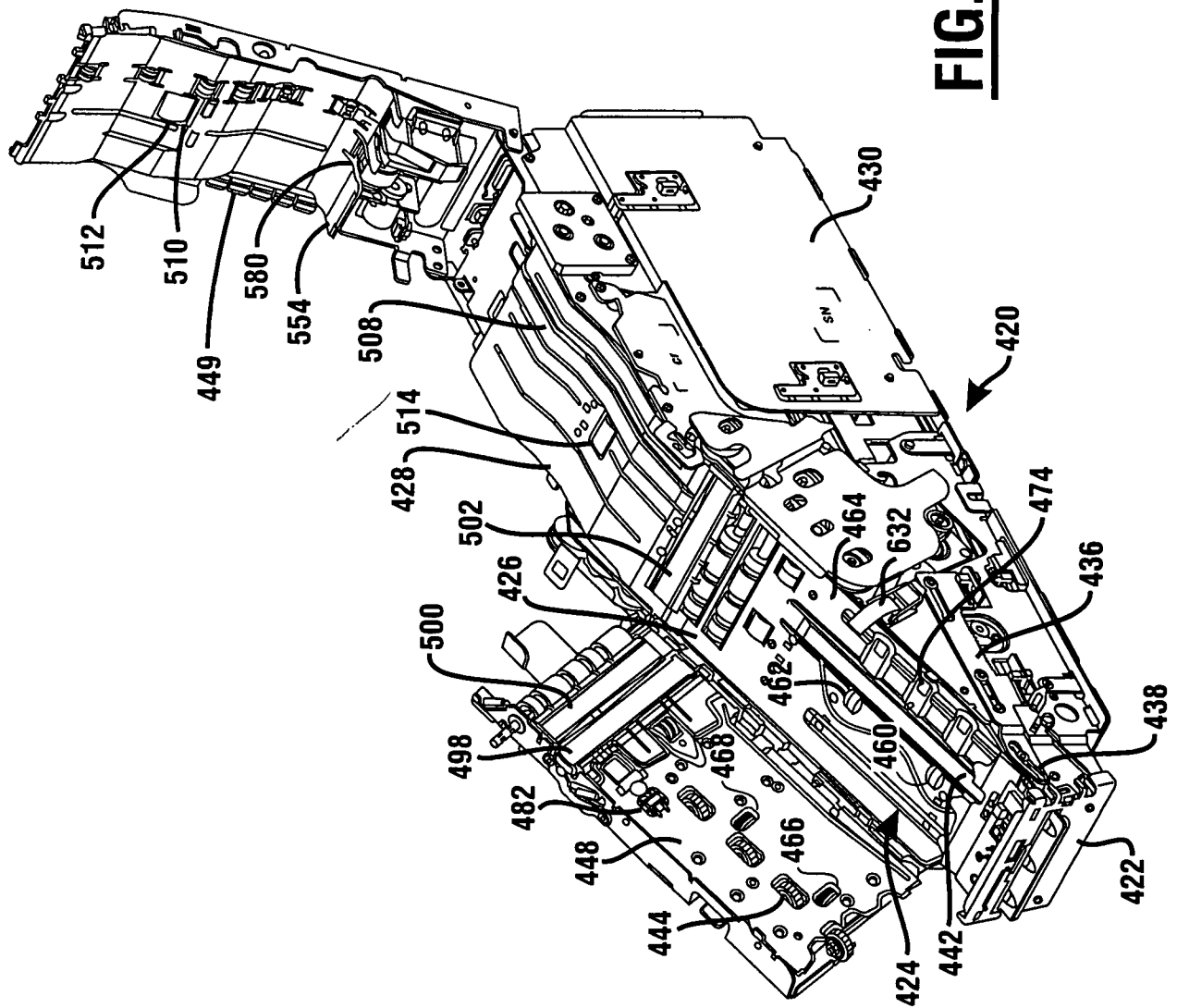


FIG. 1

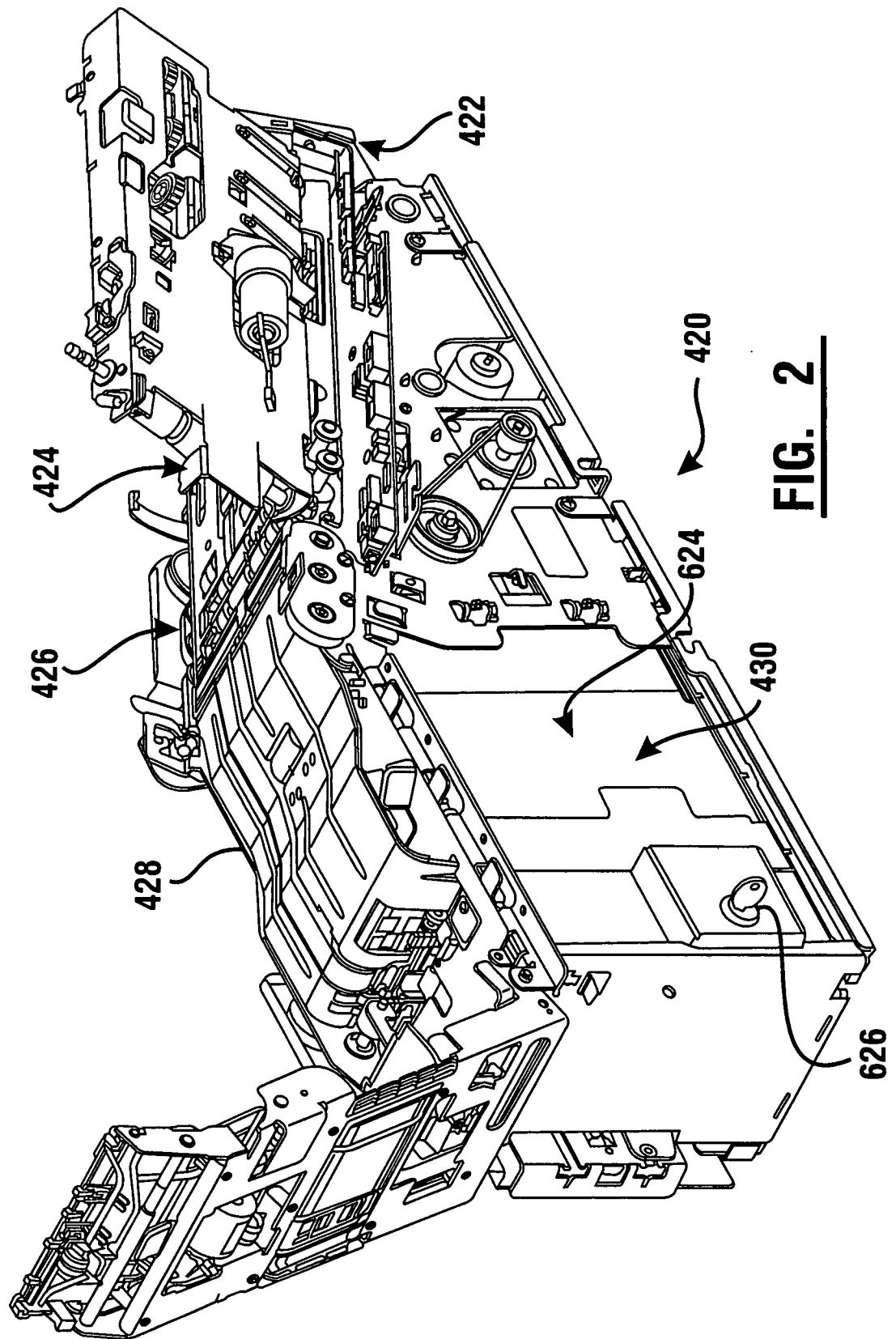


FIG. 2

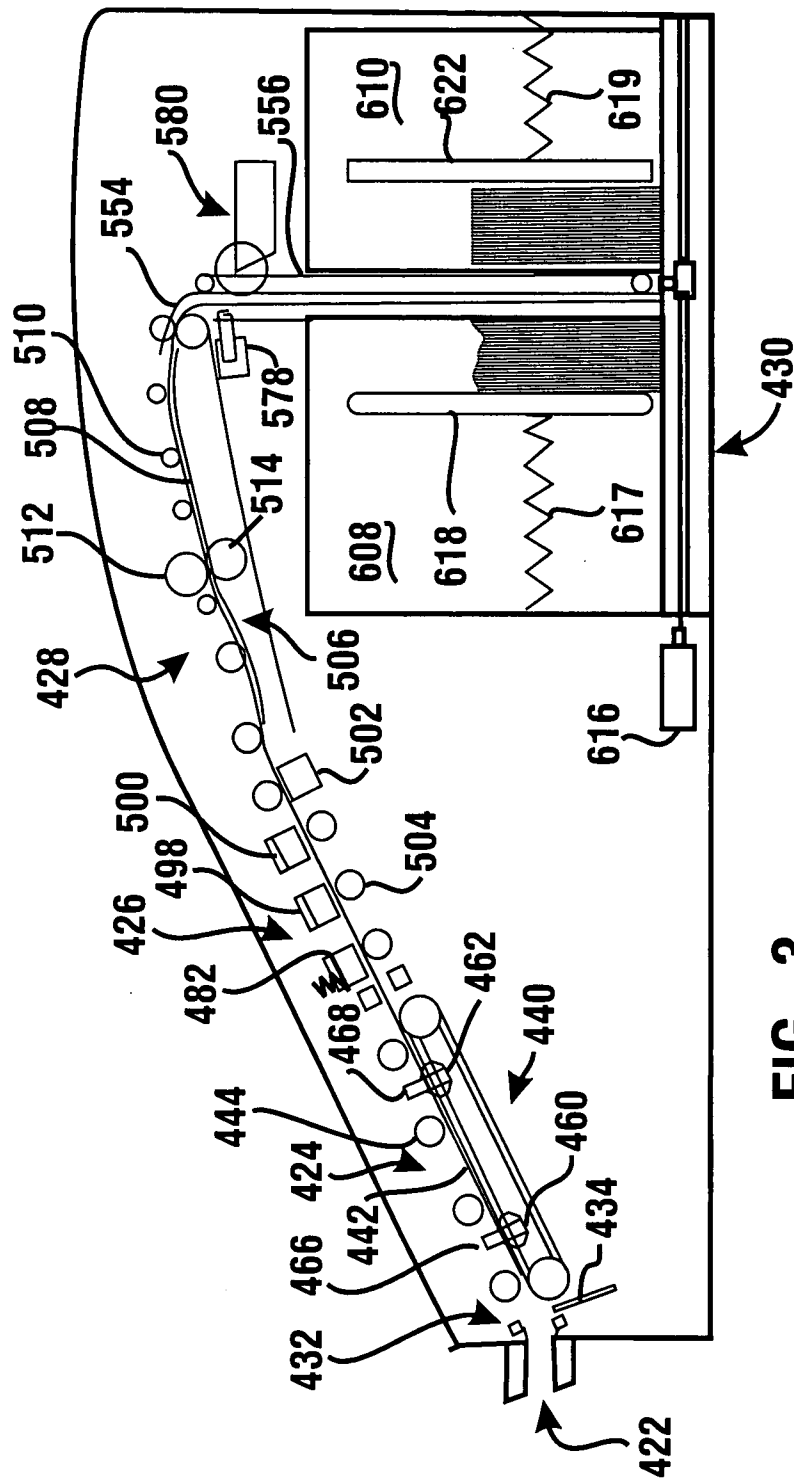


FIG. 3

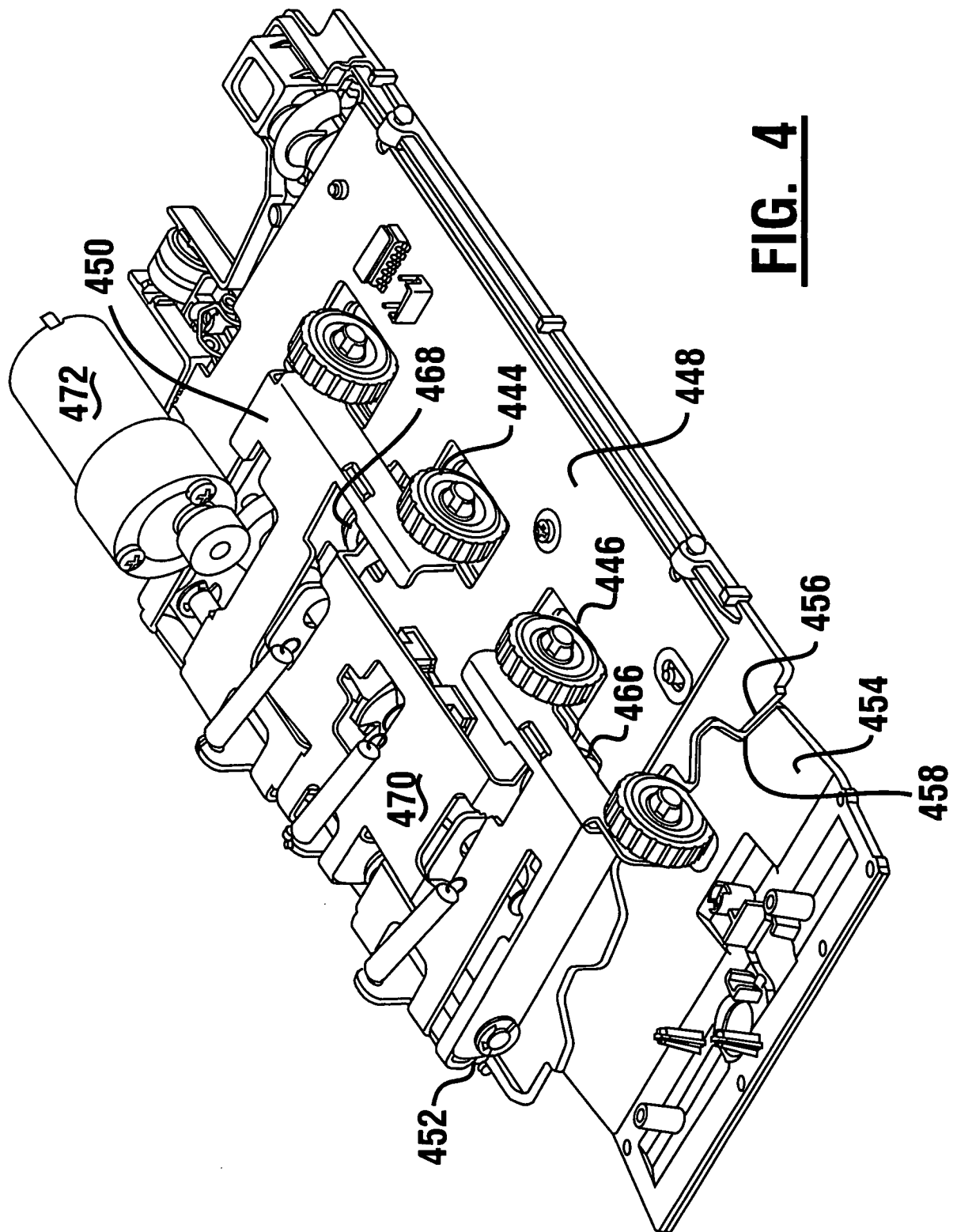


FIG. 4

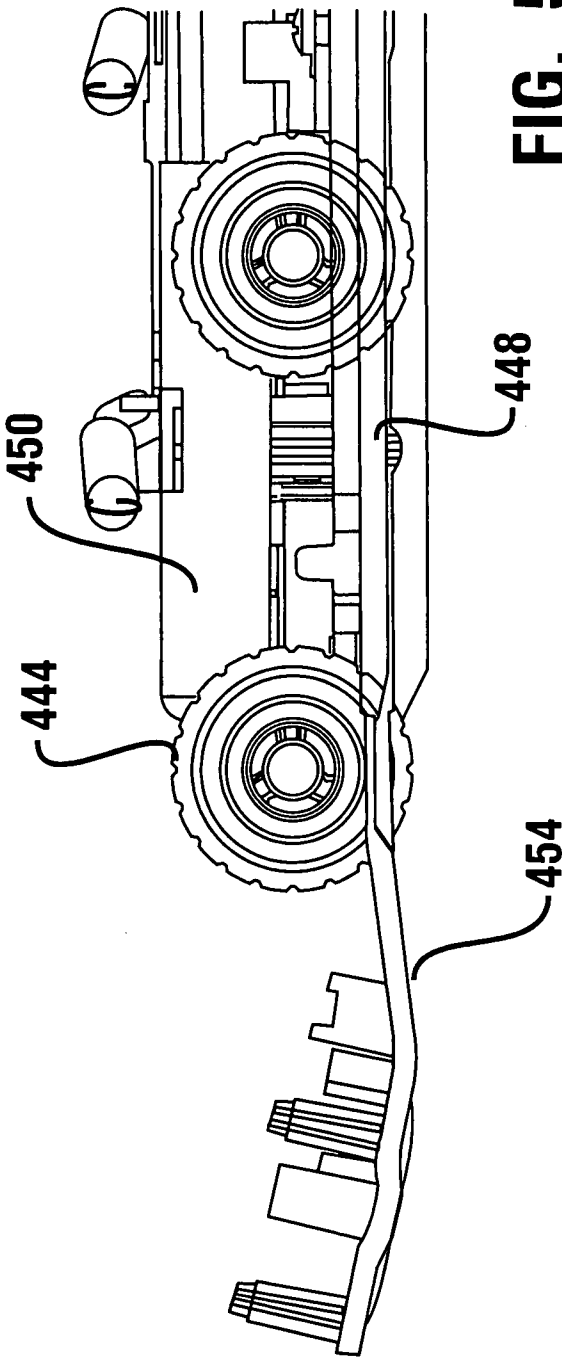


FIG. 5

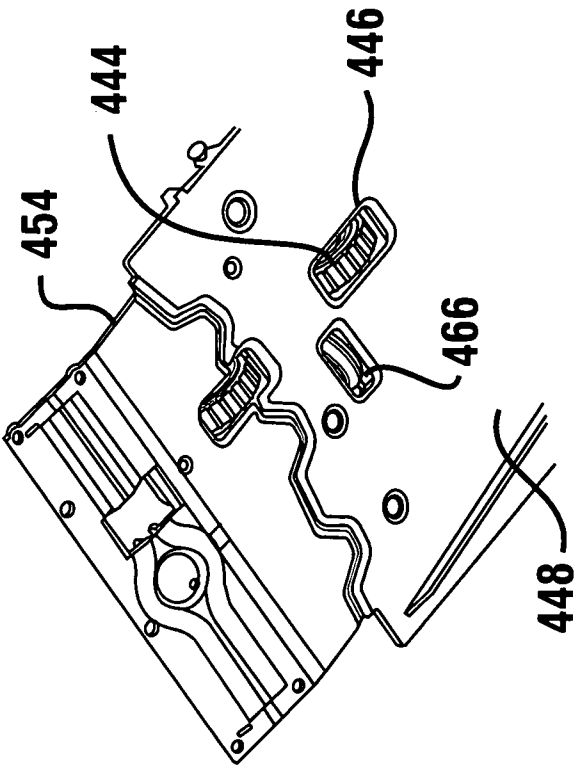


FIG. 6

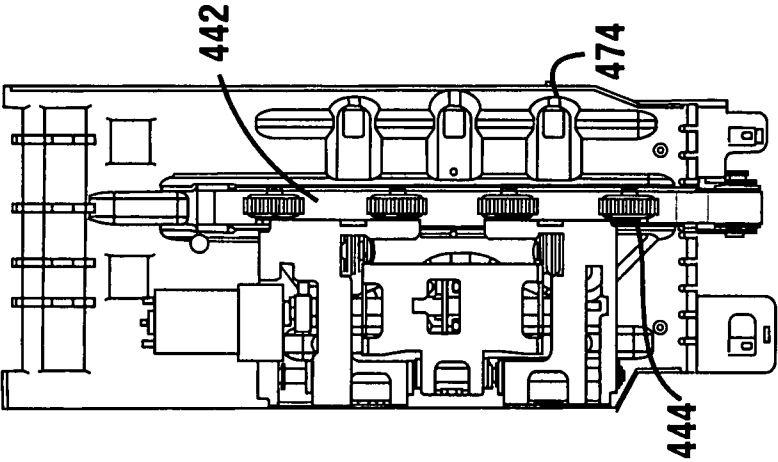


FIG. 7

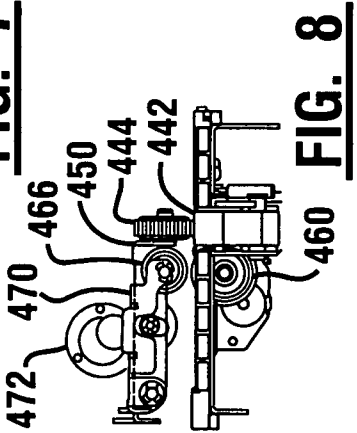


FIG. 8

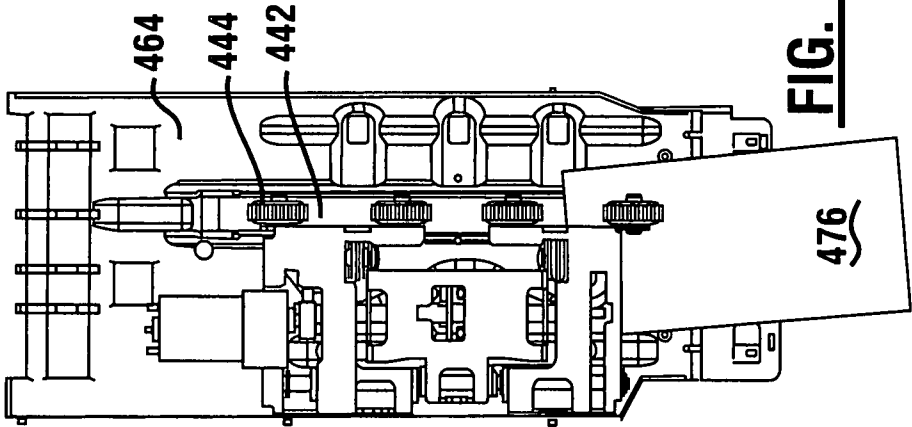


FIG. 9

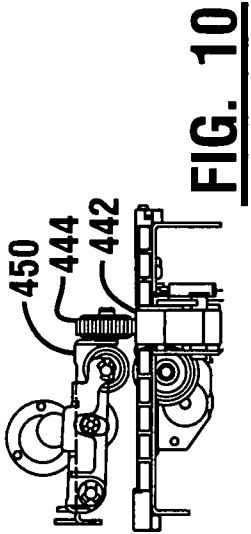


FIG. 10

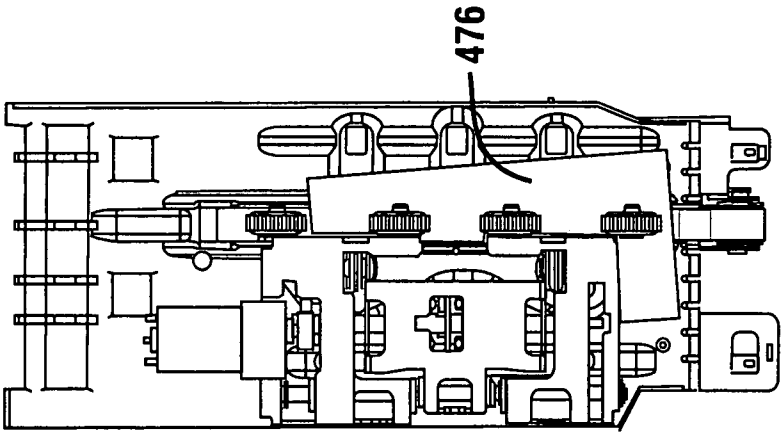


FIG. 11

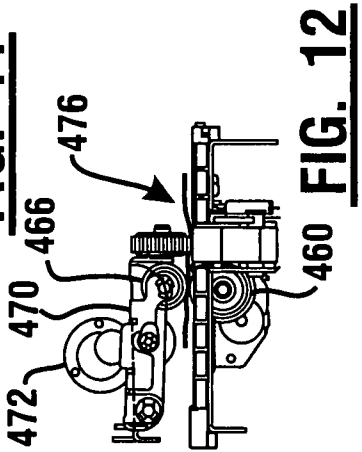


FIG. 12

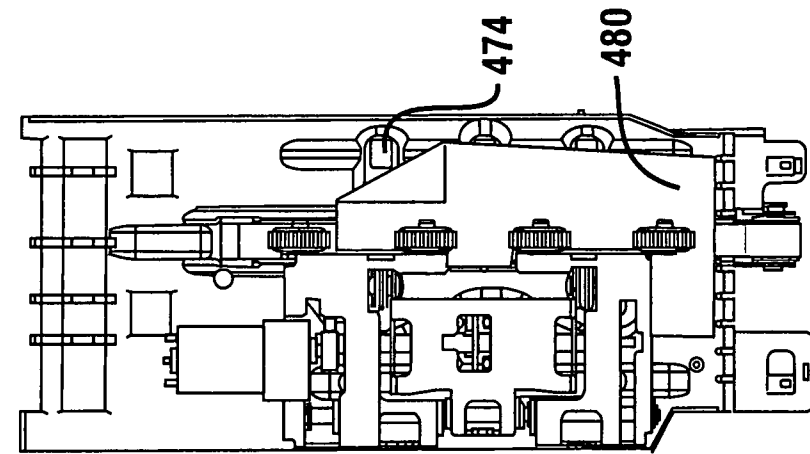


FIG. 17

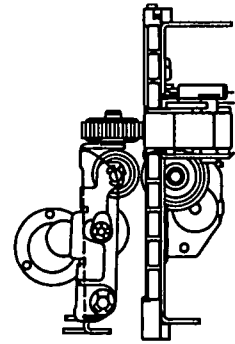


FIG. 18

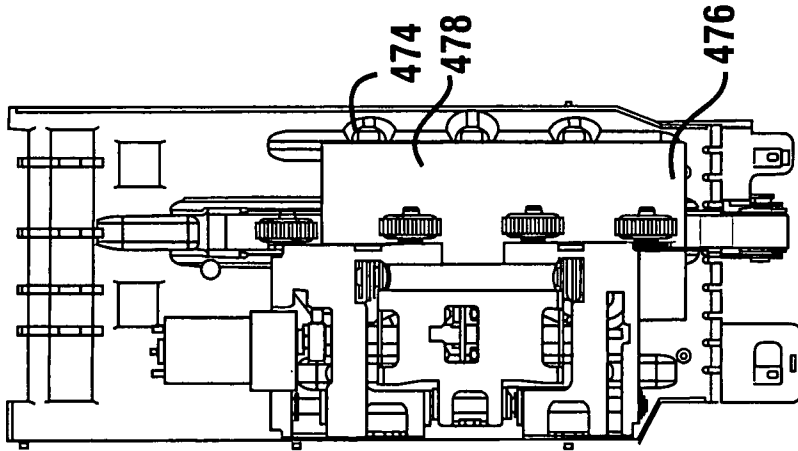


FIG. 15

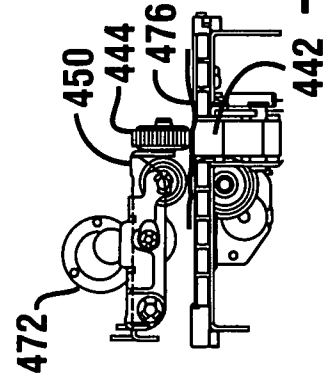


FIG. 16

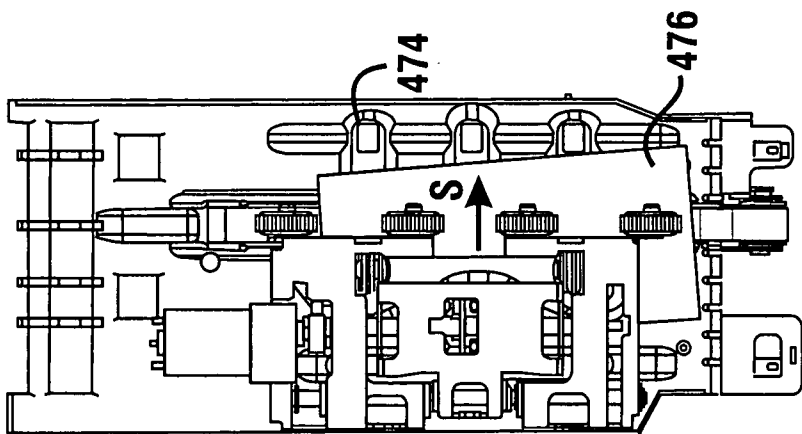


FIG. 13

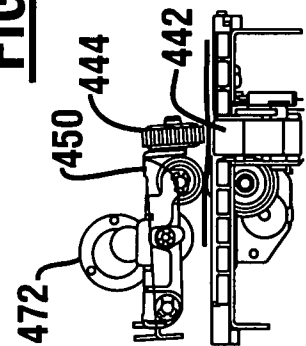


FIG. 14

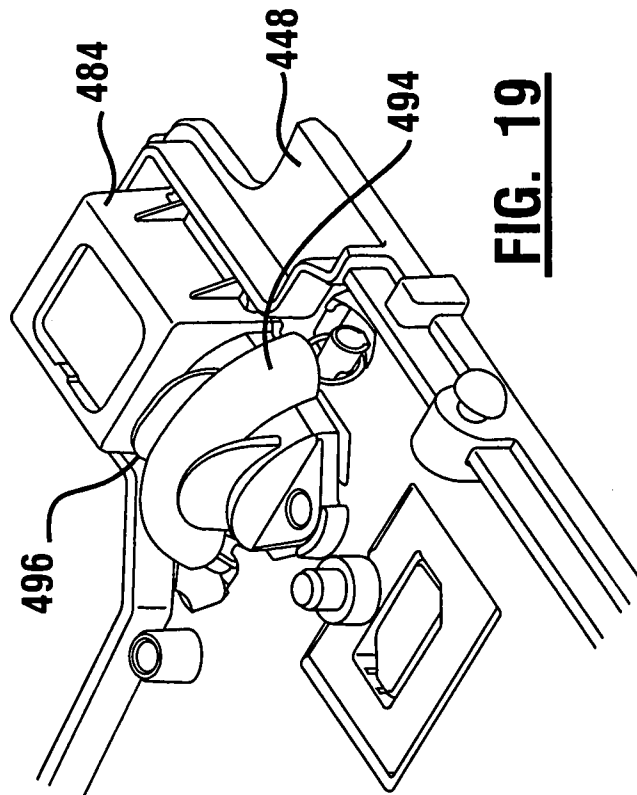


FIG. 19

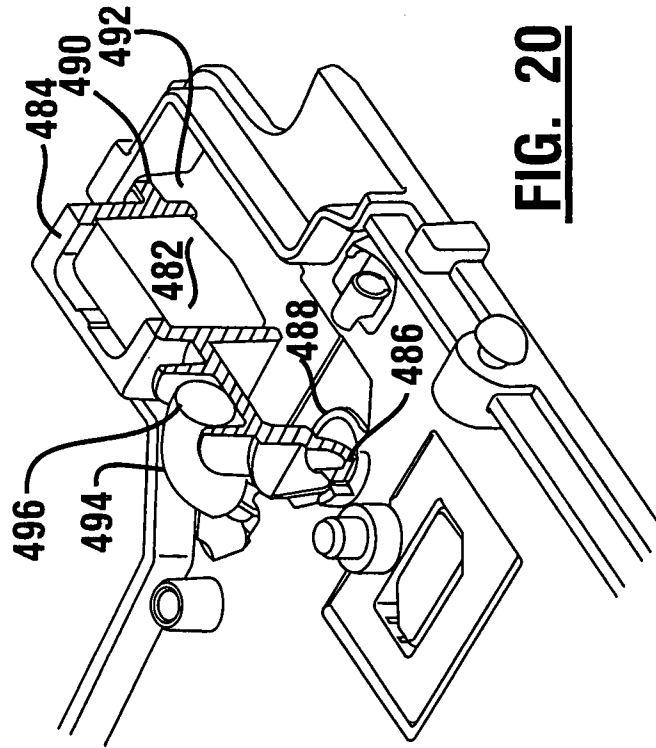


FIG. 20

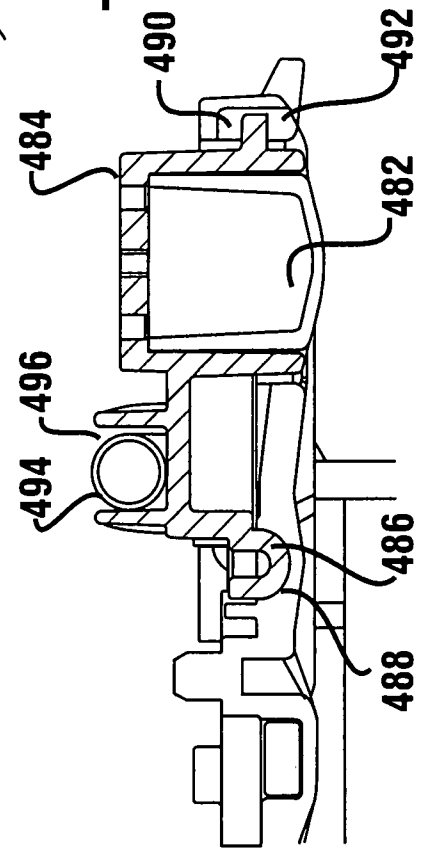


FIG. 21

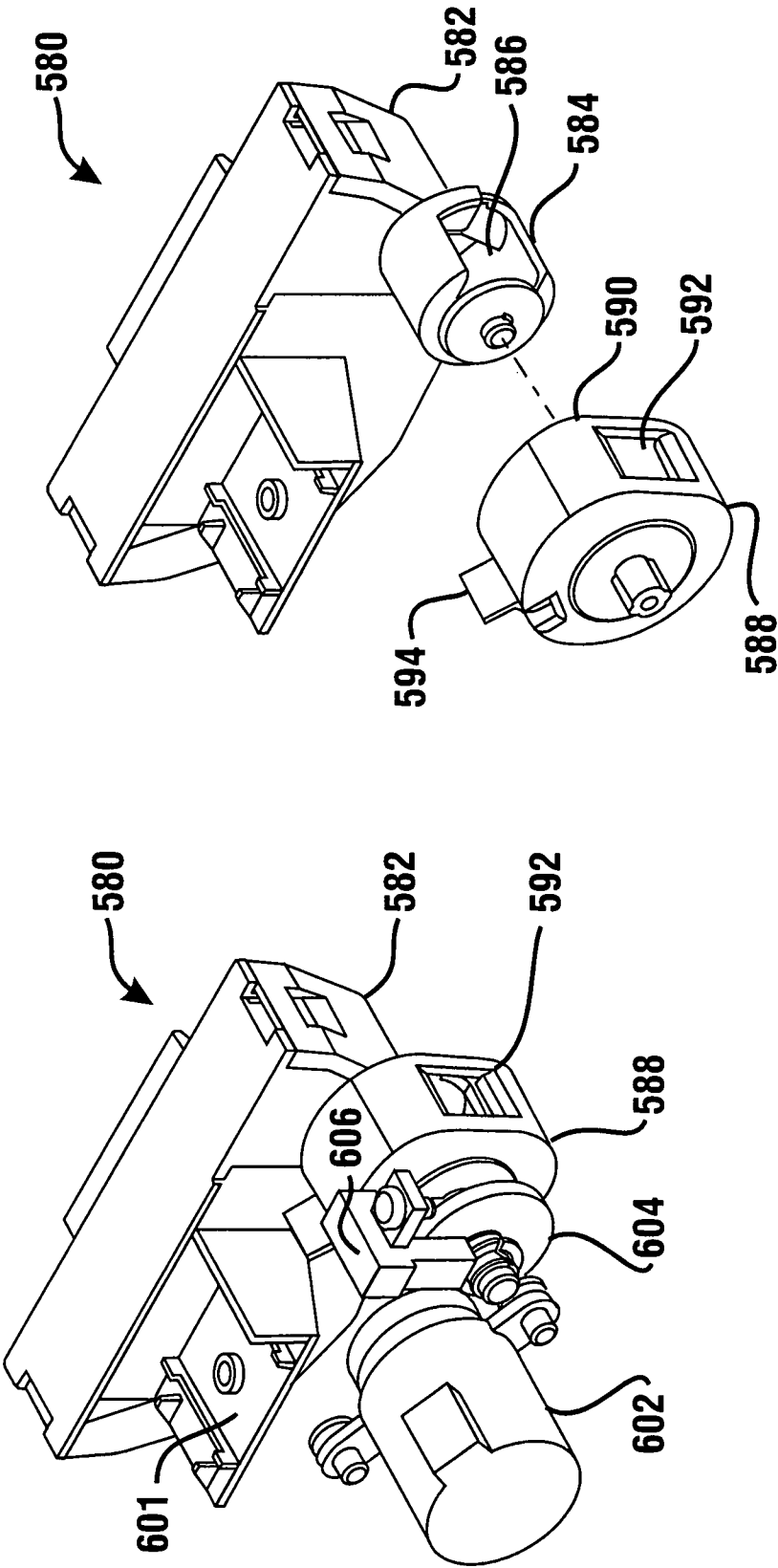


FIG. 23

FIG. 22

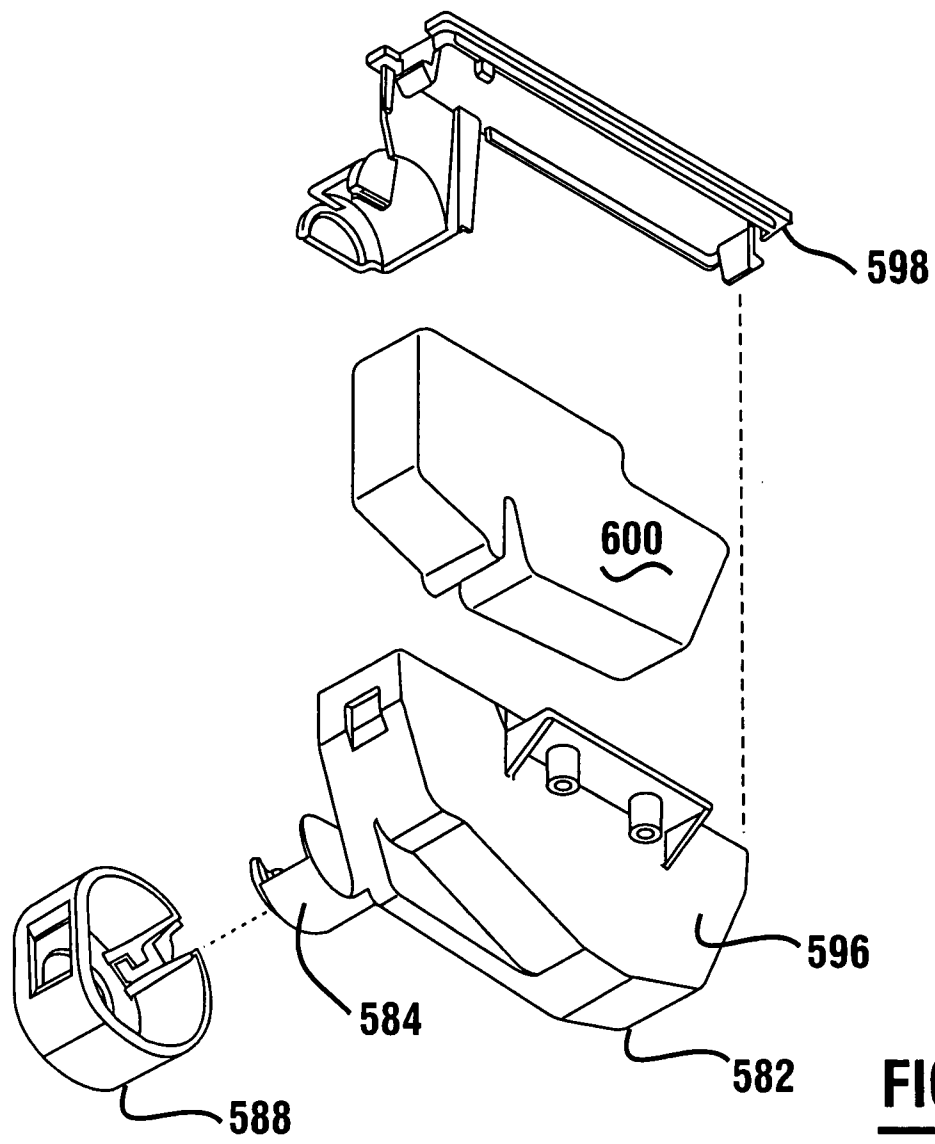


FIG. 24

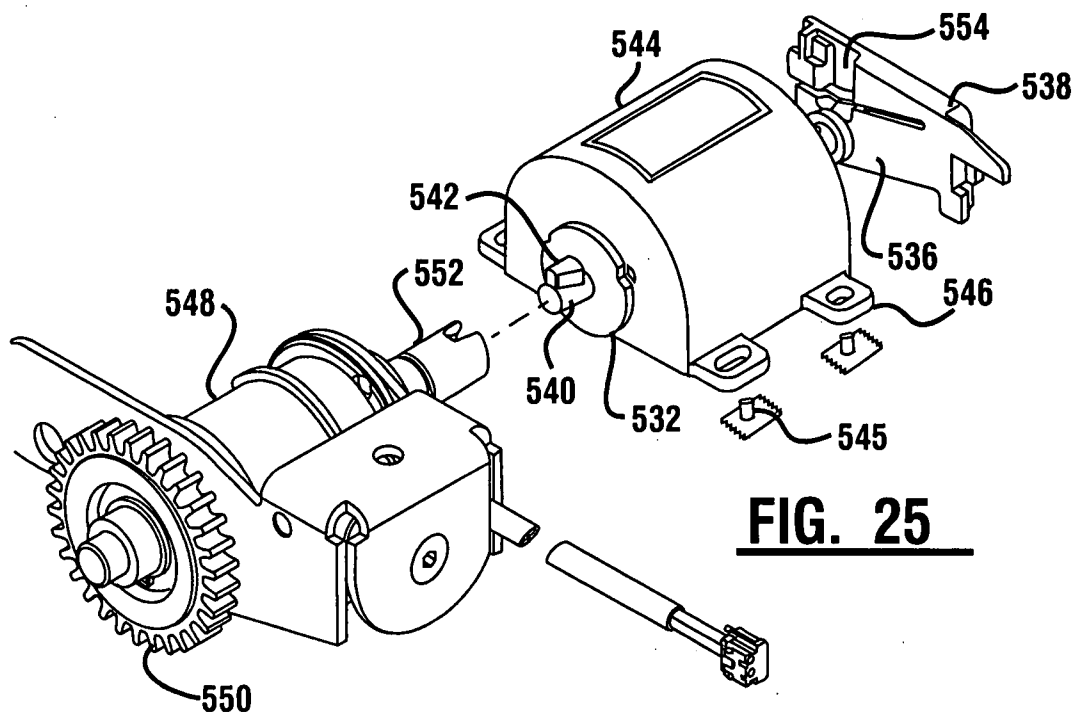


FIG. 25

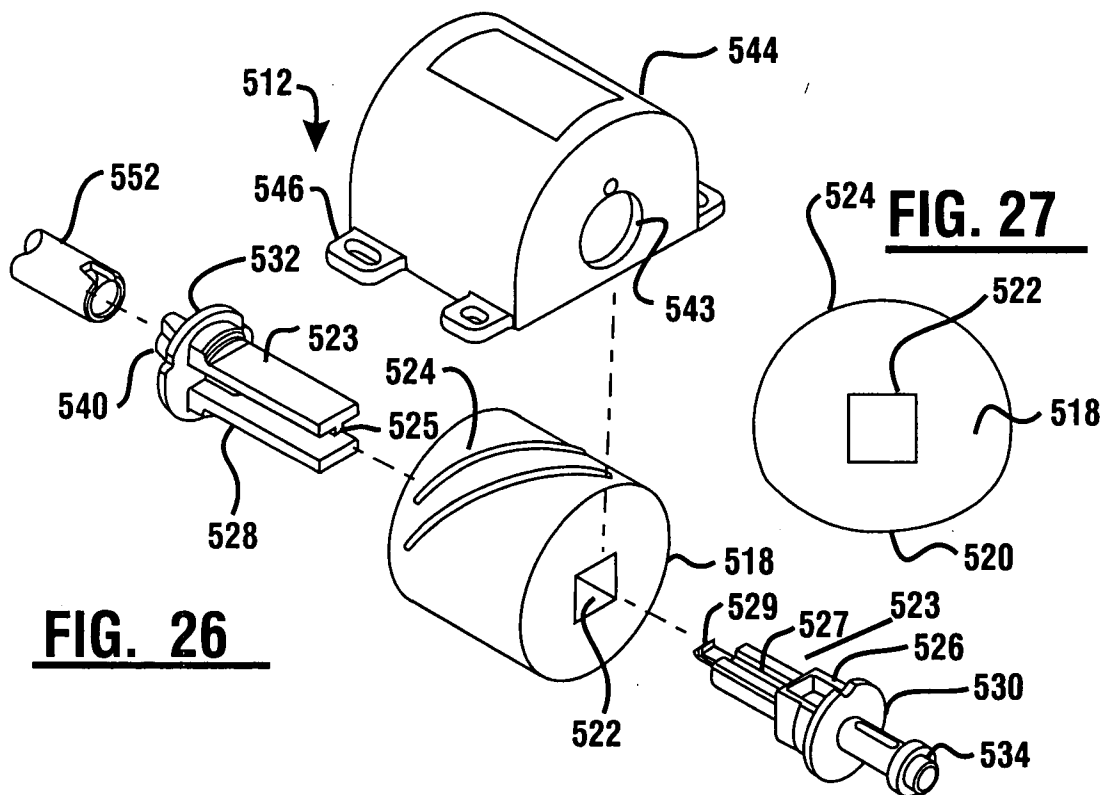


FIG. 26

FIG. 27

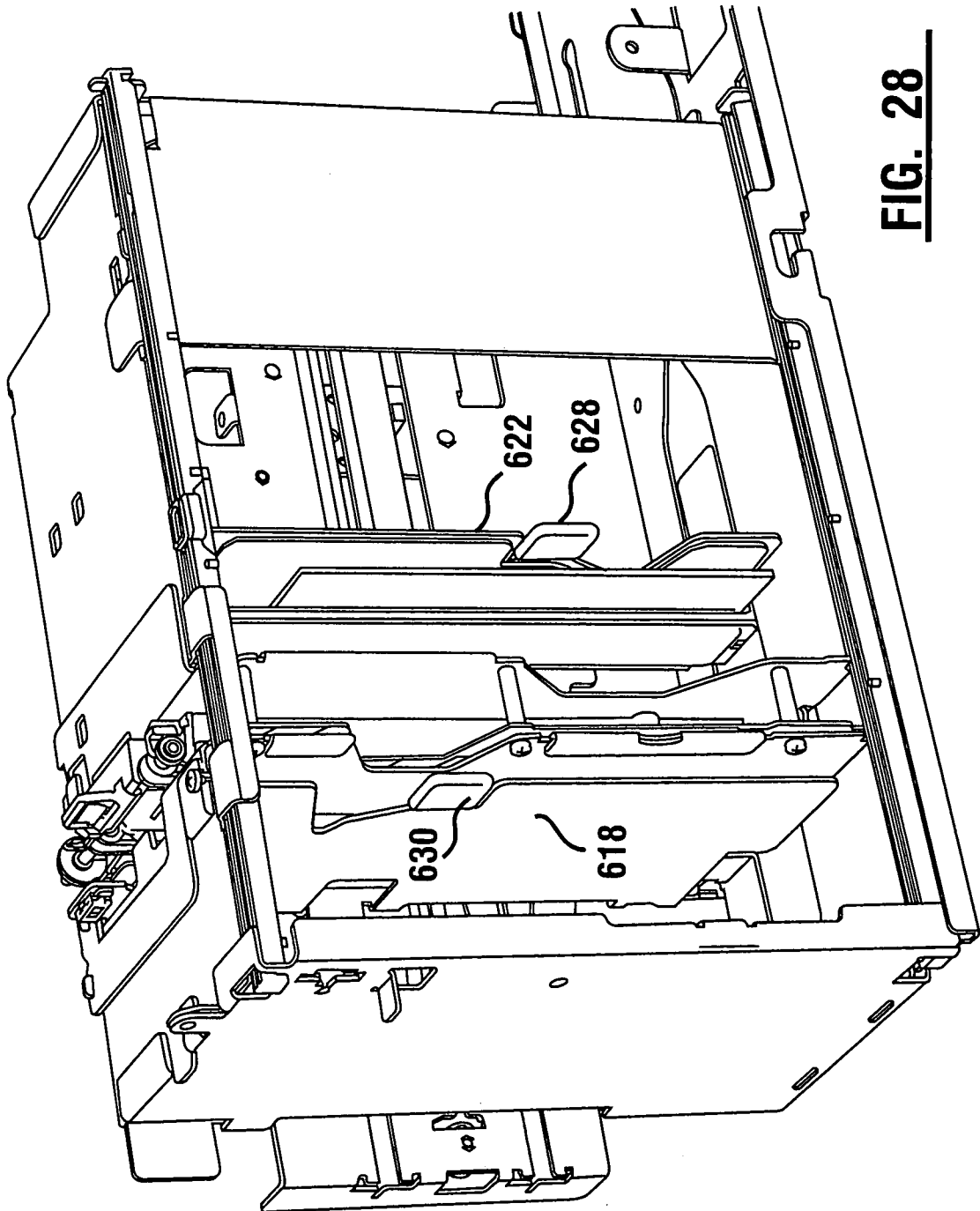


FIG. 28

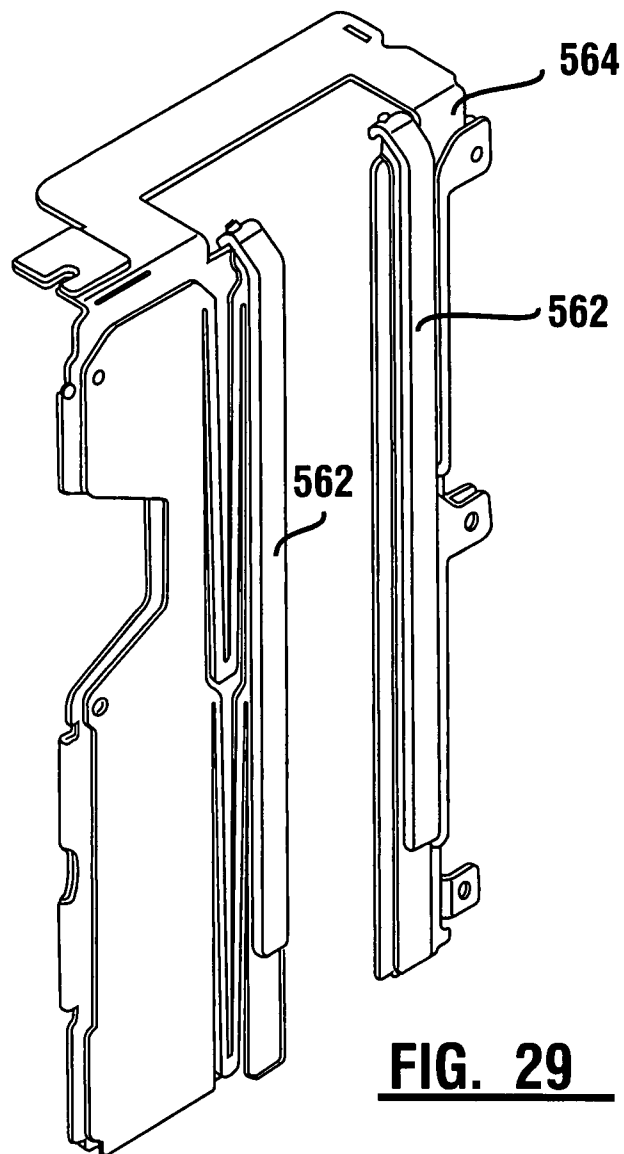


FIG. 29

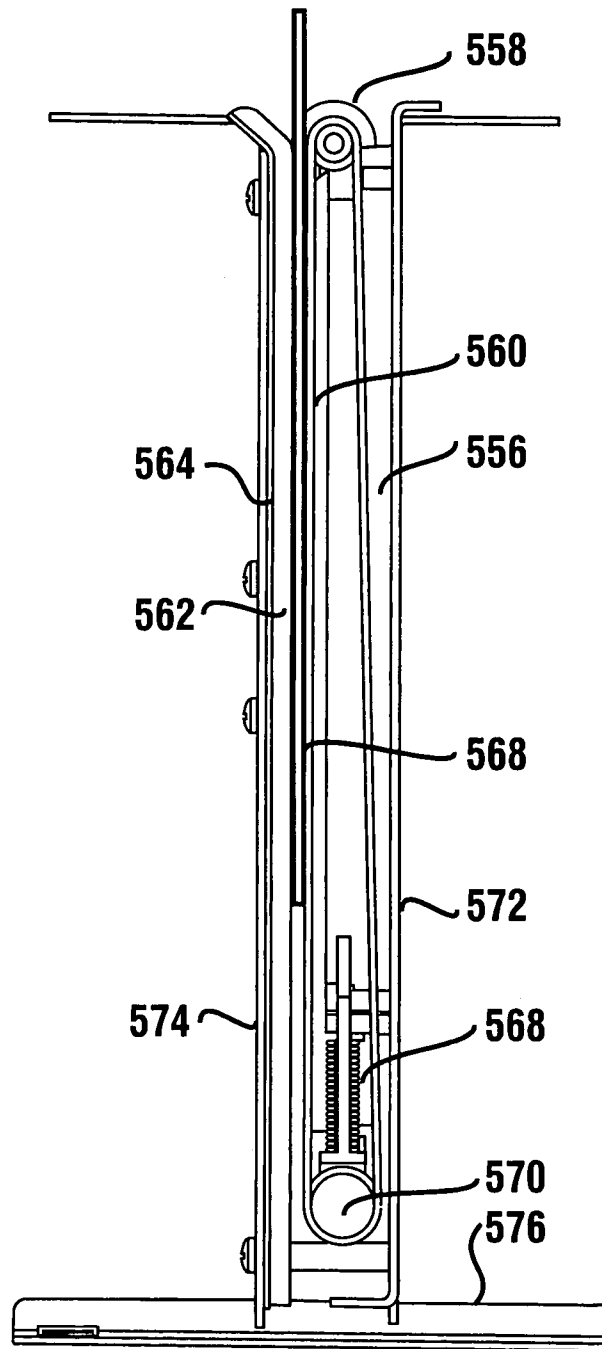
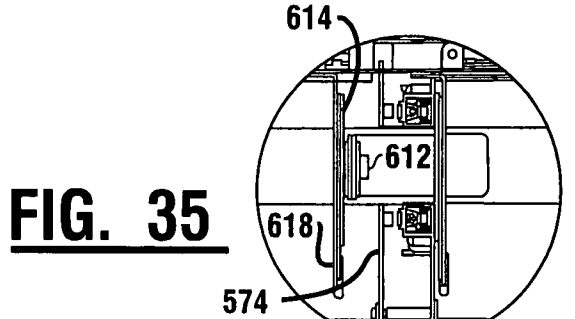
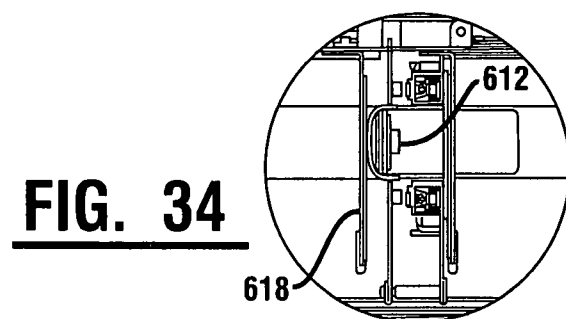
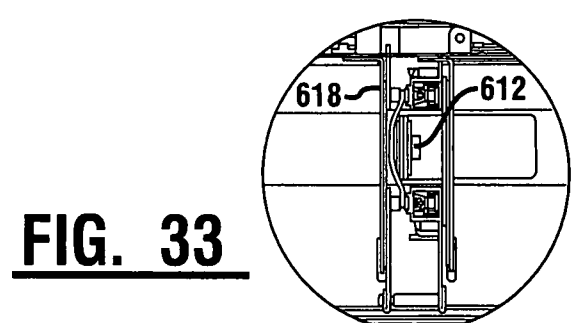
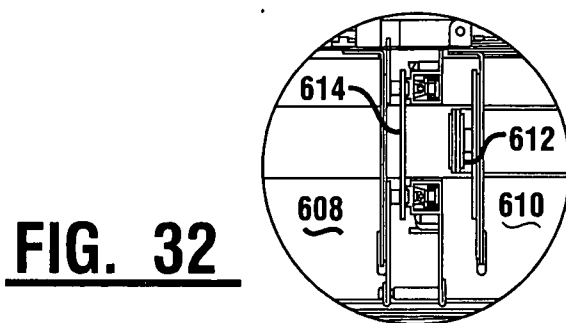
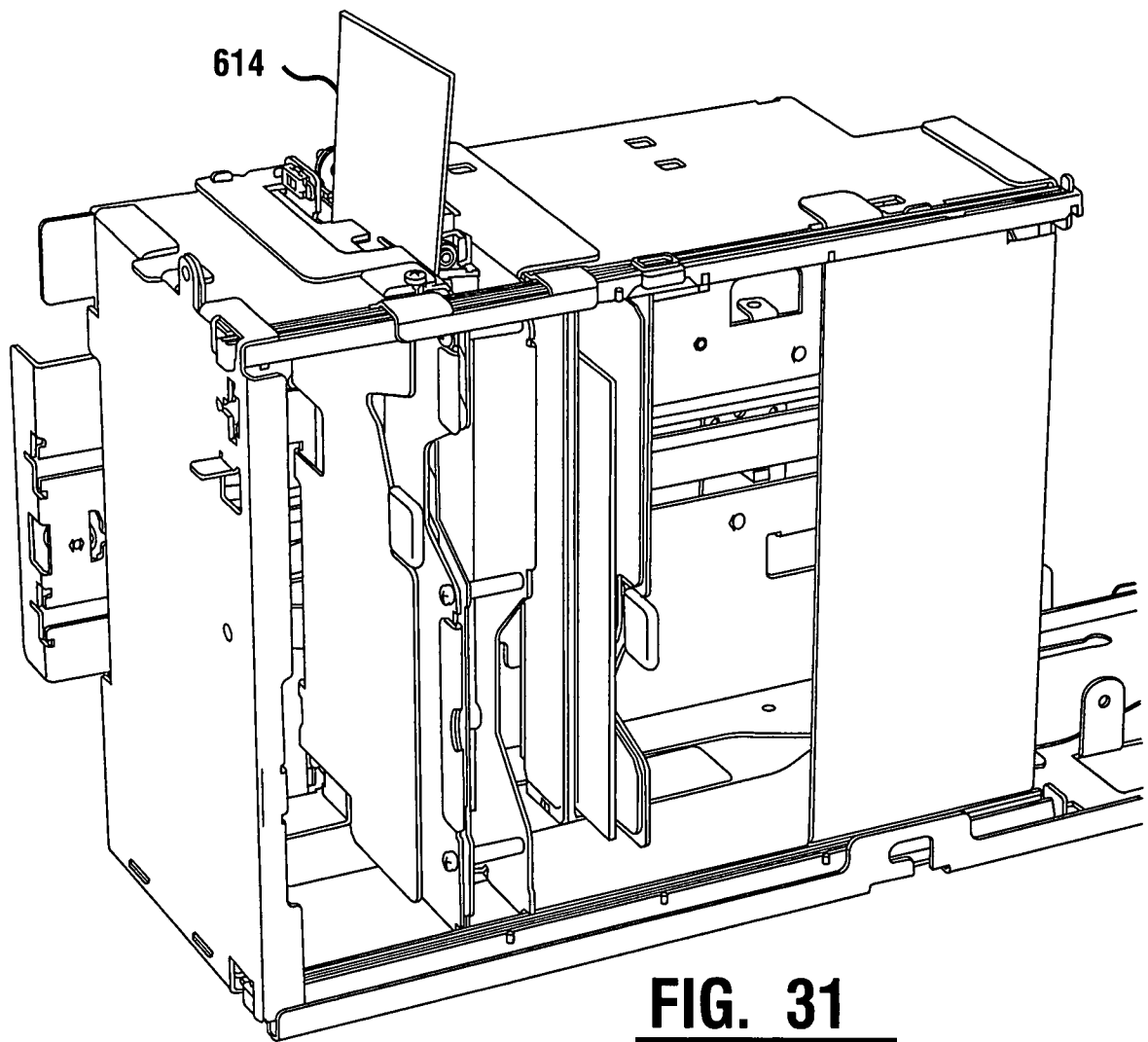


FIG. 30



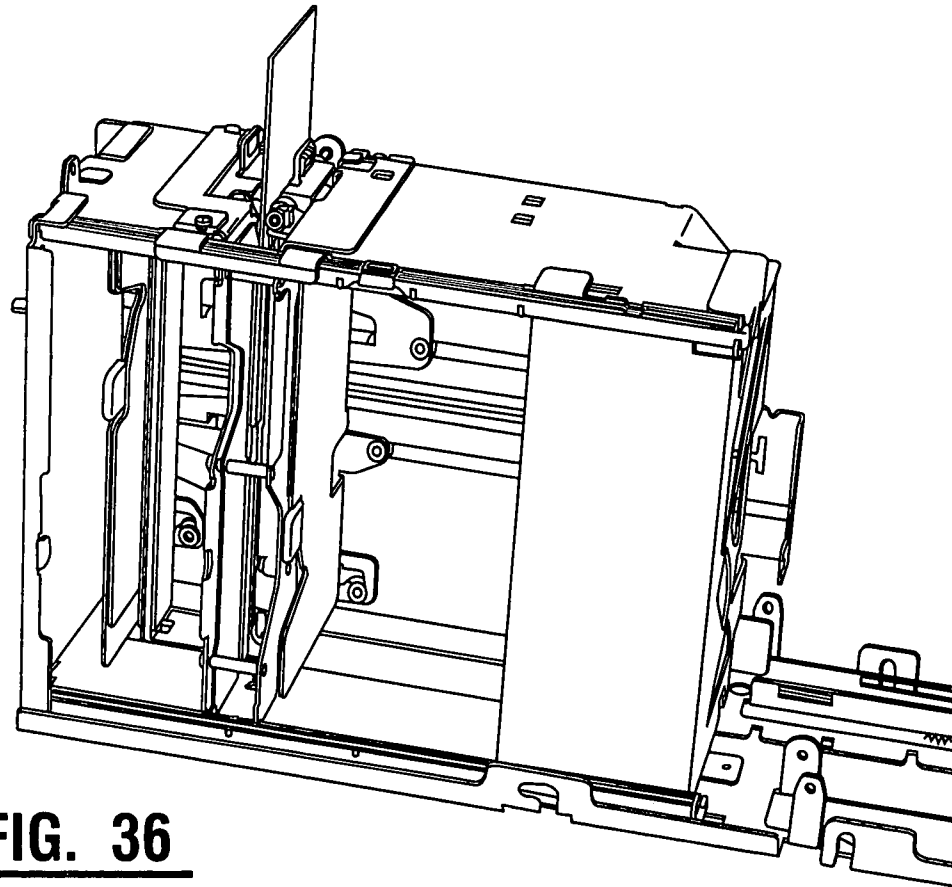


FIG. 36

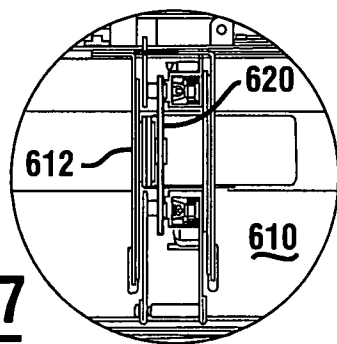


FIG. 37

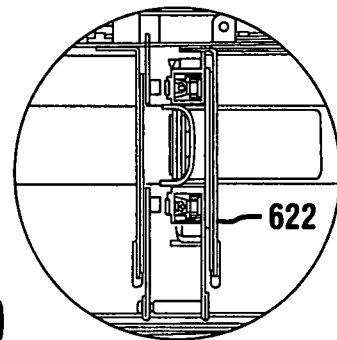


FIG. 39

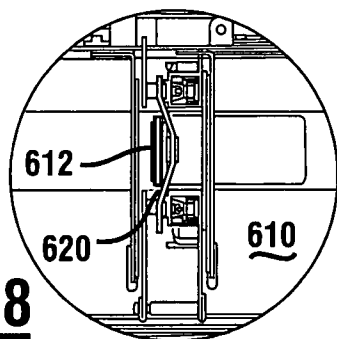


FIG. 38

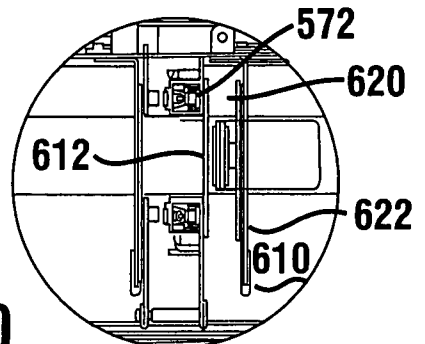
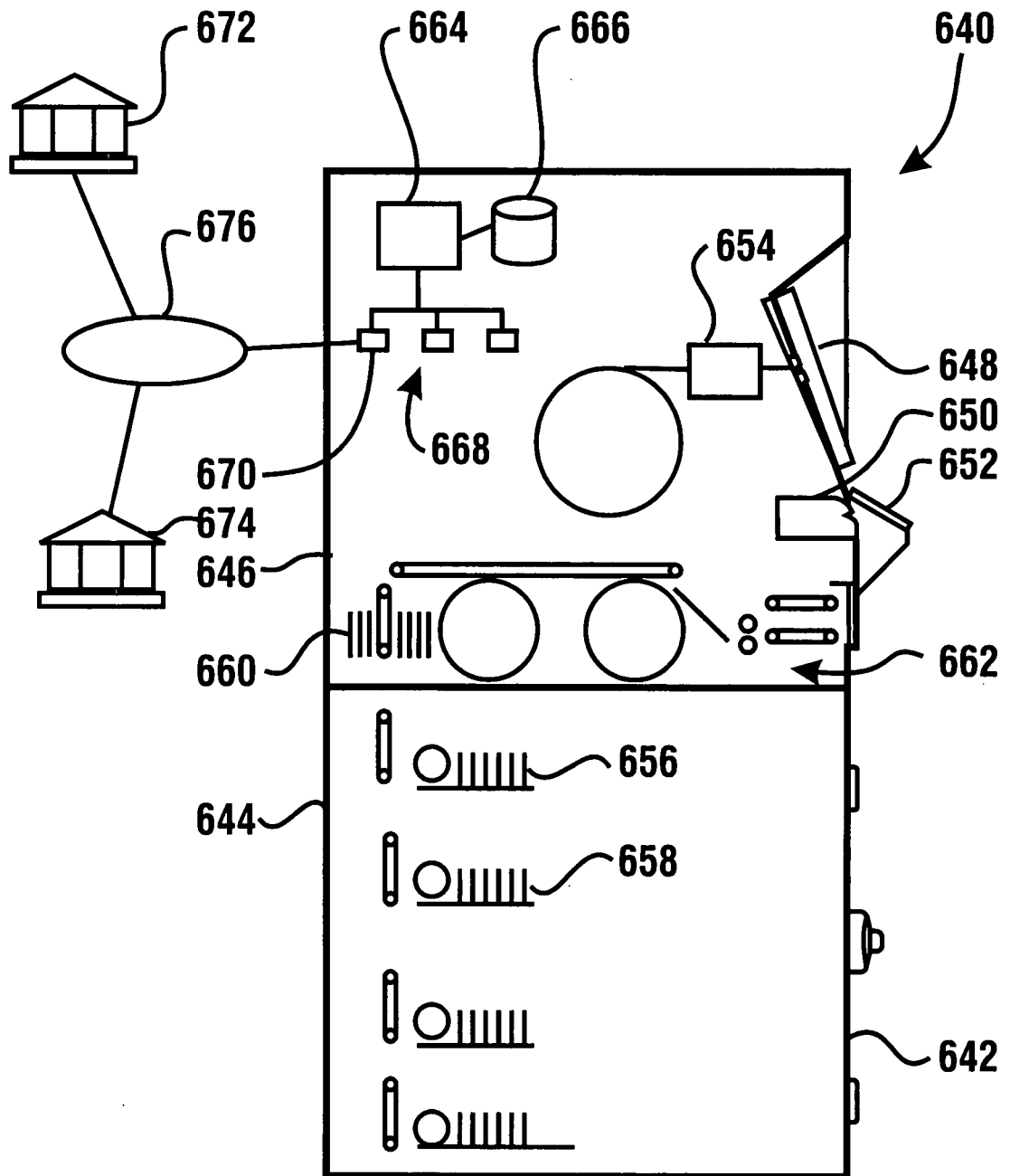


FIG. 40

**FIG 41**

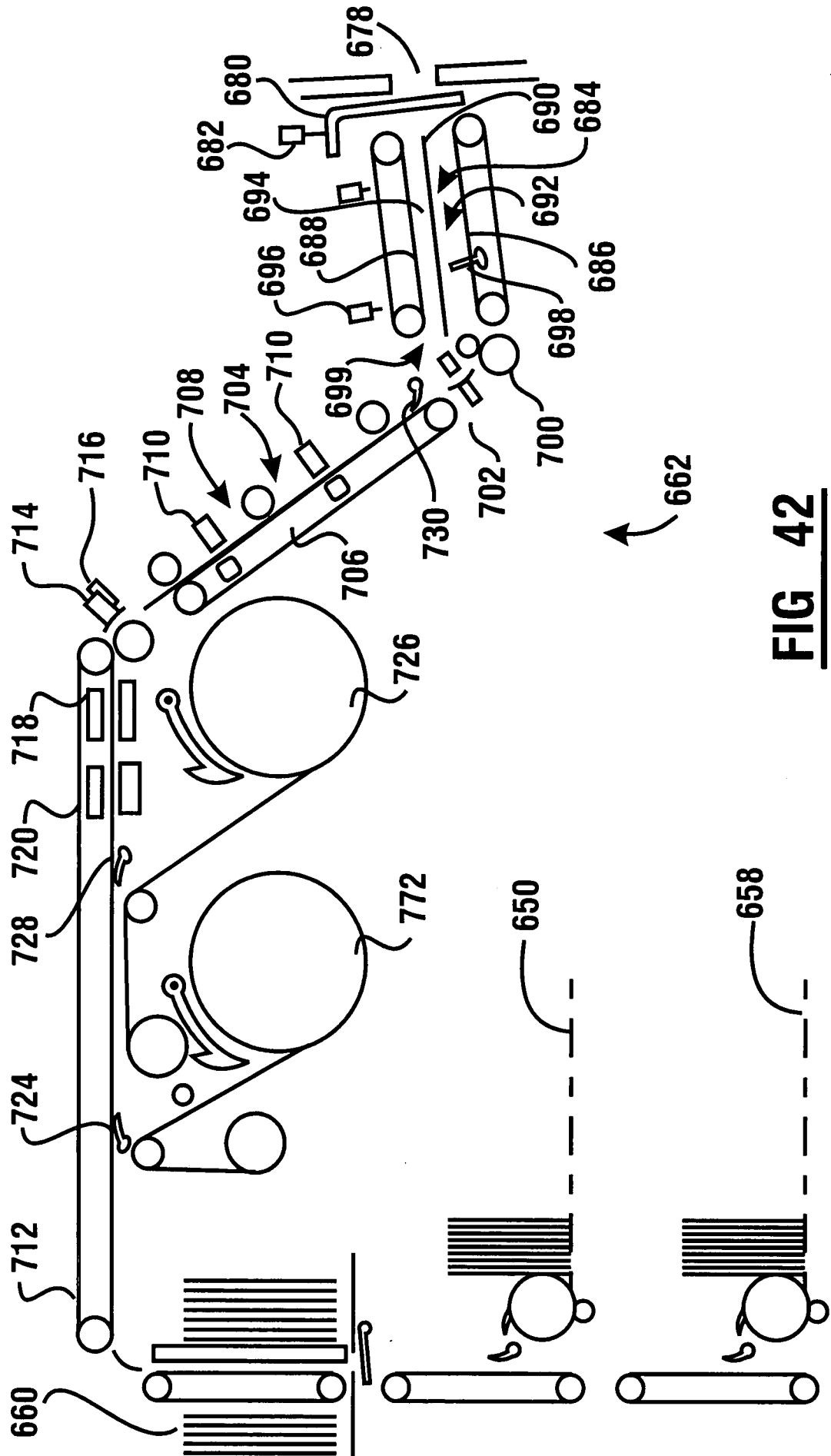


FIG 42

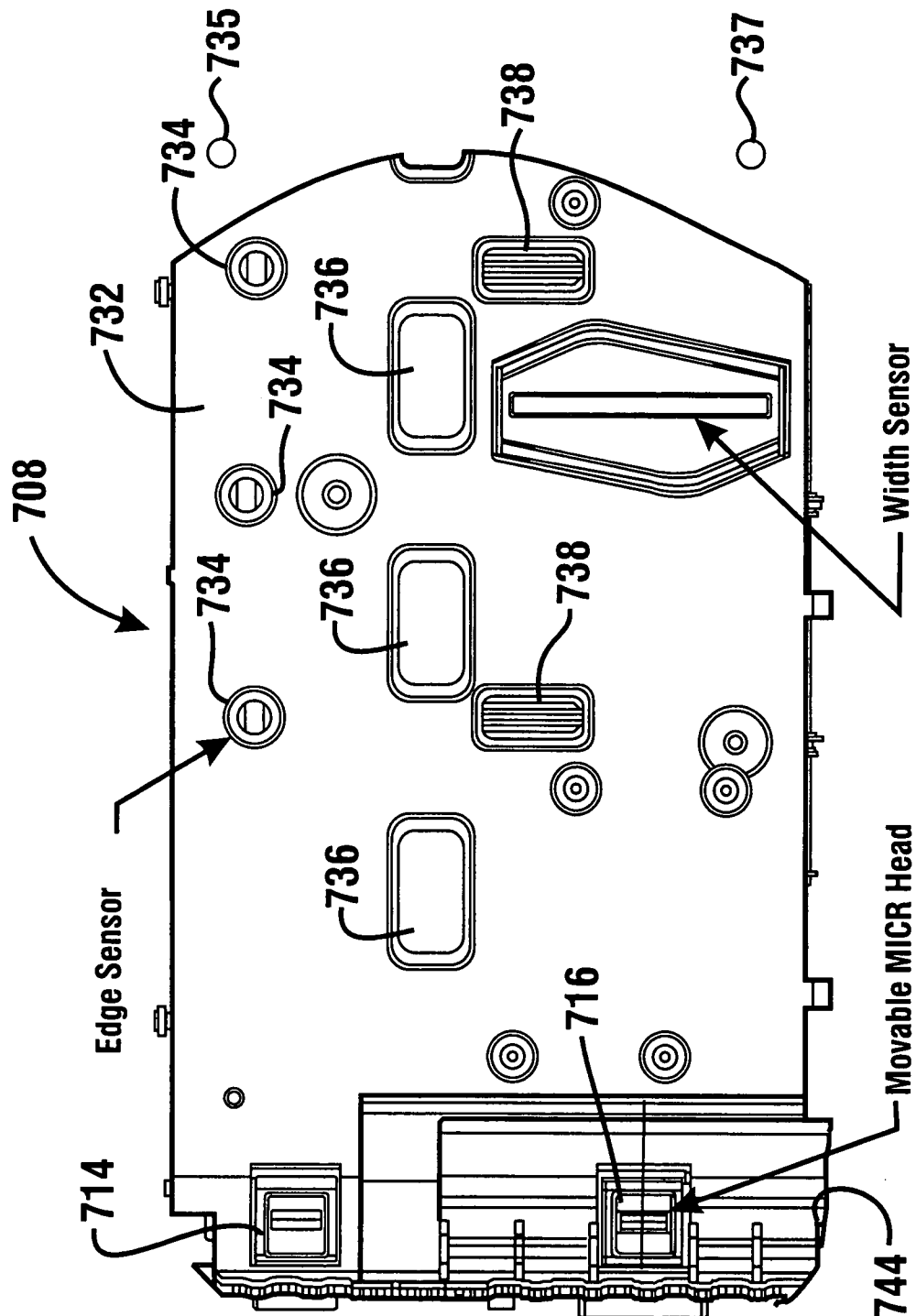


FIG 43

Check is aligned to edge sensors.

Width sensor determines opposite edge of check

Movable MICR head position based on width of check

MICR can be read from either side of check

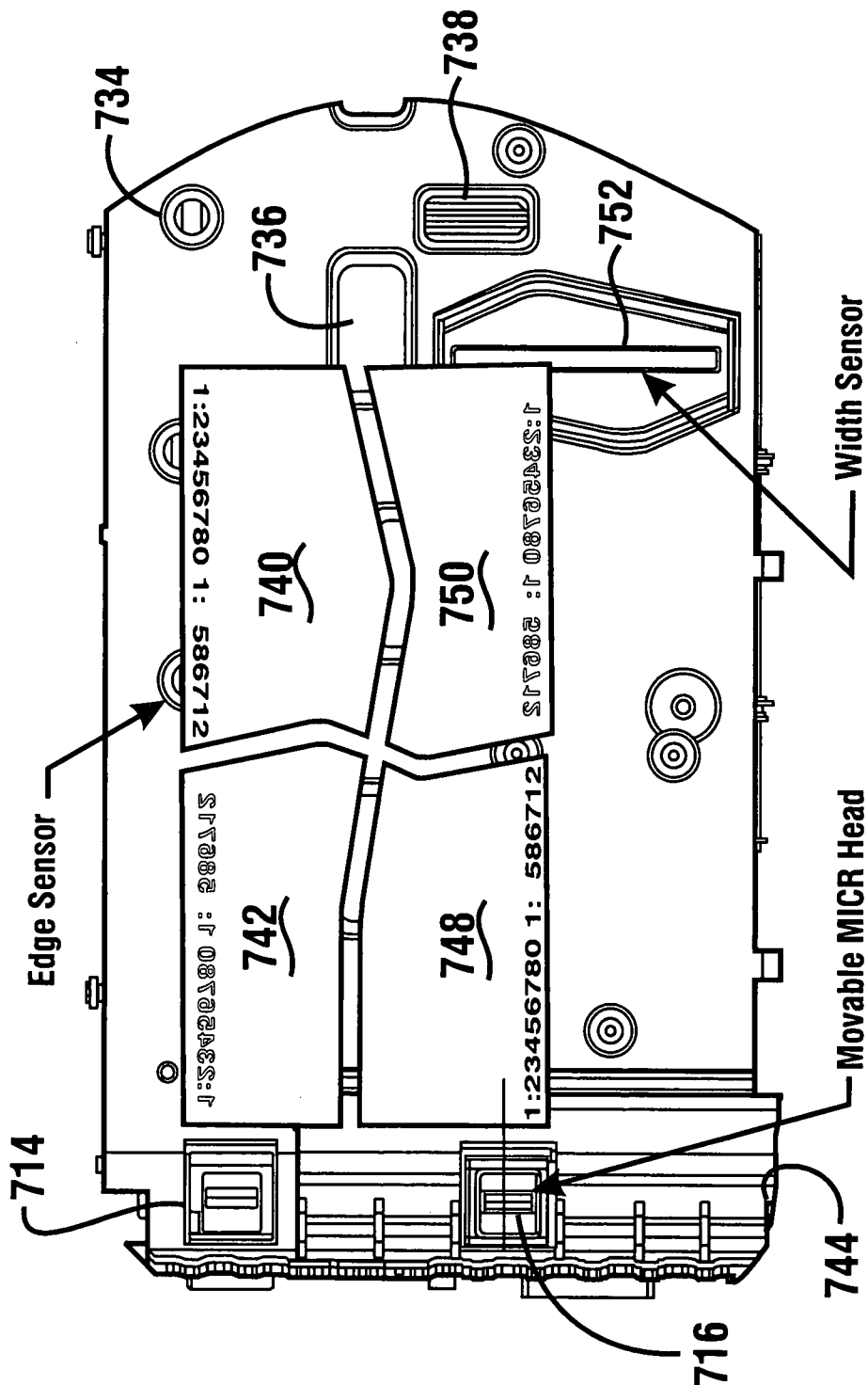


FIG 44

Check is aligned to edge sensors.
 Width sensor determines opposite edge of check
 Movable MICR head position based on width of check
 MICR can be read from either side of check

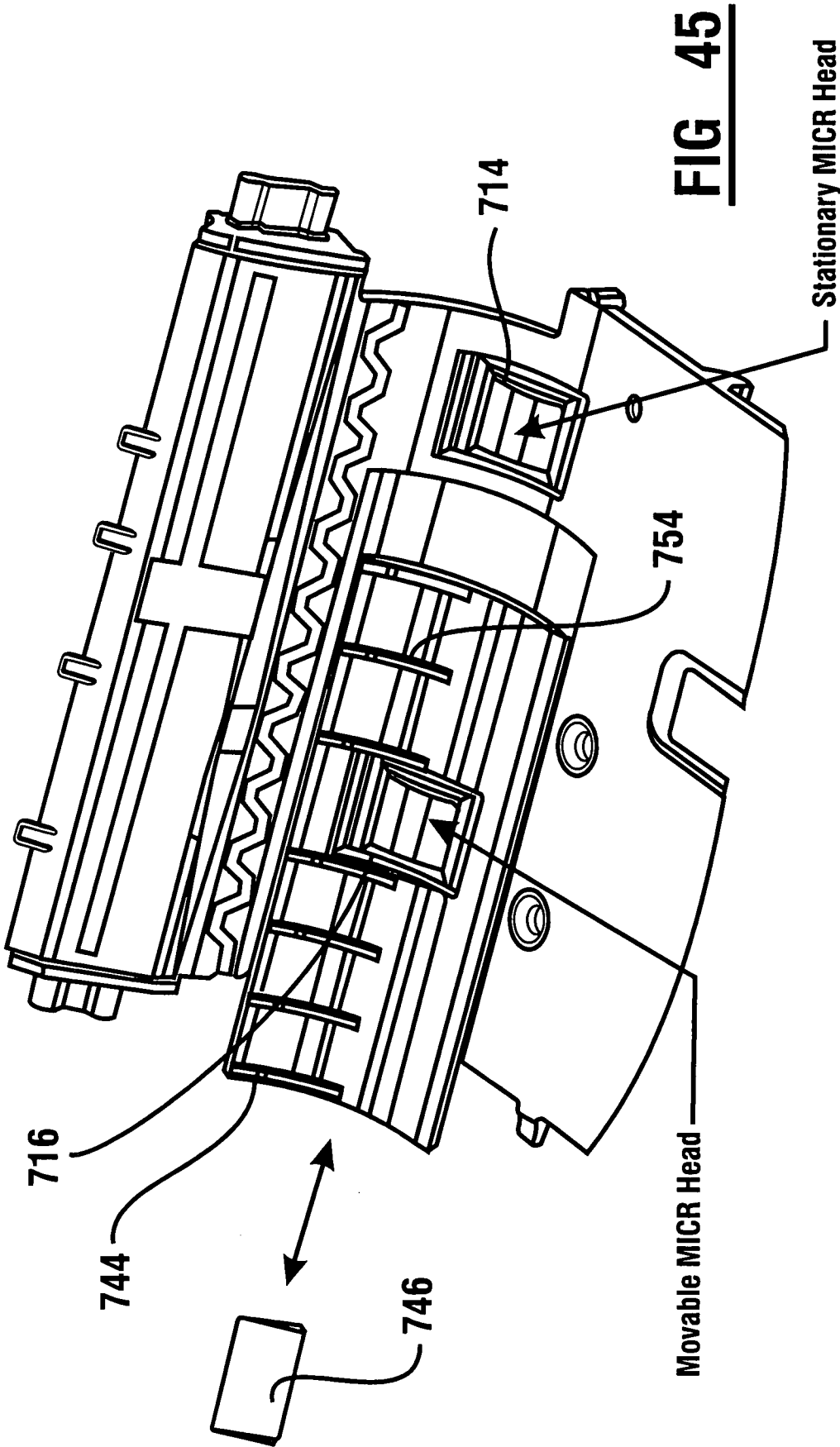


FIG 46

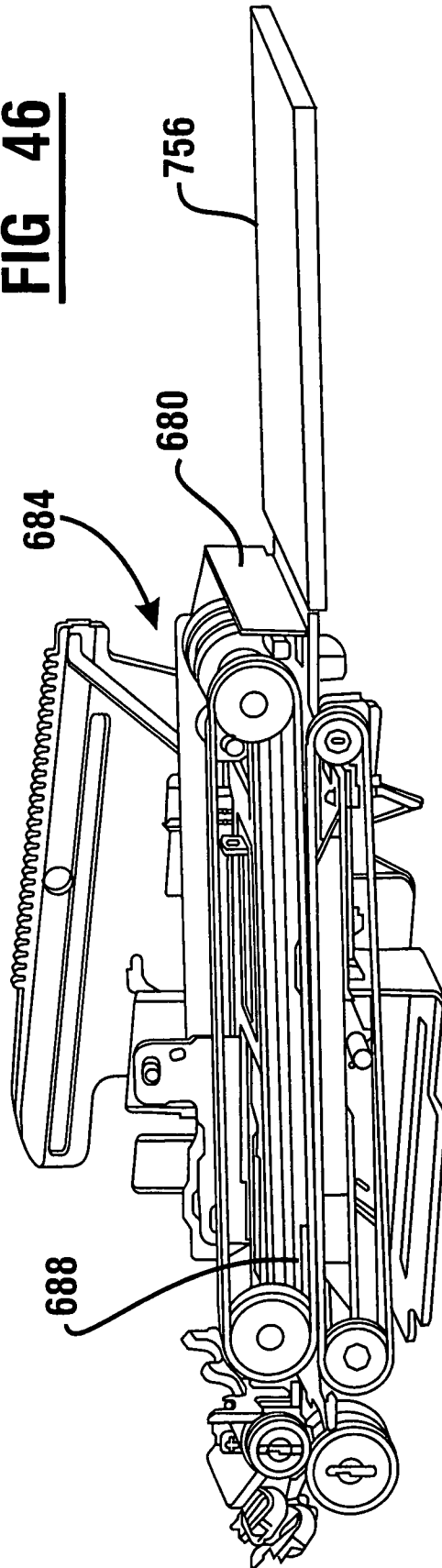
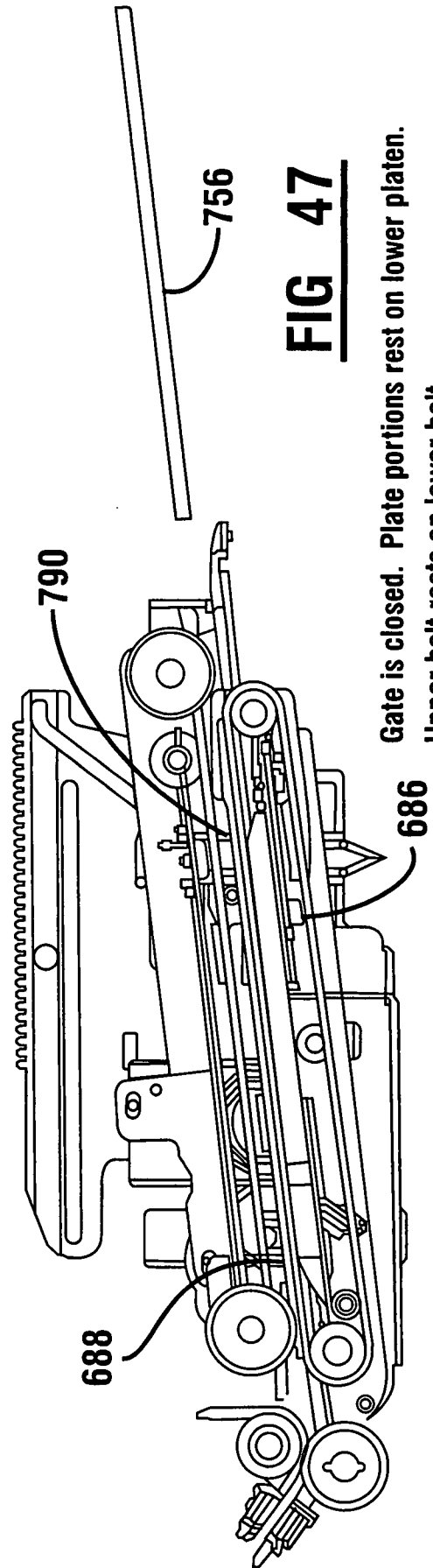


FIG 47



Gate is closed. Plate portions rest on lower platen.
Upper belt rests on lower belt.

FIG 48

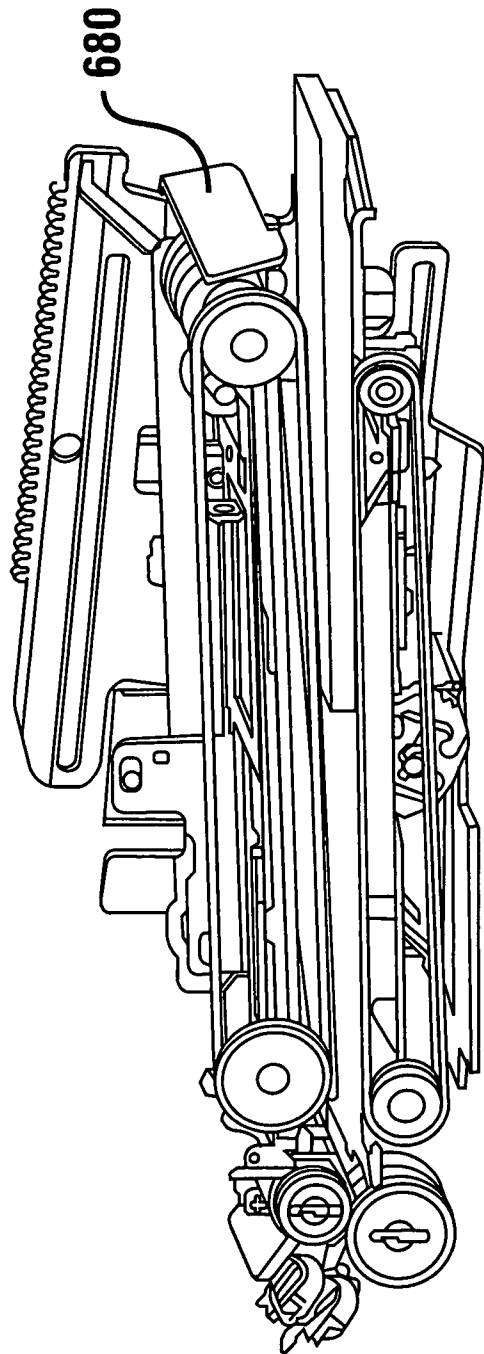
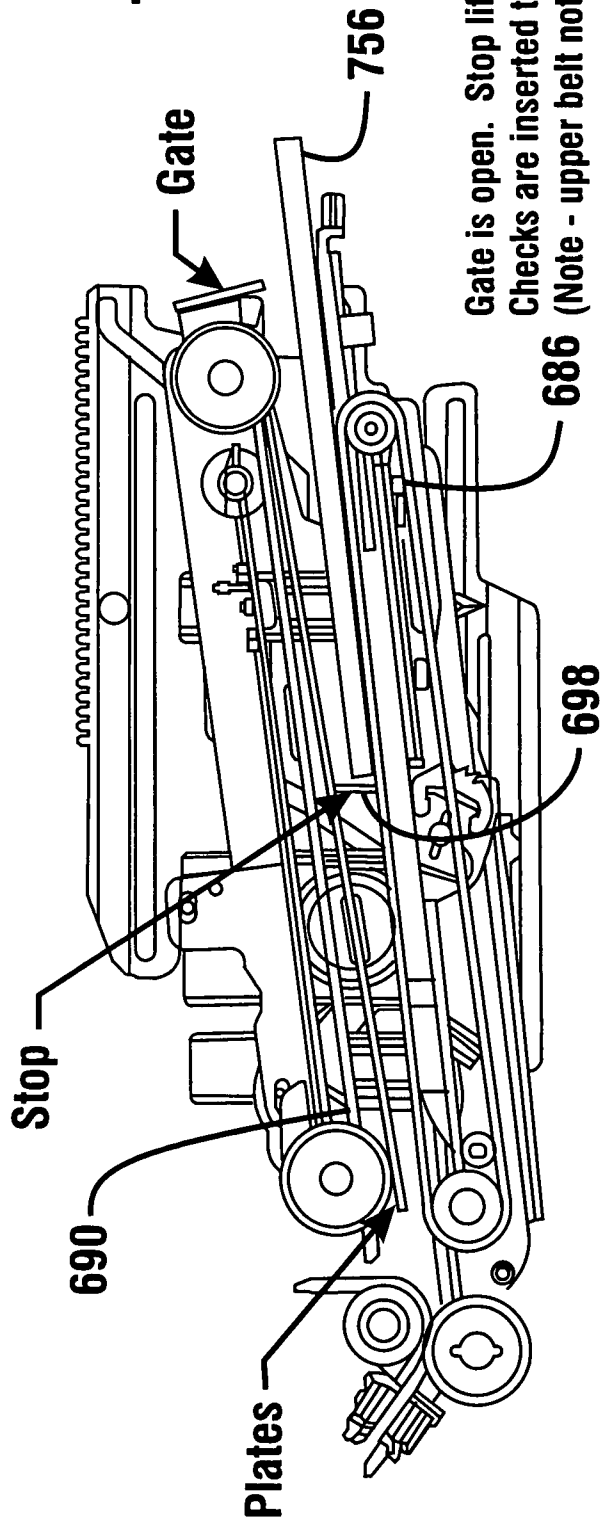


FIG 49



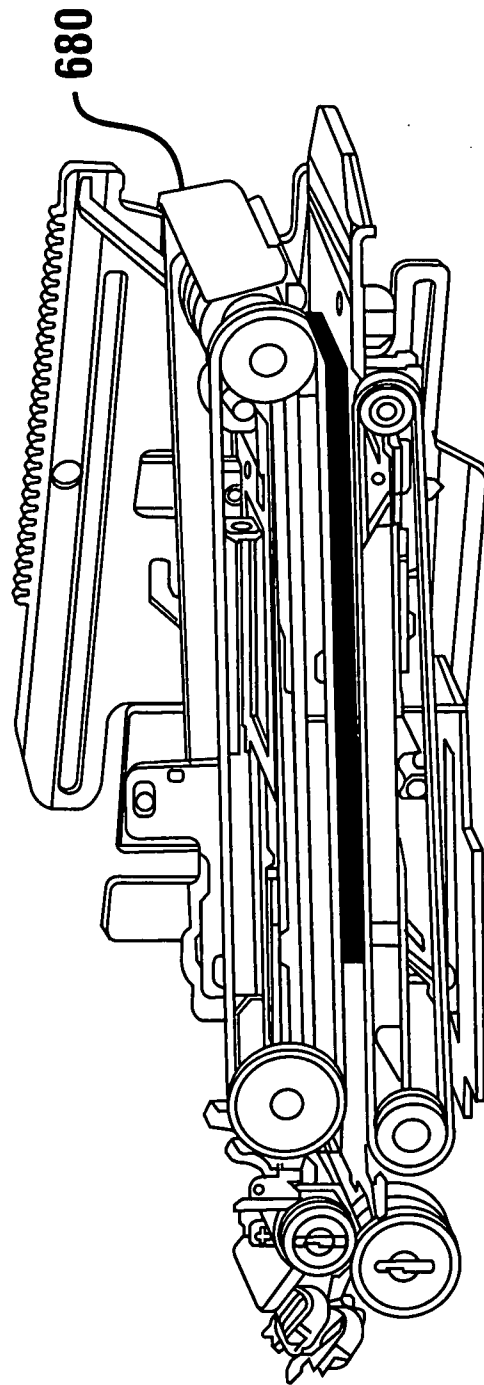
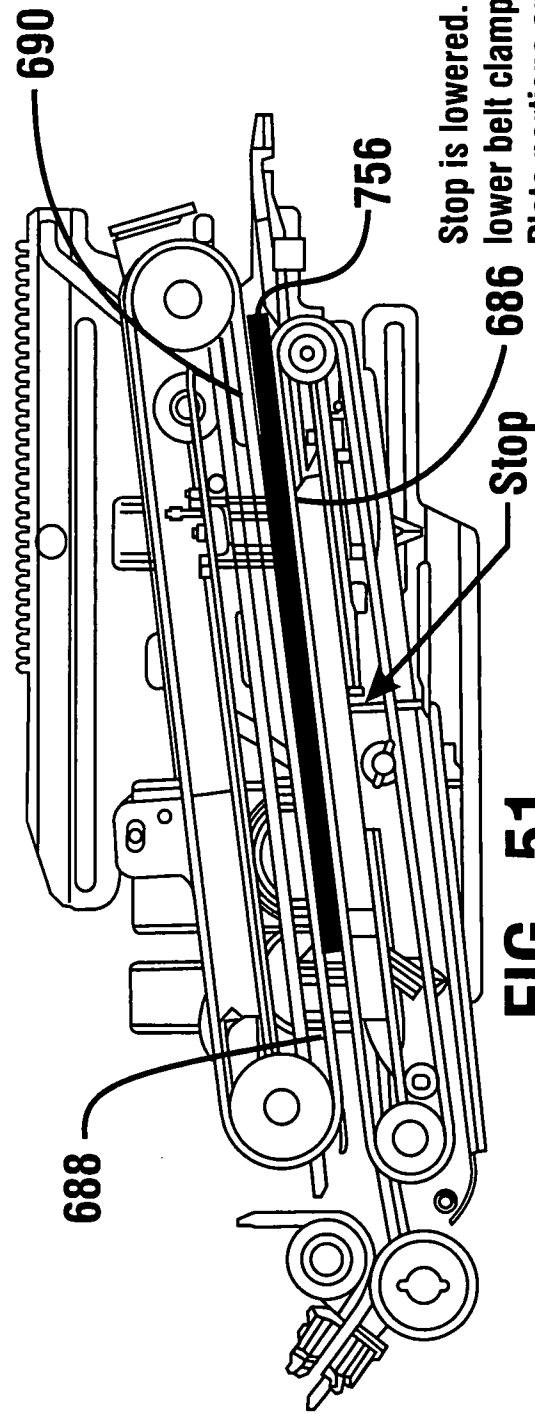


FIG 50



Stop is lowered. Upper belt and
lower belt clamp and move the checks in.
Plate portions are sitting on checks.

FIG 51

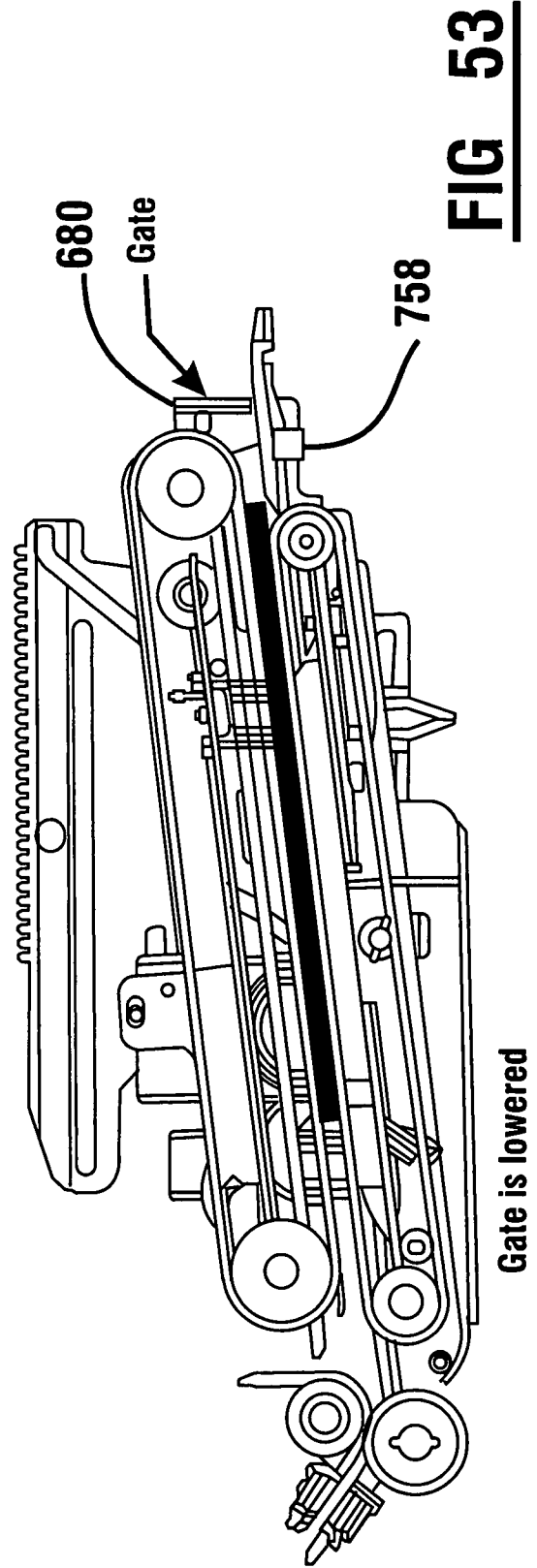
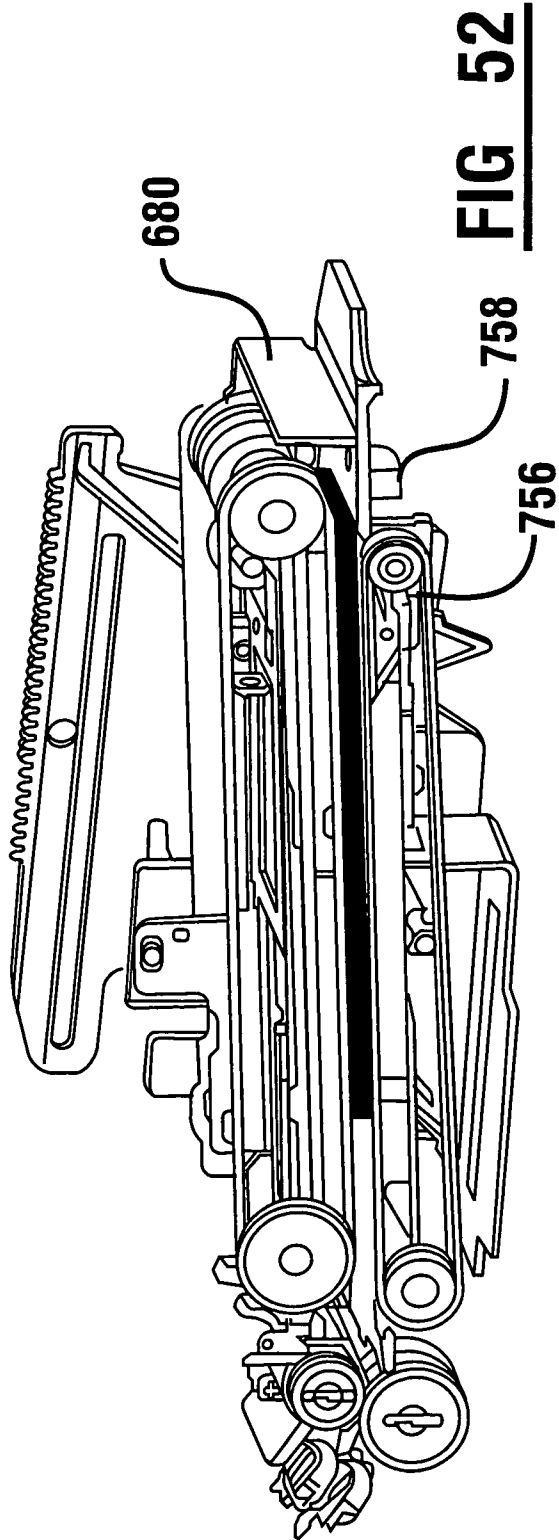


FIG 54

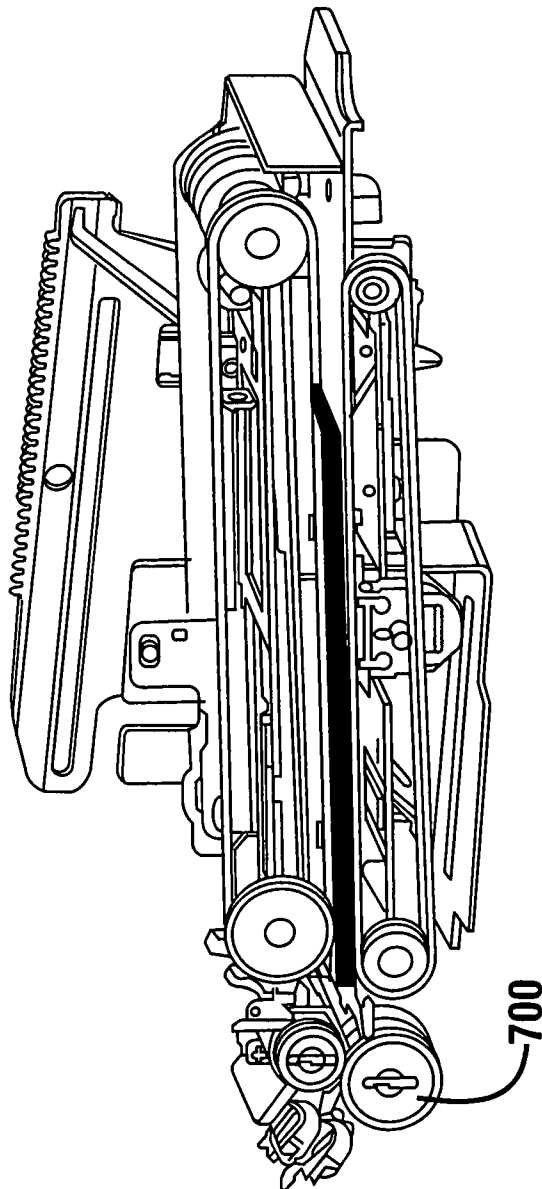
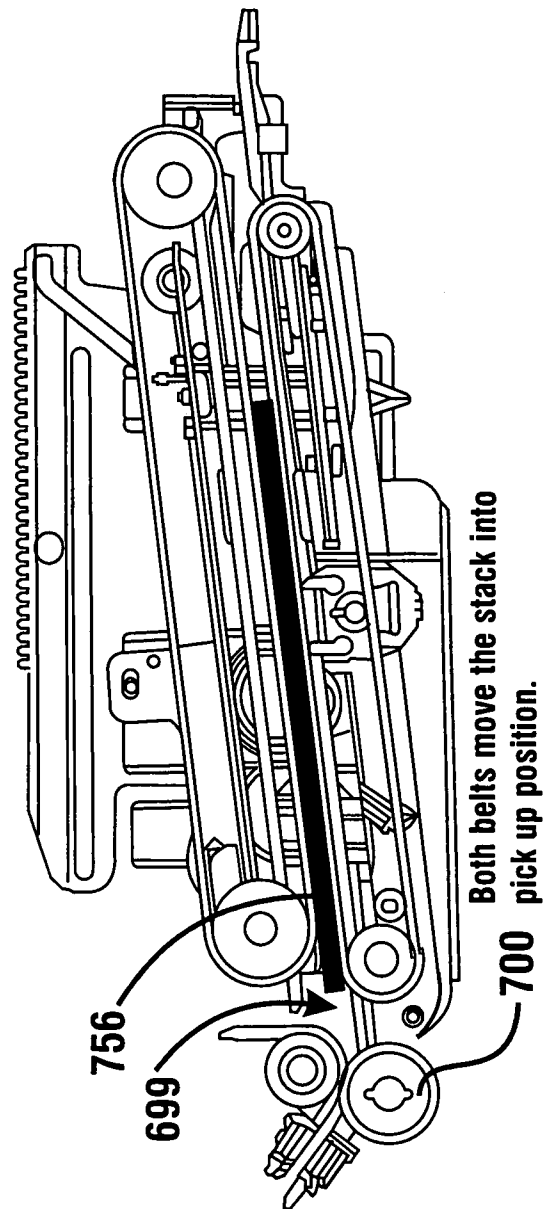
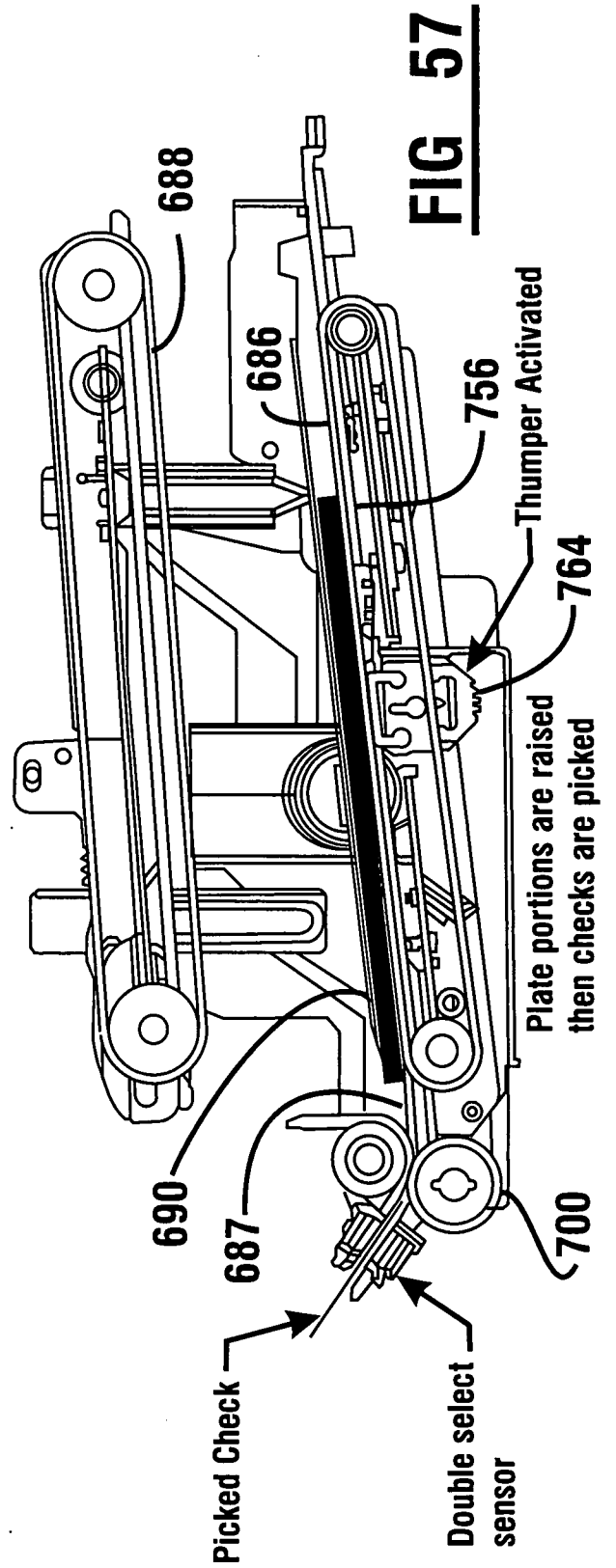
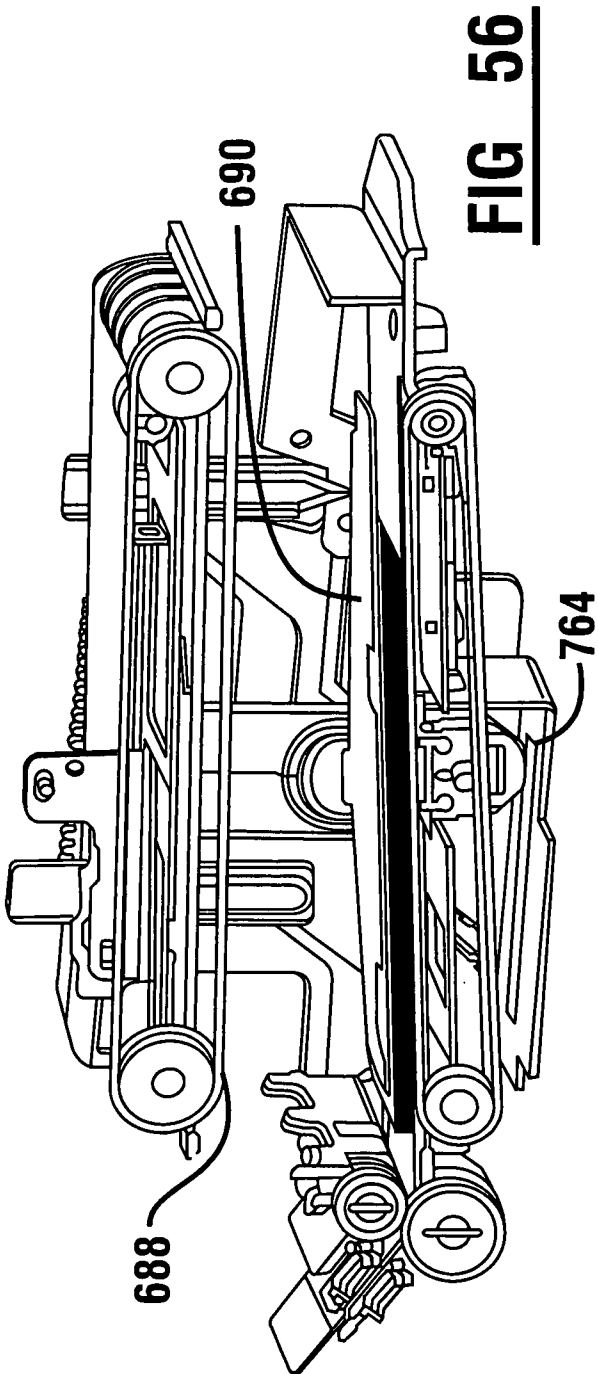


FIG 55





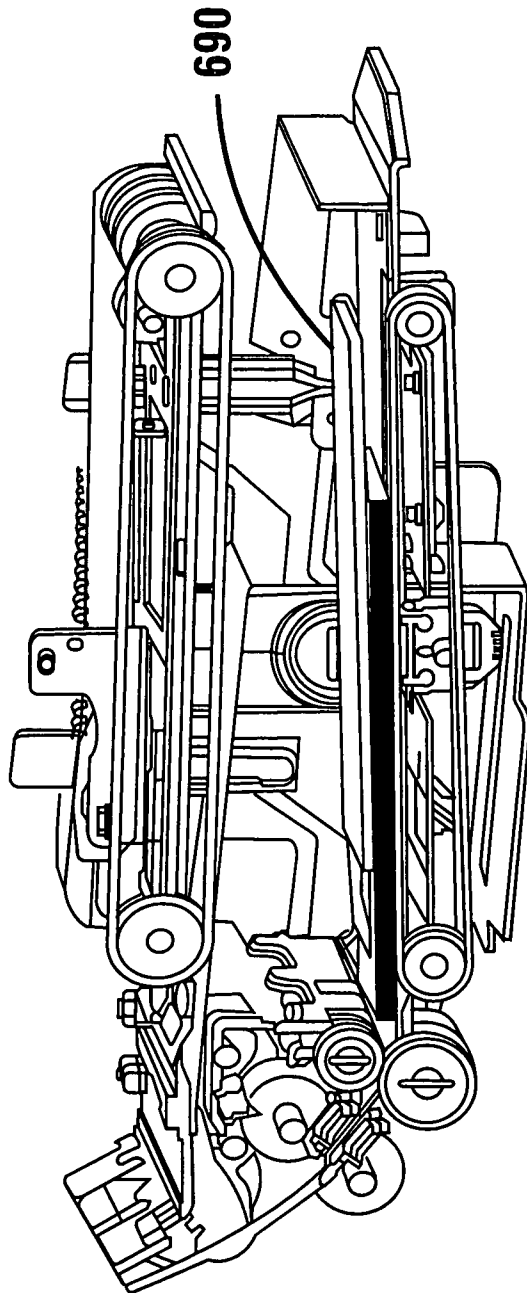


FIG 58

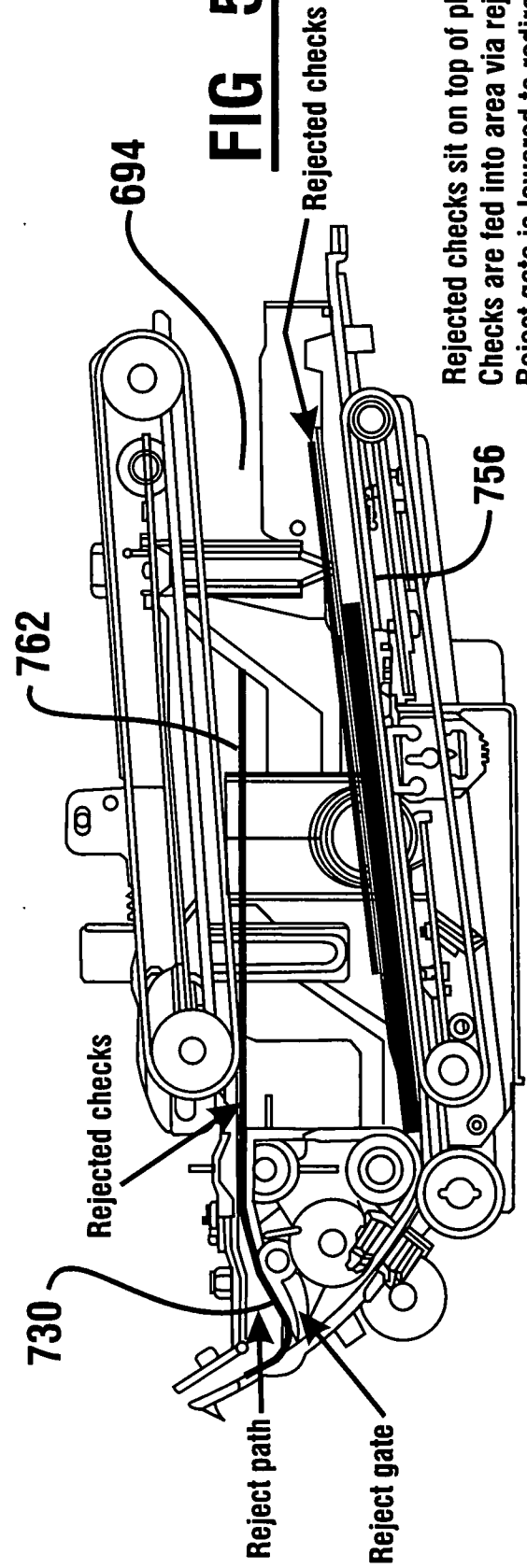
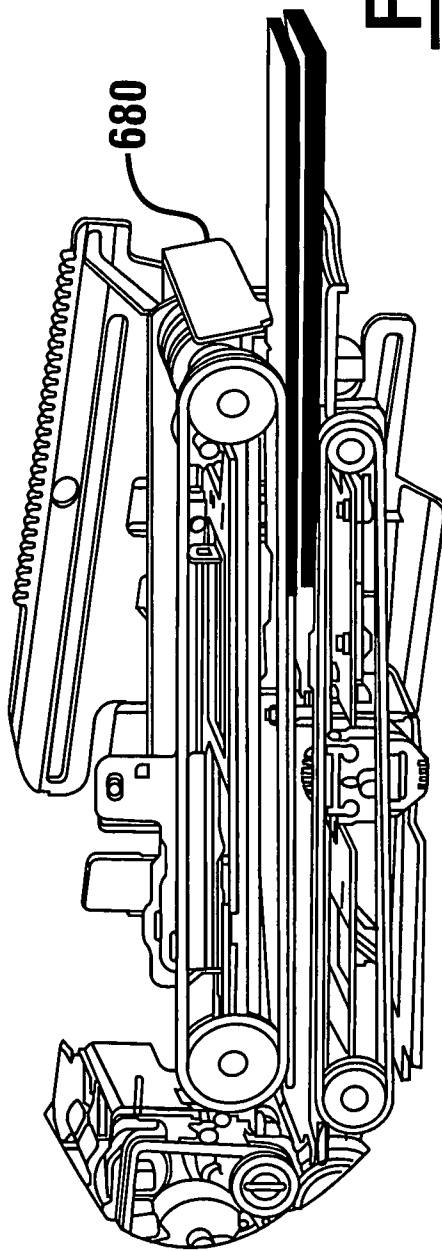
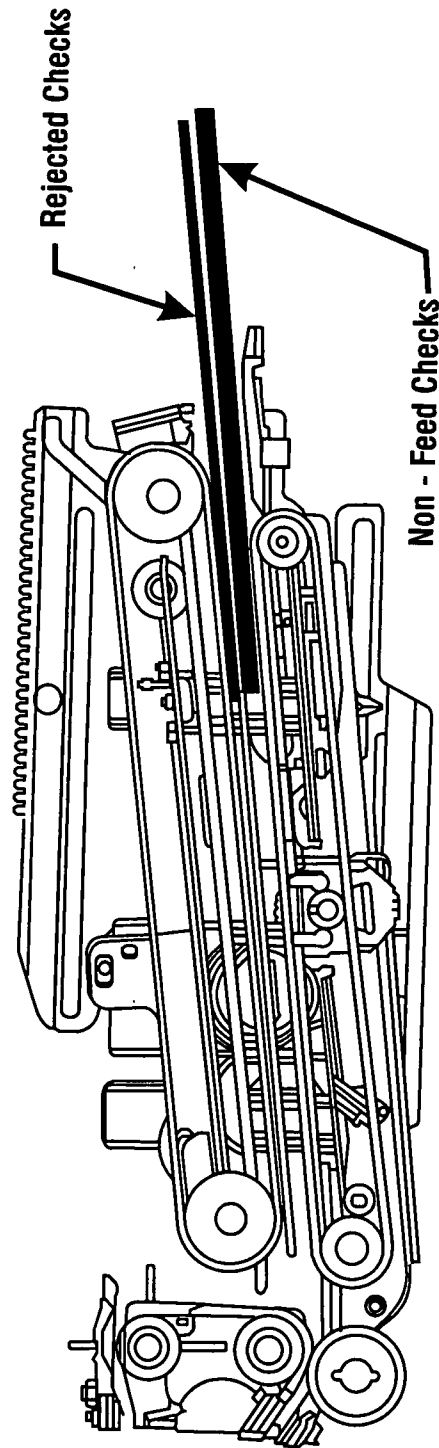


FIG 59

Rejected checks sit on top of plate portions.
Checks are fed into area via reject path.
Reject gate is lowered to redirect rejected checks into reject path.

**FIG 60****FIG 61**

Rejected checks sit on top of plate portions.
 Non-feed Checks are below plate portions.
 Checks are clamped between upper belt and lower belt.
 Gate is opened and both belts are run to feed checks back to customer.

FIG 62

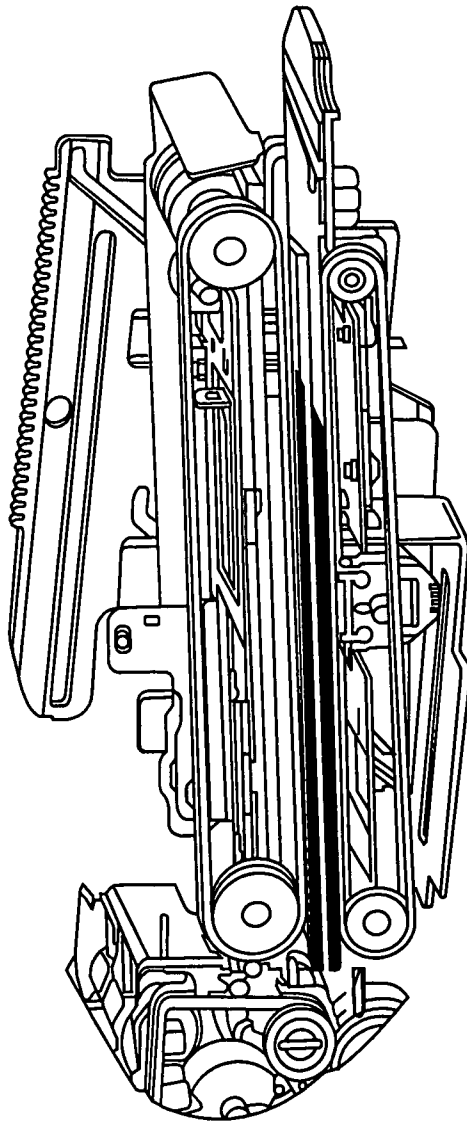
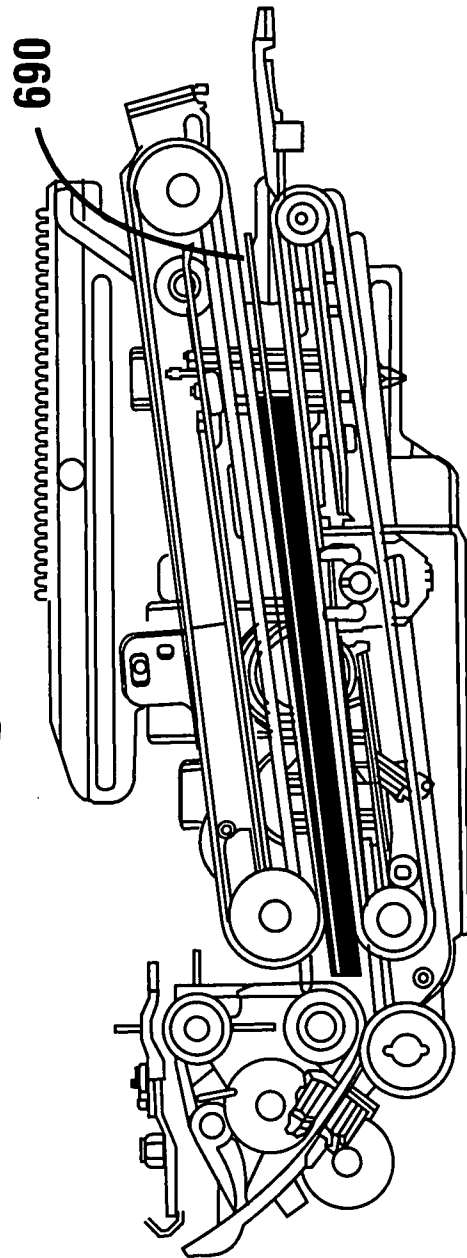


FIG 63



If the customer doesn't take checks upper belt and lower belt pull checks back into the machine.

FIG 64

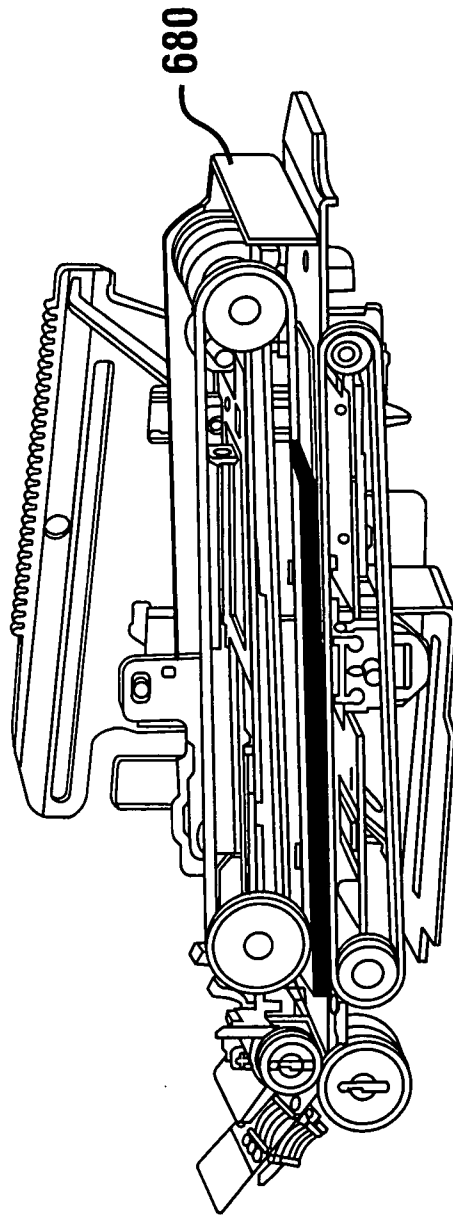


FIG 65

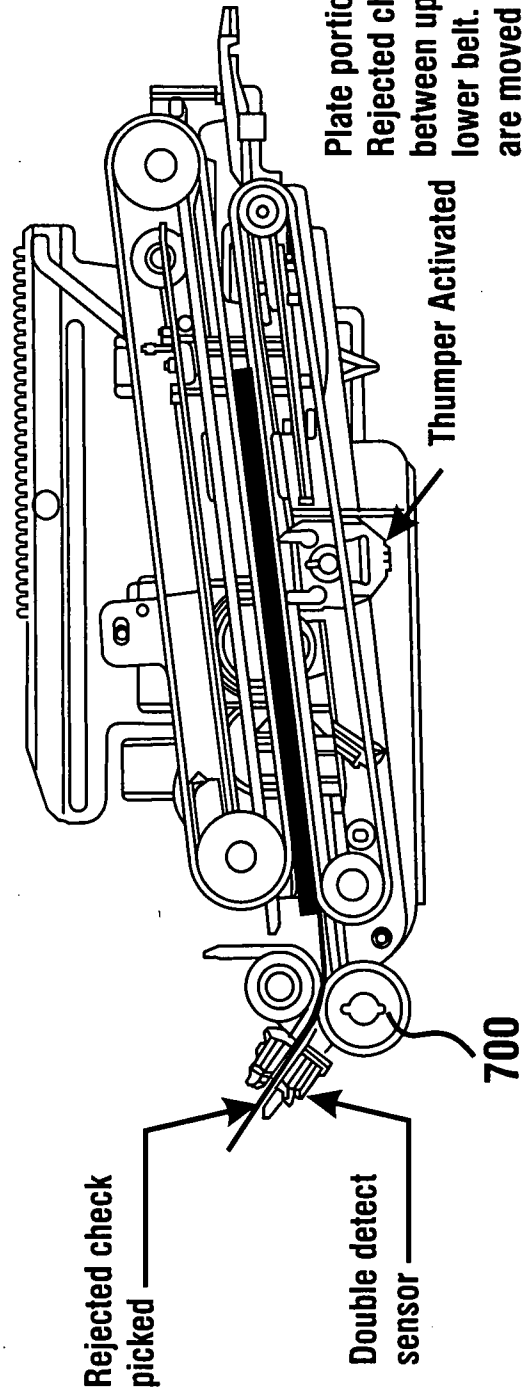


Plate portions rest on lower platen.
Rejected checks are clamped
between upper belt and
lower belt. Rejected checks
are moved to pick position and
picked.

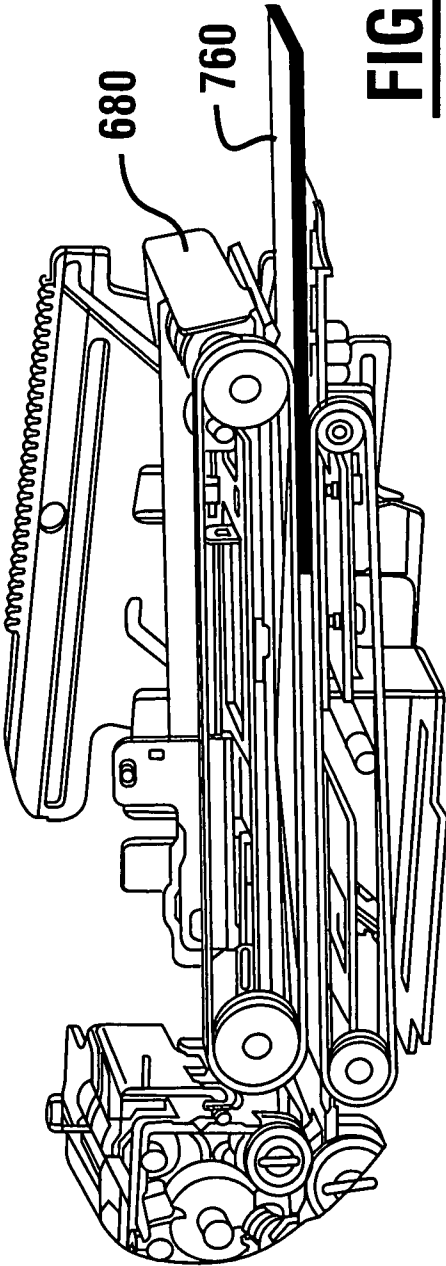


FIG 66

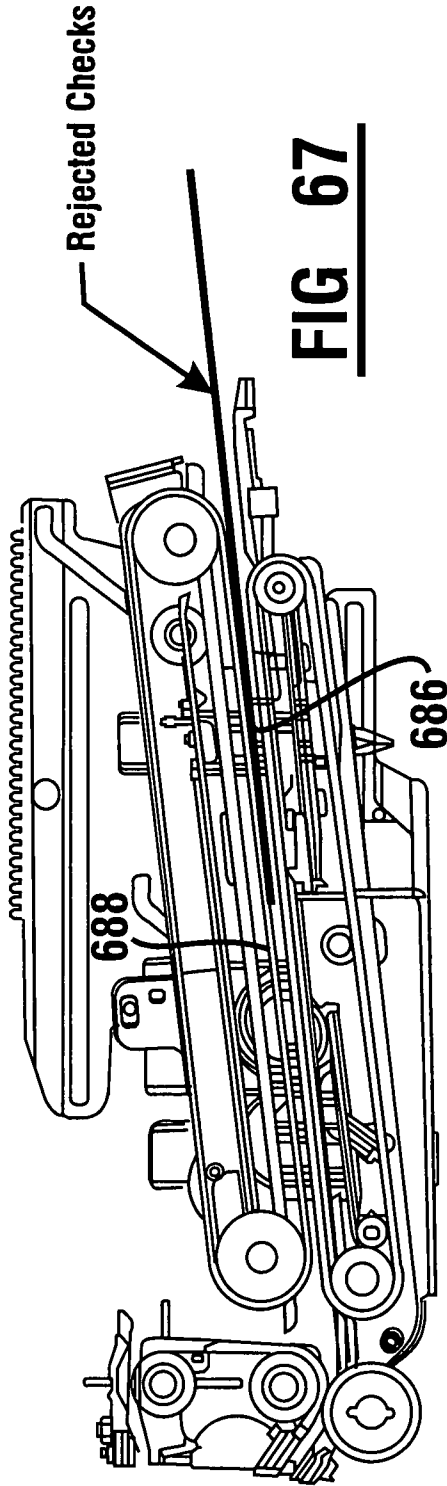


FIG 67

Plate portions sit on lower platen.
Rejected checks are above plate.
Rejected checks are clamped between upper
belt and lower belt.
Gate is opened and both belts are run
to feed rejected checks back to customer.

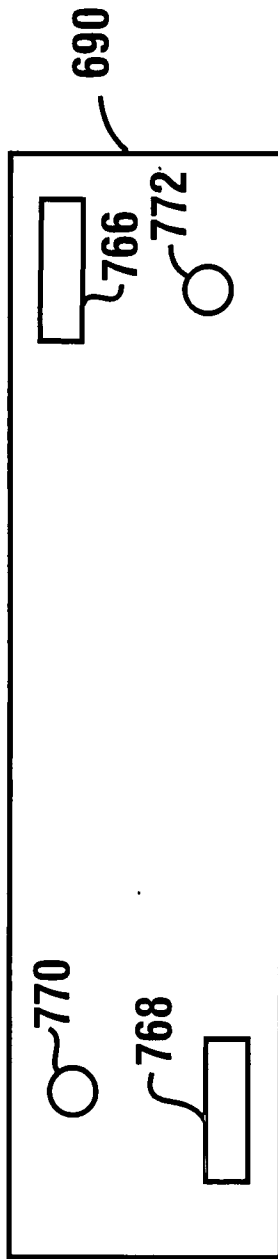


Fig. 69

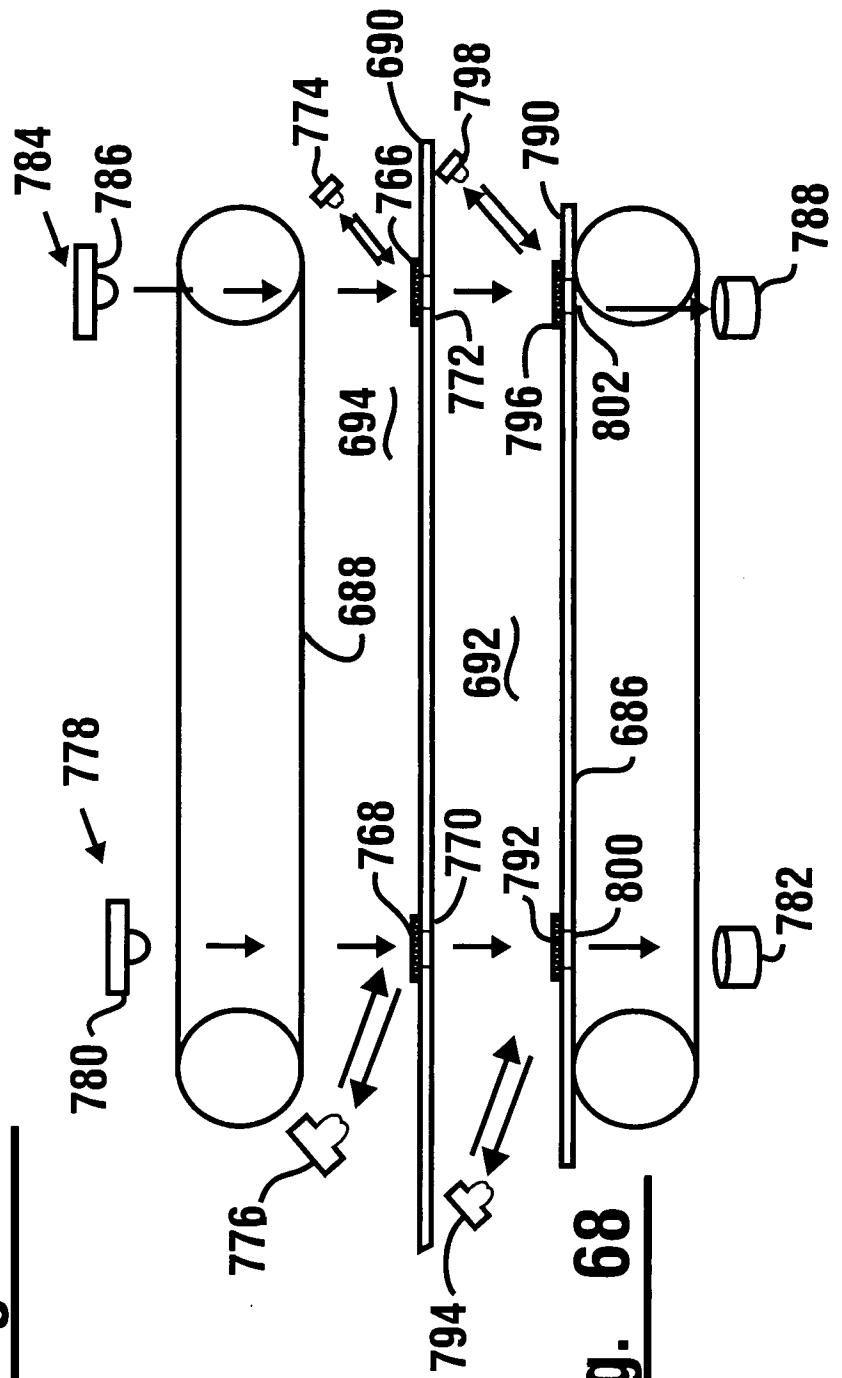


Fig. 68