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(54) Title: AUTOMATED BANKING MACHINE WHICH DISPENSES, RECEIVES AND STORES NOTES AND OTHER FINANCIAL INSTRUMENT SHEETS

(57) Abstract: An automated banking machine (10) accepts deposit items such as currency, checks, gift certificates or other items of value. Deposited items after being accepted in the machine and processed are moved to the container (260). The container includes an interior area (268) which is bounded by a shaker member (282) on which deposit items are supported. The machine is operative to control operation of an actuator (290) which moves the shaker member to impart shaking motion to deposited items (278) to facilitate the compact storage thereof within the container. The container is enabled to be removed from the machine to facilitate removal of the deposited items. Movement of the container out of and away from the machine is facilitated by rollable supports (296) and a retracted handle (298).
Automated Banking Machine Which Dispenses, Receives and Stores Notes and Other Financial Instrument Sheets

TECHNICAL FIELD

This invention relates to automated banking machines. Specifically this invention relates to automated banking machines that have the capability of receiving financial instrument sheets such as notes, checks and other documents from users. This invention also relates to automated banking machines that dispense financial instrument sheets to users of the machines.

BACKGROUND ART

The common type of automated banking machine used by consumers is an automated teller machine ("ATM"). ATMs enable customers to carry out banking transactions. Banking transactions carried out using ATMs may include the dispensing of cash, the making of deposits, the transfer of funds between account and account balance inquiries. The types of banking transactions a customer can carry out are determined by the capabilities of the particular banking machine and the programming of the institution operating the machine.

Other types of automated banking machines may be operated by merchants to carry out commercial transactions. These transactions may include, for example, the acceptance of deposit bags, the receipt of checks or other financial instruments, the dispensing of rolled coin or other transactions required by merchants. Still other types of automated banking machines may be used by service providers in a transaction environment such as at a bank to carry out financial transactions. Such transactions may include, for example, the counting and storage of currency notes or other financial instrument sheets, the dispensing of notes or other sheets, the imaging of checks or other financial instruments, and other types of service provider transactions. For purposes of this disclosure an automated banking machine shall be deemed to
include any machine that may be used to carry out transactions involving transfers of value.

Many types of automated banking machines are required to handle financial instrument sheets. Such sheets may include for example, notes, checks or other documents that are representative of value. In some cases the financial instrument sheets may have varying properties from sheet to sheet. For example some sheets may be new and crisp while others that are equally valid may be used and worn. Alternatively, financial instrument sheets may be of different types which have different properties. These may include for example combinations of documents such as notes and checks which may be comprised of different types of paper or plastic materials. Mechanisms which may separate each individual sheet from a stack rapidly and reliably, particularly in situations where the sheets have diverse properties, present challenges.

Automated banking machines are often positioned in locations that are sometimes unattended by bank officials or representatives of other entities owning the machines. In such cases security features are desirable to make it more difficult for criminals to attack the machine and attain access to the valuable financial instrument sheets that may be housed therein.

Some automated banking machines are operated under conditions where they are exposed to the elements. In such situations rain or snow may enter openings in the machine and cause problems. This may be particularly true of sensitive mechanisms within the machine that handle financial instrument sheets.

Automated banking machines are useful because they perform banking functions in a generally rapid and reliable manner. However there are situations where machines must go out of service for preventive maintenance or remedial service. In such cases it is desirable to enable an unauthorized servicer to complete the maintenance activity as expeditiously as possible.

This is desirably done by enabling ready access to the interior of the machine
authorized servicers while minimizing the risk of unauthorized access by criminals.

Thus there exists a need for automated banking machines with improved properties related to handling financial instrument sheets, weather resistance, security and service capabilities.

**DISCLOSURE OF INVENTION**

It is an object of an exemplary embodiment of the present invention to provide an automated banking machine.

It is a further object of an exemplary embodiment of the present invention to provide an automated banking machine that has improved capabilities for handling financial instrument sheets.

It is a further object of an exemplary embodiment of the present invention to provide an automated banking machine which provides enhanced security.

It is a further object of an exemplary embodiment of the present invention to provide an automated banking machine that facilitates user operation.

It is a further object of an exemplary embodiment of the present invention to provide an automated banking machine that has improved weather resistance.

It is a further object of an exemplary embodiment of the present invention to provide an automated banking machine that provides improved service access.

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

Certain of the foregoing objects are accomplished in an exemplary embodiment of the invention by an automated banking machine which is an automated teller machine ("ATM"). The ATM includes a user interface which includes input devices for receiving identifying inputs that identify user
accounts, as well as inputs from users that cause the machine to carry out
transaction functions. The user interface further includes one or more output
devices that output indicia such as instructions for a user in operating the
machine.

The exemplary embodiment includes a cash acceptor mechanism that
is capable of receiving a stack of documents from a user. In the exemplary
embodiment the stack of documents may include a stack of notes of various
denominations or a stack comprising mixed types of financial instrument
sheets such as notes and checks. In order to identify and process these
financial instrument sheets, the exemplary embodiment includes a mechanism
which operates to separate each sheet individually from the stack. This is
accomplished in the exemplary embodiment through movement of a picking
member which includes a plurality of sheet engaging portions which engage a
first sheet bounding the stack and urge the sheet to move in a first direction.

In the exemplary embodiment the sheet engaging portions are separated by
recesses which extend along the first direction. To reduce the risk that any
sheets other than the first sheet are separated from the stack, a first stripper
portion is generally aligned with at least one recess. The first stripper portion
engages the first sheet on a face thereof opposed from the face of the sheet
engaged by the sheet engaging portions. This first stripper portion is generally
not in a contacting stripping engagement with the picking member, and
remains disposed therefrom a sufficient distance to enable the first sheet to
In the exemplary embodiment a second stripper portion is provided and is engaged by the first sheet as it moves in the first direction after the sheet has been engaged by the first stripper portion. The second stripper portion is generally engaged in contacting stripping engagement with the picking member. The second stripper portion is biased toward the picking member with such force that sheets other than the first sheet moving in the first direction are prevented from moving past the second stripper portion while the first sheet is enabled to pass between the picking member and the second stripper portion. In the exemplary embodiment the relative movement of the picking member in stripping engagement with the second stripper portion is operative in most cases to separate additional sheets from the first sheet that have not been separated by the first stripper portion. For example, financial instrument sheets may have different frictional and rigidity properties from sheet to sheet. For this reason the sheets that are not separated by the action of the picking member and the first stripper portion, will often be separated by the action of the picking member and the second stripper portion.

In the exemplary embodiment the picking member comprises a generally cylindrical member with arcuate high friction segments thereon for engaging the sheet. The high friction segments in the exemplary embodiment are separated by annular recesses. In the exemplary embodiment the first stripper portion includes a surface of a plurality of rollers that are positioned in generally opposed but non-contacting engagement with the annular recesses. The first stripper rollers in the exemplary embodiment are each in operative connection with a one-way clutch which resists movement of the rollers in a rotational direction in which the rollers are urged to move as the first sheet is being separated by the stack. The one-way clutches, however, enable ready movement of the sheet in the opposite direction so as to return a sheet to the stack. This may be done in some embodiments when it is detected that a double sheet has been picked and it is desired to reverse the sheet in an attempt to strip all but a single sheet. In the exemplary embodiment the second
stripper portion includes a surface of at least one contacting stripper roll that is biased into stripping engagement with a sheet engaging portion of the picking member. The contacting stripper roll is similarly in operative connection with a one-way clutch so as to resist movement of the sheet being removed from the stack to provide stripping while enabling movement of the sheet to return to the stack. It should be understood, however, that this arrangement is exemplary and in other embodiments other approaches may be used.

The exemplary embodiment of the ATM further includes a housing. The housing includes a fascia which includes elements of the user interface and which extends through an exterior wall of a structure. The ATM housing within the structure includes a secure chest portion in a lower part of the housing. In the exemplary embodiment the chest is a generally L-shaped chest in cross section. In the exemplary embodiment the L-shaped chest has a sheet accepting mechanism such as a cash acceptor device positioned in supporting connection with the chest. The cash accepting mechanism is operative to analyze sheets that have been separated from the stack by operation of the picking member and stripper portions, and to direct sheets that are to be stored in the machine into the chest portion through an opening in an upper surface of the chest. In an exemplary embodiment the cash accepting mechanism is movably mounted in supporting connection with the chest so that when a service door of the housing is opened, the cash acceptor mechanism may be moved rearward for purposes of servicing.

In the exemplary embodiment because the cash accepting mechanism is positioned outside the secure chest and may be moved to expose the opening, provisions are made for minimizing the risk that criminals may access the financial instrument sheets in the chest through the cash accepting opening. This is accomplished in the exemplary embodiment by providing a transport which moves financial instrument sheets transported into the chest from the cash acceptor, in a direction transverse to the cash accepting opening in the chest. After moving transversely relative to the cash accepting opening,
the sheets are then transported to a note storage mechanism that may be comprised of storage compartments or other mechanisms for handling the sheets. In an exemplary embodiment a security plate is provided in intermediate relation between the transport which moves the sheets transversely from the opening of the chest, and the note storage mechanism. The security plate reduces the ability of a criminal to access stored sheets through the cash accepting opening. Further, in the exemplary embodiment the driving force for the transport is provided by engagement of a driving member of the cash acceptor mechanism with a driven member through the cash accepting opening. The presence of these members within the opening further obstructs the opening and reduces the risk that a criminal will be able to access stored financial instrument sheets.

In the exemplary embodiment the cash accepting mechanism is provided with a chute for receiving stacks of documents from the user. In the operative position of the cash acceptor mechanism the opening to the chute is controlled by a gate. However, as can be appreciated, it is necessary for the machine to open the gate to enable a user to place or remove sheets from the chute. In some circumstances rain, snow and moisture may enter the chute when the gate is open. The presence of rain, snow or moisture in the chute may interfere with the proper operation of the machine. To minimize this risk in the exemplary embodiment, a water capturing opening is provided in a lower surface of the interior of the chute. The water capturing opening is operative to capture moisture that may enter the chute and the collected moisture is routed in an exemplary embodiment to a drain to that is in fluid communication with the outside of the machine housing. In the exemplary embodiment the drain is provided through a lower surface of the fascia. Also in the exemplary embodiment because the cash acceptor mechanism is movable, a resilient gasket is provided in generally surrounding relation with the chute and interiorly of the fascia. In the operative position of the cash acceptor mechanism the resilient gasket provides a generally fluid type seal.
such that water, snow or other elements are not enabled to migrate into the interior of the housing through the opening in the fascia through which the chute extends in its operative position.

In the exemplary embodiment the cash acceptor mechanism is operative to store unacceptable sheets such as suspected counterfeit notes in a suspect note storage area outside the secure chest. In the exemplary embodiment authorized servicers who have access to the area of the housing outside the secure chest are enabled to remove these unacceptable sheets. A readily accessible closure device is provided to facilitate the removal of these suspect sheets by authorized persons. Further, in some embodiments locking mechanisms may be provided not only for the housing area outside the secure chest, but also a separate locking mechanism for the particular compartment in which the unacceptable sheets are stored. This assures that the unacceptable sheets are only accessed by authorized persons while still assuring that other authorized persons can access appropriate machine components without accessing the stored unacceptable sheets.

In the exemplary embodiment the cash acceptor mechanism further includes closure panels which generally surround the components within the mechanism. These closure panels when in the operative position reduce the risk of migration of dirt or other contaminants into the mechanism they also reduce the risk of inadvertent damage to the mechanism when other components are being serviced. In the exemplary embodiment these closure panels are made readily openable through hinged or sliding arrangements that enable the panels to be opened when the mechanism is in a servicing position. In exemplary embodiments an approach is used for mounting closure panels to facilitate gaining access to the components of the cash accepting module, while assuring that the panels will be replaced upon completion of any repair activity. This assures that the benefits provided by the closure panels are not inadvertently lost due to the failure to reinstall such panels after the completion of the servicing activity.
In some exemplary embodiments currency sheets accepted by the cash acceptor mechanism are stored in selected compartments. This enables storing of each type of sheet in a particular compartment. In some embodiments mechanisms are provided for re-dispensing such sheets from the compartment so as to enable recycling of valid sheets. In alternative embodiments sheets that have been validated by the cash accepting mechanism are stored in one or more storage containers. In some exemplary embodiments the storage containers include an interior area which is bounded at the lower end by a moveable shaker member. The shaker member supports deposited sheets in the interior area. An actuator is in operative connection with the shaker member so as to impart shaking action to the deposited items within the interior of the container. This facilitates the dispersal and settling of the items so as to facilitate storing the maximum number of items in the container. In some exemplary embodiments the container is removable from the machine. In some further exemplary embodiments the container includes rollable supports and a retractable handle so as to facilitate moving the container out of and away from the machine when it has been filled with deposit items. Although the exemplary embodiment is described with regard to storing sheets, the principles may be applied to the storage of other items such as tickets and deposit envelopes.

In some exemplary embodiments of the machine the user interface includes multicolor light emitting devices so as to facilitate a user's operation of the machine. In some exemplary embodiments the light emitting devices are selectively controlled by at least one controller in the machine to emit light of a selected color responsive to conditions of associated transaction function devices. For example, the controller may operate to guide a user to a location on the user interface where the user is required to perform some activity related to a transaction. In some exemplary embodiments the light emitting devices selectively emit green, yellow and red and may be operated to indicate a status or condition of a particular device. Alternatively, light emitting
devices may flash the same or different colors at varying rates so as to convey
information or facilitate use of the machine.

In some exemplary embodiments the user interface of the machine is
provided with horizontally disposed convex mirrors positioned vertically
above the user interface. Such mirrors are positioned so as to facilitate the
ability of a user of the machine to view an area behind and otherwise near the
user. This reduces the risk of persons in proximity to the user not being
observed by the user carrying out transactions at the machine. The exemplary
horizontally disposed convex mirrors are further positioned outward relative to
a light which illuminates the user interface to facilitate the user's operation.
This reduces the risk of glare and facilitates the user's ability to view the area
observable in the mirrors.

Further novel aspects of the exemplary embodiment will be made
apparent in the following detailed description. It should be understood that the
features described are exemplary and in other embodiments other approaches
may be used which nonetheless employ the inventions as claimed herein.

BRIEF DESCRIPTION OF DRAWINGS

Figure 1 is a front plan view of an ATM fascia of an automated
banking machine of an exemplary embodiment of the present invention.

Figure 2 is a schematic side view of components within a housing of
the ATM shown in Figure 1.

Figure 3 is a further schematic side view of components within the
housing of the ATM shown in Figure 1.

Figure 4 is a view of a sheet stacking mechanism which may be
employed in an exemplary embodiment of the ATM.

Figure 5 is a further view of the exemplary sheet stacking mechanism
which may be used to hold multiple types of sheets.
Figure 6 is a rear view of the housing of the ATM of the exemplary embodiment.

Figure 7 is a schematic view of an exemplary embodiment of a mechanism for separating sheets from a stack of financial instrument sheets placed within the ATM.

Figure 8 is a front plan view of an exemplary picking member in combination with a plurality of non-contacting stripper rolls and a contacting stripper roll used for separating individual sheets from the stack.

Figure 9 is a schematic view showing separation of a first sheet from a sheet stack through operation of the mechanism shown in Figure 7.

Figure 10 is a view showing a cross-sectional wave configuration imparted to a sheet through action of the picking member and the non-contacting stripper rolls.

Figure 11 is a schematic view showing a cash acceptor mechanism moved to a servicing position and exposing the cash accepting opening in an upper portion of the chest of the ATM.

Figure 12 is a schematic view of the cash acceptor mechanism withdrawn for servicing similar to Figure 11 and with a first embodiment of an access door in an open position for purposes of accessing unacceptable sheets which have been identified through operation of the cash acceptor mechanism.

Figure 13 is a view of the ATM similar to Figure 12 but with an alternative access mechanism for accessing unacceptable sheets.

Figure 14 is yet another view of the ATM similar to Figure 12 showing a further alternative mechanism for accessing unacceptable sheets.

Figure 15 is a schematic view of the cash acceptor mechanism with a first form of service panel shown in an open position for purposes of servicing.

Figure 16 is a view of the cash acceptor mechanism similar to Figure 15 but with an alternative form of service panels shown in an accessible position.
Figure 17 is a schematic cross-sectional view of a chute to and from which stacks of sheets are received and removed through the fascia of the machine, and including devices for capturing and draining water which may enter the chute.

Figure 18 is an external isometric view of the cash acceptor mechanism represented in Figure 17 and including a schematic representation of the drain used for passing water collected in the chute to the outside of the machine.

Figure 19 is a schematic view representative of a sealing system used in an exemplary embodiment to minimize the risk of contaminants entering the machine through the opening in the machine fascia through which the chute extends in an operative position of the cash acceptor mechanism.

Figure 20 is a transparent side view of an alternative form of a mechanism for accepting and storing financial instrument sheets that have been processed by the cash acceptor mechanism.

Figure 21 is an isometric view of the financial instrument holding container shown in Figure 20, moved outside the machine.

Figure 22 is a schematic view of a light emitting device which is operated to facilitate use of the machine by users.

Figure 23 is an enlarged view of the light emitting device shown in Figure 22.

Figure 24 is a schematic view of the light emitting diodes included in the light emitting device.

Figure 25 is a cross-sectional view of the flexible web which includes the diodes in the light emitting device.

Figure 26 is an isometric view of the fascia shown in Figure 1 and particularly the mirrors thereon which facilitate a user viewing the area adjacent to them when operating the machine.

Figure 27 is a schematic top view indicating the area viewable by a user operating the machine.
BEST MODES FOR CARRYING OUT INVENTION

Referring now to the drawings and particularly to Figure 1, there is shown therein a front plan view of an automated banking machine which in the exemplary embodiment is an automated teller machine ("ATM") 10. ATM 10 is a through-the-wall type machine which includes a fascia 12. Fascia 12 is accessible to users of the machine who are positioned externally of the wall 14. In some embodiments wall 14 may be an exterior building wall and ATM 10 may be used in a walk-up or drive-up environment. In other embodiments the ATM may be used in an indoor environment. Of course this configuration is exemplary and in other embodiments, other types of ATM configurations may be used.

The exemplary ATM includes a user interface generally indicated 15. The user interface of the exemplary embodiment includes input devices for receiving inputs from users. These input devices include a card reader 16, a keypad 18, function keys 20 and an imaging device 22. In the exemplary embodiment the input devices may be used for providing identifying inputs such as indicia read from cards, numerical data or biometric data which may be used to identify a particular user of the machine and/or their accounts. In addition the exemplary input devices are also operative to receive transaction inputs which cause the ATM to carry out selected transaction functions. It should be understood that these input devices are exemplary and in other embodiments other types of input devices may be used. The exemplary user interface 15 further includes output devices. The output devices of the exemplary embodiment include a display 24, a speaker 26 and a headphone jack 28. The output devices of the exemplary embodiment are operative to output indicia either visual, audible or both, which are usable to operate the ATM. Of course the output devices shown in user interface 15 are exemplary and in other embodiments other or additional output devices may be used.

The exemplary ATM 10 further includes other transaction function devices. These transaction function devices include a receipt printer 30 which
is operative to provide receipts to users of the machine. As shown in more
detail in the interior view of the machine shown in Figure 2, the receipt printer
includes a paper supply 32 which supplies paper on which receipts are printed
by a printer mechanism 34. Printed receipts are then transported to the receipt
opening in the fascia 12 by a transport 36. In exemplary embodiments the
receipt printer used may be of the type shown in U.S. Patent No. 5,850,075,
the disclosure of which is incorporated herein by reference. Of course in other
embodiments other types of receipt printers may be used.

The exemplary ATM 10 includes on the fascia as shown in Figure 1, a
cash dispensing opening 38 and a cash accepting opening 40. Each of these
openings is in operative connection with corresponding transaction function
devices as later discussed, and each has an associated gate mechanism which
operates to block access through the opening except at appropriate times
during transactions by authorized users. In the exemplary embodiment the
cash dispensing opening is shown controlled by a gate 42 and the cash
accepting opening is controlled by a gate 44. It should be understood that the
fascia and devices associated with ATM 10 are exemplary and in other
embodiments other or different fascia configurations and devices may be used.

In the exemplary embodiment the user interface of the machine
includes a plurality of multicolor light emitting devices 17, 31, 41, 43 and 45.
Each of the light emitting devices is positioned at a location adjacent to the
location on the user interface which is associated with a particular transaction
function device. For example, light emitting device 17 is positioned adjacent
to the opening to card reader 16. Likewise, light emitting device 31 is
positioned adjacent to the slot for delivery of receipts. Likewise, light emitting
device 41 is associated with cash-accepting opening 40, and light emitting
device 43 is associated with cash-dispensing opening 38. As later explained,
in this exemplary embodiment the multicolor light emitting devices are
selectively operated to output light of a particular color responsive to
conditions of the associated transaction function device. Such features may be
used to guide a user in operation of the machine, provide indications
concerning the status of devices, alert a user to particular conditions, or
provide improved aesthetics for the machine.

As shown in Figures 2, 3 and 6, ATM 10 includes a housing 46 which
extends generally on an interior side of wall 14. Housing 46 includes a chest
portion 48. In the exemplary embodiment chest portion 48 is a generally
secure chest which has a safe-like access door 50. Access to the interior of the
chest portion is limited to authorized personnel through a suitable locking
mechanism schematically indicated 52 (see Figure 3). In the exemplary
embodiment the chest is generally L-shaped in cross section.

Housing 46 further includes an upper portion 54. Upper housing
portion 54 which is in connection with the fascia, is in supporting connection
with the chest portion 48. In the exemplary embodiment upper housing
portion 54 has in association therewith, access doors 56 and 58. Access to the
upper housing portion is controlled by one or more locking mechanisms in
operative connection with access doors 56 and 58 as represented by key locks
60 and 62. In the exemplary embodiment the secure chest portion 48 is used
to house financial instrument sheets such as currency notes, checks and other
valuable sheets. The upper housing portion 54 is generally used to house
components of the machine that do not hold on an extended basis notes or
other financial instrument documents which can be redeemed for value. Of
course it should be understood that the construction of ATM 10 is exemplary
and in other embodiments other approaches may be used.

As schematically shown in Figure 2, ATM 10 includes at least one
controller schematically indicated 64. In the exemplary embodiment controller
64 includes at least one processor and is in operative connection with at least
one data store schematically indicated 66. In the exemplary embodiment the
data store is operative to hold data representative of instructions such as
computer programs, configuration parameters, data about transactions
conducted and other information that may be usable in the operation of the
ATM 10.

Controller 64 is in operative connection with numerous transaction
function devices within the ATM, and is operative to control the operation
thereof in accordance with its programming. Controller 64 is shown
schematically in operative connection with devices 68, 70 and 72. It should be
understood that this representation is schematic only and is intended merely to
represent numerous components within the machine which are in operative
connection with the controller. For example the transaction function devices
may include moving devices such as motors, solenoids and other devices that
are operative to impart motion to components. Likewise transaction function
devices may include sensors such as radiation sensors, proximity sensors,
switches and other types of sensors that are operative to sense items,
conditions, properties, characteristics or components within the ATM and to
enable a controller to perform functions in accordance with its programming.
Transaction function devices include output devices such as sound emitters
and light emitting devices. For example and without limitation, transaction
function devices may include the card reader, display, keyboard, function keys,
printer, cash dispenser, cash acceptor, storage mechanisms and other devices
previously discussed as well as other devices within the machine which are
operative in response to the controller.

In the exemplary embodiment the controller is also in operative
connection with a communications device schematically indicated 74. The
communications device is operative to communicate messages electronically
between the ATM 10 and other computers in financial transaction processing
systems. These may include for example communications with systems
operated by banks, credit card networks, automated clearinghouses and other
entities. In Figure 2 the communications device 74 in the ATM 10 is
schematically shown as providing communication with a financial institution
76 through a network 78. It should be understood that this communication
configuration is exemplary and in other embodiments other communication arrangements may be used.

As represented in Figures 2 and 6, in the operative position of ATM 10 the housing 46 houses a sheet acceptor mechanism 80 which is also referred to herein as a cash acceptor mechanism. In the exemplary embodiment the mechanism 80 is operative to accept sheets from a machine user through the opening 40, to analyze each sheet for at least one property or characteristic, and to route the sheets selectively for storage within the housing of the machine based on the characteristics analyzed. It should be understood that in various embodiments these sheets may include currency notes, checks or other financial instrument sheets. It should further be understood that in exemplary embodiments the financial instrument sheets may be sheets comprised of different types of material such as paper, plastic or combinations thereof. It should further be understood that references herein to a cash acceptor mechanism shall be deemed to encompass mechanisms which handle not only currency notes, but also other financial instrument sheets such as checks, money orders, gift certificates, vouchers, etc.

As represented in Figure 2, cash acceptor mechanism 80 includes a chute 82 which extends through opening 40 in fascia 15 in its operative condition. As previously discussed the user accessible opening to chute 82 is controlled by a movable gate 44. Gate 44 moves responsive to the controller 64 and enables authorized users to access the chute at appropriate times during transaction sequences.

In operation of the machine users are enabled to insert a stack of financial instrument sheets schematically indicated 84, into the chute. The stack 84 may comprise currency notes, checks or other forms of financial instrument sheets.

In operation of the cash acceptor mechanism sheets are individually separated from the stack by a picker mechanism 86, an exemplary embodiment of which is later discussed in detail. Each picked sheet is transported
individually from the picker mechanism past the validator device
schematically indicated 88. The validator device 88 of the exemplary
embodiment is operative to determine at least one characteristic of each sheet.
This may include for example a determination as to whether the sheet is a note
or check and if a note, the denomination and whether it is valid. If the
document is a check, a determination may be made as to whether the check is
genuine as well as the indicia associated with the maker of the check and the
amount thereof. For example in some exemplary embodiments the validating
device may be of the type shown in U.S. Patent No. 5,923,415, the disclosure
of which is incorporated herein by reference. Alternatively or additionally a
validating device having features disclosed in U.S. Patent No. 6,554,185, the
disclosure of which is incorporated herein by reference, may be used. Of
course in other embodiments other types of validating devices such as imagers,
readers, sensors and combinations thereof may be used. For example, in some
embodiments the sheet accepting device may be operative to image
instruments such as checks and provide data which can be stored and
transmitted as an electronic reproduction of that check. In such circumstances
an electronic reproduction of the check may be transmitted to remote locations
so as to facilitate review and validation of the check. Alternatively or in
addition, the electronic representation of the check may serve as a substitute
for the physical paper check which thereafter enables the paper check to be
cancelled and subsequently destroyed.

In the exemplary embodiment of the cash acceptor mechanism 80,
sheets which have been analyzed through operation of the validator device 88
are moved through a transport 90 to a routing device 92. The routing device is
operative responsive to the controller 64 to route sheets selectively to either an
escrow device 94 or to a transport 96. Escrow device 94 generally operates to
hold sheets in storage on a temporary basis. Such an escrow device may be of
the type shown in U.S. Patent No. 6,371,368, the disclosure of which is
incorporated by reference herein. Escrow device 94 may be operative to
accept sheets and store them. Thereafter responsive to operation of the controller 64 the escrow device may deliver those sheets to the routing device 92 which directs them along sheet paths in the machine to carry out transactions. Of course it should be understood that the escrow device shown is exemplary and in other embodiments other types of escrow devices may be used.

In the exemplary embodiment transport 96 is used to receive unacceptable sheets which have characteristics that do not satisfy certain parameters set by the machine. These may include for example, notes which have one or more characteristics which suggest that they are counterfeit. In other embodiments such sheets may include checks which have properties which suggest that they are reproductions or forged or otherwise unacceptable. Of course in other embodiments other sheets may be deemed unacceptable. As schematically represented in Figure 2, sheet acceptor mechanism 80 is operated to cause transport 96 to deposit suspect sheets schematically indicated 98 in a storage area 100. In the exemplary embodiment the suspect sheets are stored within the cash acceptor mechanism and outside of the secure chest so that they may be recovered by servicing personnel in a manner that is later discussed. Of course this approach is exemplary and in other embodiments other approaches may be used.

In the exemplary embodiment the cash acceptor mechanism 80 is operative responsive to signals from the controller 64 to cause financial instrument sheets that are determined to be valid or otherwise acceptable, to be directed through a cash accepting opening 102 that extends in an upper surface 104 of the chest. In the operative position of the cash acceptor mechanism shown in Figure 2, the transport in the cash acceptor mechanism is aligned with the cash accepting opening and a transport 108 that extends into the secure chest. As schematically represented in Figure 2, in the operative position of the cash acceptor mechanism 80 at least one driving member 110 of the transport 106 is in operative connection with a driven member 112 of
the transport 108. In the exemplary embodiment this enables the cash acceptor mechanism to transmit movement to sheet handling mechanisms within the secure chest and to assure coordinated movement of processed sheets therein. Further in the exemplary embodiment the driving and driven members extend in the cash accepting opening so as to block access therethrough by unauthorized persons as later discussed.

In the exemplary embodiment when the cash acceptor mechanism is moved from the operative position shown in Figure 2 to a servicing position such as shown in Figures 12, 13 and 14, the driving member 110 and the driven member 112 disengage. In some exemplary embodiments the movement of the cash acceptor mechanism from the operative position to a servicing position may include movably mounting the cash acceptor mechanism such that the mechanism moves both upward away from the secure chest so as to disengage the driving and driven members as well as outward for purposes of servicing. Of course to return the cash acceptor mechanism to the operative position, movement thereof is made both inward and downward so as to reengage the driving and driven members. This may be accomplished by a combination of slides, rollers or other suitable mechanisms. Of course the approach described of providing for engagement between the cash acceptor mechanism and a mechanism for handling sheets within a chest portion is exemplary and in other embodiments other approaches may be used, or the transport within the chest portion may have a separate motor or other moving device. As shown in Figure 2, transport 108 which moves sheets generally in a vertical direction through the cash accepting opening is in operative connection with a horizontal transport schematically indicated 114. The horizontal transport is operative to engage sheets moved into the chest portion and to move them transversely away from the cash accepting opening. The horizontally extending transport 114 is in operative connection with a vertically extending transport 116 which is transversely disposed from the cash accepting opening in the secure chest.
Vertical transport 116 is operative to move sheets selectively into engagement with sheet handling mechanisms 118, 120, 122 and 124. In some exemplary embodiments sheet handling mechanisms 118, 120, 122 and 124 may be sheet stacking mechanisms such as those shown schematically in Figures 5 and 6. Alternatively or in addition in other embodiments one or more of the sheet handling mechanisms may include sheet receiving and dispensing mechanisms which are operative to selectively accept sheets for storage as well as to dispense sheets therefrom. Examples of sheet accepting and stacking mechanisms as well as sheet accepting, stacking and dispensing mechanisms which may be used in some exemplary embodiments are described in detail in U.S. Patent Nos. 6,302,393 and 6,290,070, the disclosures of each of which are incorporated by reference.

As shown schematically in Figure 4, the exemplary sheet accepting and stacking mechanism 118 is selectively operative to accept a sheet 126 moving in the vertical transport 116. Sheet 126 is guided to engage the sheet handling mechanism 118 through movement of a gate member 128. The gate member moves responsive to the controller 64 to direct the leading edge of the sheet into a recess 130 of a rotatable member 132. As the leading edge of the sheet 126 enters the recess 130 the rotatable member 132 rotates in the direction of Arrow R. This causes the gripper portion bounding the recess 130 to move inwardly capturing the sheet 126 therein. The rotatable member 132 rotates until the leading edge of the sheet 126 engages a stop surface 136 at which time the gripper portion 134 has moved radially outward such that the sheet disengages from the rotatable member 132 and is integrated into a sheet stack 138. Stack 138 may be for example a stack of currency notes all of which are of the same denomination. Of course in other embodiments the stack 138 may be a collection of other types of sheets.

In the exemplary embodiment the stack is maintained in abutting relation with the rotatable member by a biasing plate 140 which acts against the back of the stack. The biasing plate 140 is movable responsive to a biasing
mechanism 142 which is operative to enable the stack to increase or decrease while maintaining the sheets in an appropriately aligned position. Further details related to an exemplary embodiment of the sheet handling mechanism are described in the incorporated disclosure of U.S. Patent No. 6,302,393.

Figure 5 further shows the exemplary operation of exemplary sheet handling mechanisms 118 and 120. In this case a sheet 142 moving in transport 116 is enabled to pass the rotatable member 132 when the gate member 128 remains retracted as the sheet passes. This enables the sheet to move to other sheet handling mechanisms such as sheet handling mechanism 120. This arrangement enables sheets having particular characteristics to be stored together, for example, valid currency notes of different denominations to be collected in stacked relation in selected sheet storage areas. Alternatively in other embodiments sheets of similar types such as checks may be segregated from other financial instrument sheets such as notes or travelers checks. In still other embodiments sheets which are to be recycled such as suitable fit currency notes can be segregated from valid yet worn or soiled currency notes which are not suitable for providing to customers. It should be understood that these approaches are exemplary and in other embodiments other approaches may be used.

In the exemplary embodiment shown in Figure 2, a security plate 144 extends within the secure chest in intermediate relation between the horizontal transport 114 and the note storage mechanism such as the storage area 146 associated with sheet handling mechanism 118. The security plate 144 in the exemplary embodiment is secured within the interior of the secure chest and is adapted to prevent unauthorized access through the cash accepting opening 102 in the chest. This may be accomplished by securing the security plate 144 to the walls bounding the interior of the secure chest or other suitable structures. As can be appreciated because in the exemplary embodiment the upper housing portion 54 houses the sheet acceptor mechanism 80, it is generally easier to access the area housing the sheet acceptor mechanism than
the secure chest. In cases where criminals may attack ATM 10 and attempt to remove the sheet accepting mechanism, ready access through the cash accepting opening is first blocked by the driving and driven members and other components of the transports 106 and 108. However, in the event that criminals attempt to clear away the transport mechanism components, access to the stored sheets in the note storage mechanisms is still blocked by the security plate. Figure 11 shows greater detail of the cash acceptor mechanism 180 retracted to a servicing position so as to expose the cash accepting opening. In the exemplary embodiment the cash acceptor mechanism is movably mounted in supporting connection with the chest portion on suitable slides or other members. As can be appreciated in this exemplary embodiment the security plate 144 operates to separate the cash accepting opening 102 from the notes or other valuable financial instrument sheets which are stored below the security plate within the secure chest. Of course the security plate is exemplary and other forms of security plates or other structures may be used.

In an alternative embodiment the ATM includes a bulk storage container 260 shown in Figure 20 for holding currency bills, notes, checks or other items that have been deposited into the machine. The container 260 includes a top wall 262 with an opening 264 which corresponds to opening 102 in the chest when the container 260 is in the operative position. Container 260 includes a transport 266 which transports items that pass through the opening 264 into an interior area 268 of the container. A horizontal transport 270 is operative to move deposited items transversely away from the opening 264. A security plate 272 is positioned to reduce the risk of unauthorized access to the interior area 268. A further transport 274 is operative to move deposit items such as currency sheet 276 to a suitable location for being dispatched into the interior area 268 below the security plate. Deposited items schematically represented 278 are held within the interior area of the container 260.
In the exemplary embodiment the container 260 includes a bottom wall 280. The interior area 268 is bounded by a shaker member 282 that is disposed vertically above the bottom wall. In the exemplary embodiment the shaker member comprises a resilient flexible membrane 284. A rigid plate 286 extends in underlying relation of a central portion of the membrane. Flexible supports 288 support the rigid plate 286 above the bottom wall 280. The flexible supports further enable movement of the rigid plate and membrane relative to the bottom wall. In exemplary embodiments the rigid supports 288 may include springs or other members which enable relative vertical and/or horizontal movement of the bottom wall and the rigid plate.

In the exemplary embodiment an actuator 290 extends in intermediate relation between the bottom wall and the rigid plate. In exemplary embodiment the actuator is an electrical vibrating device which is operative to shake the rigid plate and overlying membrane. The shaking action of the actuator 290 is operative to impart shaking motion to the deposited items 278 that are in supporting connection with the membrane. This facilitates the dispersal and settling of deposited items and enables a relatively larger quantity of such items to be collected within the interior area 268 before such items need to be removed. In exemplary embodiment the actuator 290 is electrically connected to the circuitry within the machine through a releasable connector 292. This facilitates removal of the exemplary container as hereafter discussed. In addition, in some embodiments the moving devices for transports within the container may be supplied with signals and/or electrical power through the releasable connector.

In operation of the machine, the interior area 268 of the container 260 is in operative connection with the opening 38 in the housing of the machine through which deposited items are accepted. The deposited items are passed through the cash accepting mechanism or other mechanism for processing such items. Items appropriate for deposit in the container are passed through the opening 102 in the top of the chest. Such items are transported by the transports 266, 270 and 274 to the area below the secure plate 272 and
accumulate within the interior area 268. Periodically responsive to the controller, the actuator 290 operates to impart shaking motion to the deposited items 278 within the interior area. This facilitates settling of the items so as to densely pack the items therein. Sensors 294 may be included within the interior area so as to sense the deposited items. The controller may be operative to cause the actuator to shake deposited items responsive to the sensing the level of such items by the sensors. Alternatively the controller may be operative to shake deposited items based on elapsed time, number of items deposited, or other programmable bases. In the exemplary embodiment the sensors 294 may be in operative connection with the controller through the releasable connector 292.

The exemplary container 260 is removably mounted within the secure chest. The exemplary container is supported on rollable supports 296. The rollable supports 296 may be castors, wheels, ball rollers or other type items that enable more ready movement of the container in a loaded condition. In the exemplary embodiment upon opening of the secure chest the container 260 is enabled to moved outward from the chest. This is facilitated by a servicer grasping a handle 298 which is attached to the container. The releasable connector 292 is enabled to be disconnected so that the container 260 can be pulled outward from the secure chest. As shown in greater detail in Figure 21, in the exemplary embodiment the handle 298 is a telescoping handle that is enabled to be moved upward once the handle has cleared the secure chest. This facilitates moving the container outside of the ATM. Thereafter the container may be moved to a suitable location by the handle away from the ATM for purposes of removing the contents. This may be, for example, an area within a vault or other secure room in which the items within the container may be processed.

As represented in Figure 21, the container 260 in the exemplary embodiment includes a door 300. Access to door 300 is controlled by one or more locks represented 302. In the exemplary embodiment door 300 is shown hinged at a side toward the chest door so as to reduce the risk of persons
obtaining unauthorized access to the interior of the container when the container is within the machine. Once the container has been moved to a suitable location, the lock 302 may be unlocked, the door opened, and deposited items removed. After the items have been removed, the door 300 may be returned to the closed position. Thereafter the container may be reinstalled in the machine with the handle 298 being retracted so as to enable the container to again be aligned with opening 102. Further, the releasable connector 292 may be reconnected so as to again enable operation of the container within the machine.

As can be appreciated, the exemplary container 260 is enabled to hold a substantial quantity of deposited items. Further, the construction including the rollable supports and telescoping handle facilitates movement of the loaded container out of the ATM and the container into the ATM. It should be understood that the container is exemplary and in other embodiments other approaches may be used. These may include, for example and without limitation, containers which include multiple interior areas in which deposited items are supported on shaking members. Such embodiments may achieve, for example, a separation of deposited notes, checks and/or envelopes by denomination or deposit type, and achieve more densely packed storage within a particular interior compartment within the container.

In addition or in the alternative, in other embodiments shaking members may be provided on side walls or on top walls bounding the container so as to facilitate the shaking of deposited items and the packing and storage thereof. In addition or in the alternative, containers may be used in some embodiments in conjunction with sheet handling mechanisms such that certain sheets are stored precisely positioned in containers for purposes of stacking and/or recycling while other sheets are stored in bulk within a container or compartment within a container. These alternatives are encompassed within the teachings of the present invention.

Figures 7 through 10 schematically describe an exemplary embodiment of the picker mechanism 86 used in the cash accepting mechanism 80. In this exemplary embodiment the stack of sheets 84 is positioned in the chute 82 and is in supporting connection with a generally angled lower surface 148. Moving members 150 and
152 are operative to engage the stack and selectively rotate responsive to a motor or other mechanism in the direction of Arrow P so as to move the stack into generally abutting relation with an engaging surface 154. Positioned adjacent to the engaging surface 154 in proximity to the lower surface 158 is an idler roll 156 which is a generally free wheeling roll. The engagement of the stack 84 of the engaging surface 154 and the face of the roll 156 is operative to splay the sheets as shown.

The picker mechanism 86 further includes a generally cylindrical picking member 158. Picking member 158 is rotatable selectively by a motor or other driving member responsive to the controller 64. The picking member during picking operation rotates in the direction of Arrow P as shown. Picking member 158 further includes high friction arcuate segments 160 which in the exemplary embodiment serve as sheet engaging portions and which extend about a portion of the circumference of the picking member.

Picker mechanism 86 of the exemplary embodiment further includes a plurality of rolls 162 that serve as non-contact stripper rolls in a manner later discussed. The picking mechanism further includes a contact stripper roll 164 which biasingly engages the high friction segments 160 of the picking member.

As represented in Figure 8, the picking member is a generally cylindrical member that includes a plurality of annular recesses 166. The outer surface of the non-contact stripper rolls 162 extend into a corresponding annular recess 166, but are generally not in stripping engagement therewith. As represented in the exemplary embodiment of Figure 8, the outer surface of the non-contact stripper rolls 162 are disposed slightly away from the base of the annular recess. As a consequence the outer surface of the non-contact stripper rolls which serve as a first stripper portion are not positioned to be in direct contact stripping engagement with the picking member. However, because the surface of such rolls is disposed in close proximity thereto and generally enables only a single sheet to pass between the picking member and the non-contact stripper rolls, the separation of a single sheet from other sheets is generally achieved. It should be understood however that while in the exemplary embodiment the non-contact stripper rolls are disposed slightly from the picking member, in other embodiments such rolls or other stripper
members may operate to actually contact the picking member but may be of such resilient consistency or other properties that the rolls are not in a biased contact stripping engagement as is the case with the contact stripper roll 164.

As shown in Figure 8 the contact stripper roll is biased to engage a central sheet engaging portion 168 of the picking member. This central sheet engaging portion is generally centered with regard to sheets that are moved by the picker mechanism 86. This reduces the tendency of sheets to twist or skew as they are being moved in the picker mechanism. Of course it should be understood that this arrangement is exemplary and in other embodiments other approaches may be used.

The operation of the exemplary picker mechanism 86 is represented in Figures 9 and 10. The picker mechanism is operative to separate sheets individually from the stack 84. This is done by sequentially picking a first sheet 170 which bounds the lower end of the stack while moving the first sheet in a first direction generally indicated by Arrow F so as to move the sheet away from the stack. To accomplish this the controller 64 operates motors or other moving mechanisms to cause the moving members 150 and 152 to rotate as the picker mechanism 168 similarly rotates in a counterclockwise direction as shown. The rotation of the picking member causes the high friction arcuate segments 160 which serve as sheet engaging portions to engage a lower face of the first sheet and pull the sheet in intermediate relation between the picking member and the non-contact stripper rolls 162. As the first sheet is moved the idler roll 156 rotates to facilitate the movement of the first sheet between the picking member and the non-contact stripper rolls.

The non-contact stripper rolls 162 are in operative connection with a one-way clutch 172 such that the first stripper rolls remain stationary when the first sheet is engaged therewith and moving in the direction of Arrow F. Because the resistance force provided by the non-contact stripper rolls against the face of the sheet engaged therewith is less than the moving force imparted to the opposed face of the sheet, the first sheet 170 is moved into intermediate relation between the picking member and the non-contact stripper rolls. This causes the sheet to assume the cross-sectional wave configuration shown in Figure 10. This is caused by the sheet being deformed by the non-contact stripper rolls into the annular recesses 166.
of the picker member. This cross-sectional wave configuration is generally operative in combination with the opposing force applied by the non-contact stripper rolls, to separate the first sheet from other sheets that may be moving therewith from the stack.

As the first sheet 170 moves further in the direction of Arrow F as shown in Figure 9, the leading edge of the sheet then engages the contact stripper roll 164 which is biased to engage the sheet engaging portions of the picking member. The contact stripper roll is also in operative connection with a one-way clutch 174 such that in the exemplary embodiment the contact stripper roll remains stationary as the first sheet moves in the direction of Arrow F. The engagement of the contact stripper roll and the first sheet operates to displace the contact stripper roll so as to enable the sheet 170 to move in intermediate relation between the contact stripper roll and the central sheet engaging portion 168. The resistance force of the non-contact stripper roll is generally operative to separate any sheets other than the first sheet 170 from moving in the direction of Arrow F.

As shown in Figure 9 the sensor 176 is positioned adjacent to the contact stripper roll in the exemplary embodiment. Sensor 176 is operative to sense the presence of double sheets which may have been able to pass the non-contact and contact stripper rolls. Suitable sensors in some embodiments may be those shown in U.S. Patent Nos. 6,241,244 and 6,242,733, the disclosures of which are incorporated herein by reference. Upon sensing a double sheet the controller of the machine is enabled to make additional attempts to strip the sheet as later discussed. However, in the event that only a single sheet is sensed the picker member 158 continues moving in the counterclockwise direction until the leading edge of the sheet reaches takeaway rolls 178. In the exemplary embodiment takeaway rolls are operative to engage the sheet and to move the sheet in the cash accepting mechanism toward the validator device 88. In the exemplary embodiment one rotation of the picking member is operative to separate one sheet from the stack.

In the event that the sensor 176 senses that a double sheet or other multiple sheet has been able to pass the contact and non-contact stripper rolls, the controller of this exemplary embodiment is operative to stop the movement of the picker
member 158 in the counterclockwise direction as shown prior to the first sheet 170 being disengaged therefrom. Thereafter the controller is operative to reverse the direction of the picker member 158 and the moving members 150 and 152 so as to move the first sheet back toward the stack. Through the operation of one-way clutches 172 and 174 the contact stripper roll 164 and the non-contact stripper rolls 162 are enabled to rotate in a counterclockwise direction as shown so as to facilitate the return of the sheets to the stack. Thereafter the controller may operate the picker mechanism 86 to again pick a single bill. Repeated attempts may be made until a single sheet is separated from the stack so that it may be processed by the cash acceptor mechanism.

It has been found that the exemplary embodiment of the picker mechanism 86 is well adapted for separating various types of financial instrument sheets having different properties. In general, sheets such as currency notes that are new or other types of sheets which have generally consistent properties of rigidity and friction from sheet to sheet are separated through the operation of the picker mechanism and the non-contact stripper rolls. However, in situations where rigidity and frictional properties vary substantially from sheet to sheet, the contacting stripper roll which subsequently engages the sheets after they have engaged the non-contact stripper rolls is effective in separating sheets that would not otherwise be separated. This may be particularly helpful for example in processing sheets that may include plastic and paper currency notes, checks or other documents that have significantly variable properties and which are mixed together in a stack from which the sheets must be individually picked.

It should be understood that while picking rolls and cylindrical members are used in the exemplary embodiment, in other embodiments other picking and stripping structures such as belts, pads, fingers and other members may be used.

The exemplary embodiment of ATM 10 comprises a through-the-wall type machine in which the fascia is exposed to the elements. As a result, rain and snow may impact on the fascia and in the absence of suitable measures may enter the machine. As can be appreciated the cash accepting opening 40 in the fascia must be sufficiently large to accept the chute 82 which holds a stack of documents 84 as
previously discussed. During transactions when an authorized user indicates that they wish to insert the stack of sheets into the chute, the gate 44 must be opened which results in exposure of the chute to the elements.

To minimize the risk posed by rain and snow to the currency acceptor mechanism 80, the exemplary embodiment includes the capability to capture and direct from the machine moisture which may enter the chute. The approach used in the exemplary embodiment is represented in Figures 17 through 19. As shown in Figure 17, the lower surface of the chute 148 includes at least one water accepting opening 180 therein. In the exemplary embodiment the water accepting opening comprises one or more troughs which extend transversely across the lower surface of the sheet. Of course in other embodiments other approaches may be used. The fluid accepting openings are in fluid connection with a conduit schematically represented 182 which is in fluid connection with a drain 184 which delivers the water outside the ATM. As represented in Figures 18 and 19 the trough 180 is in operative connection with a fluid fitting 184 which connects to a generally flexible fluid conduit 182 such as a tube. The conduit 182 connects to the drain 184 which in the exemplary embodiment includes a cavity at a lower side of the fascia and which includes openings through which the water may drain to the outside of the machine housing.

In the exemplary embodiment a tube support 186 is positioned to control the direction of the tube and assure drainage when the cash acceptor mechanism is in the operative position as well as when the cash acceptor mechanism is in a service position such as is shown in Figure 12. In the exemplary embodiment the tube support minimizes the risk of the fluid conduit being crimped or otherwise assuming a position which prevents the drainage of water from the interior of the chute to the outside of the machine. It should be understood, however, that the approach shown is exemplary and in other embodiments other approaches may be used.

In the exemplary embodiment, provision is made to minimize the risk of moisture entering the ATM in the area of the cash accepting opening through which the chute 82 extends in the operative position of the cash acceptor mechanism 80. As shown in Figures 18 and 19, in the exemplary embodiment a resilient gasket 188
extends in surrounding relation of the chute 82 in the area adjacent to the fascia. The resilient gasket is supported on a front face of the cash acceptor mechanism. As shown in Figure 19, when the cash acceptor mechanism 80 is positioned such that the chute extends through the cash acceptor opening 40 in the fascia, the resilient gasket is positioned in sandwiched fluid tight relation between the front face of the cash acceptor mechanism and the interior face of the fascia. As the seal provided by the gasket extends in surrounding relation of the chute, the risk of moisture or other contaminants entering the ATM through the cash acceptor opening is minimized. Of course it should be understood that this approach is exemplary and in other embodiments other approaches may be used.

As discussed in connection with Figure 2, the cash acceptor mechanism 80 in response to operation of the validator device 88 and the controller 64 determines at least one characteristic indicative of whether financial instrument sheets are acceptable to the machine. In the exemplary embodiment unacceptable sheets may be suspect sheets such as potentially counterfeit notes, invalid checks or other unacceptable documents. When such documents are detected, they are directed to a storage area 100 which in the exemplary embodiment is within the cash acceptor mechanism and outside the chest portion. Periodically these unacceptable sheets must be recovered by servicing personnel for purposes of either verifying the invalidity of the sheets or for purposes of tracing the sheets to the user who placed them in the machine. In the exemplary embodiment such sheets are recoverable by authorized persons who have access to the upper housing portion 54 but who may be prevented from having access to the chest 48 where documents determined to be valid are stored.

In the exemplary embodiment access to the storage area 100 is controlled by a suitable access device. In one form of such an access device shown in Figure 12, an opening 190 is provided to the storage area 100. Access to the opening is controlled by a flip-down access door 192. In some embodiments, the flip-down access door 192 may be opened only when the cash acceptor mechanism 80 has been moved rearward to extend outside of the housing subsequent to opening access door 58. In some embodiments the flip-down access door may be provided with a
locking mechanism 194 such as a key lock or other suitable locking mechanism. As a result in this exemplary embodiment in order to access the sheets in the storage area 100, the user could be required to have the necessary capabilities through keys, combinations or otherwise to unlock both lock 62 on access door 58 as well as lock 194 and flip-down door 192 in order to access the sheets. It should be understood, however, that although in the embodiment shown the cash acceptor mechanism 180 is shown retracted out of the machine to facilitate opening the flip-down door and extracting the sheets, in other embodiments the flip-down door may be sized, segmented or otherwise adapted such that the cash acceptor mechanism may not need to be retracted from its operative position in order to access sheets in the storage area 100.

Figure 13 shows yet a further alternative for accessing sheets in the storage area 100. In this exemplary embodiment an opening 196 is provided through the storage area so as to enable access to the sheets therein. Access through opening 196 is provided to a sliding door 198. Door 198 is operative to slide along the direction of Arrow S in opposed tracks, slots or other suitable mechanisms for holding and guiding the door in supporting connection with the cash acceptor mechanism. In some embodiments door 198 may include a locking mechanism 200. Locking mechanism 200 may be a suitable key, combination or other locking mechanism for assuring that only authorized personnel are enabled to access the documents in the storage area. As can be appreciated from Figure 13, door 198 may be both unlocked and opened without having to retract the cash accepting mechanism rearward. In some embodiments this may serve to speed servicing and the removal of invalid sheets from the machine.

Figure 14 shows yet another exemplary embodiment for accessing sheets in the storage area 100. In this embodiment an opening 202 is provided in a rear face of the cash accepting mechanism 80. Access to opening 202 is controlled by a door 204. In the exemplary embodiment door 204 is a sliding door adapted to be selectively moved in tracks, slots or similar devices. In some embodiments a suitable locking mechanism schematically indicated 206 is used to assure that only authorized personnel have access to the door. In the embodiment shown in Figure
14, a transport 208 is provided for moving the sheets in the storage area 100 to the service personnel through the opening 202. A transport 208 may be operative in response to provided to input devices by the servicing personnel or may be automatic responsive to the opening of the door 204. Of course it should be understood that all of the approaches shown are exemplary and in other embodiments other approaches may be used.

In some exemplary embodiments suspect notes or other documents are correlated with particular transactions conducted at the machine and/or with particular users of the machine. This may be accomplished through operation of the validator and the controller. In some exemplary embodiments the suspect documents in storage may be arranged in a particular order and the controller is operative to provide one or more outputs such as through a screen or a printer indicating the transactions and/or users which correspond to the suspect sheets. Alternatively or in addition, provisions may be made for the cash acceptor mechanism to be in operative connection with a printer which prints transaction and/or user identifying information on each of the suspect sheets. This may include for example, visible or non-visible indicia. In some embodiments the indicia may be removable such as removable labels or indicia that can be washed off or otherwise removed or neutralized. In other embodiment the characteristics determined by the validator may be such that the data is sufficiently detailed and of types that create a unique electronic profile of each suspect sheet. This data can be stored at the machine in a data store through operation of the controller or elsewhere in a connected data store. This sheet identifying data may then later be used by a servicer or other persons recovering or analyzing the suspect sheets to correlate each sheet with the transaction and/or user that provided the sheet to the machine. This may be done in some embodiments by putting the machine controller in a mode for such analysis and feeding each suspect sheet through the cash acceptor mechanism. The controller may then operate to correlate the stored data related to the transaction and/or user with the stored data that uniquely identifies the sheet. Such information is then provided to a user of the machine recovering the sheets. Alternatively, such analysis may be conducted by transferring data away from the machine along with
the suspect sheets, and conducting the analysis at another validator. Of course these approaches are exemplary of approaches that may be used to uniquely identify a suspect sheet and associate it with a user and/or a transaction.

In the exemplary embodiment of the cash acceptor mechanism 80, it is desirable to maintain the interior components of the cash acceptor mechanism isolated and in sealed relation except when access is required for servicing. As can be appreciated, while the exemplary embodiment positions the cash acceptor mechanism in intermediate relation between a vertically extending wall of the generally L-shaped chest and the wall of the housing to provide enhanced security, it also presents challenges for servicing. While the ability of the exemplary embodiment to move the cash acceptor mechanism rearward through a service opening of the ATM facilitates servicing, problems are still potentially presented by the need to have to remove cover panels and the like. Further, there is always a risk that cover panels, once removed, will not be replaced resulting in infiltration of contaminants to the cash acceptor mechanism and causing malfunctions or failures.

To reduce the risk of service persons not replacing service panels, the exemplary embodiments of the invention are made to minimize the risk that service panels will be removed and not replaced. As shown in Figure 15, in one exemplary embodiment a side service panel 210 is mounted in hinged relation in supporting connection with the cash acceptor mechanism. This enables the service panel 210 to be opened once the cash acceptor mechanism has been moved rearward from the machine. This enables ready access to the components within the machine. In addition in this exemplary embodiment, the front service panel 212 is mounted in hinged relation adjacent the front of the cash acceptor mechanism. This front service panel enables access to components accessible through a front opening of the cash accepting mechanism.

As can be appreciated because of the hinged character of service panels 210 and 212, the panels may be readily opened. However, the hinged mounting makes it difficult for a technician to entirely remove the panels from the machine. Further, the cash acceptor mechanism cannot be returned to service without closing the service panels. Of course as can be appreciated, suitable latching mechanisms or
other holding devices may be used so as to assure that once the service panels are returned to their closed position, they remain therein until such time as the service panels need to be opened again for servicing.

Figure 16 shows yet a further schematic view of an alternative approach to providing service panels on the cash acceptor mechanism 80 that provide protection for internal components and yet can be readily removed for servicing. In the embodiment shown in Figure 16, service panels 214 and 216 are provided such that they can move in the direction indicated by the adjacent arrows. Service panels 214 and 216 in the exemplary embodiment are mounted in channels, slots or other suitable devices on the cash acceptor mechanism for guiding and holding the panels in position. The useful aspect of the service panels shown in Figure 16 is that the cash acceptor mechanism 80 need not be removed from the operative position in order to open the interior of the mechanism by moving the service panel. Indeed in the exemplary embodiment, service panel 214 may be entirely removed exposing the components of the cash acceptor mechanism without moving the cash acceptor mechanism from the operative position. Service panel 216 which may include the front face supporting the resilient gasket, may be made more readily removable by moving the gasket relative to the chute. The ability to remove service panels may be particularly useful in situations where a service person needs to observe the cash acceptor mechanism in operation in order to diagnose and remedy certain problems.

In some embodiments it may be desirable to include devices to assure that the service panels 214 and 216 are reinstalled on the cash acceptor mechanism after servicing procedures are completed. This may be accomplished by including contact switches such as the contact switch schematically represented as 218 to sense when the service panels have been placed back in position. Such contact switches may limit the operation of the cash acceptor mechanism until such panels are replaced. Alternatively the circuitry within the ATM may cause an alarm or other indication to be given or may disable operation of the currency acceptor mechanism if the access doors to the upper housing are closed and the service panels have not been returned to their operative position. Of course other approaches may be used.
As can be appreciated, the arrangements of service panels shown in Figures 15 and 16 for the cash acceptor mechanism are exemplary and in other embodiments other approaches may be used.

In the exemplary ATM 10 there is also included a mechanism for dispensing cash through the cash dispensing opening 38 in the fascia. This cash dispensing mechanism generally indicated 220 is schematically represented in Figure 3. In the exemplary embodiment the cash dispensing mechanism is positioned in the higher side of the generally L-shaped chest and includes a plurality of note storage areas 222, 224, 226, 228, 230 and 232. In some exemplary embodiments the note storage areas may be housed within removable currency cassettes which are suitable for holding notes and which may be readily removed from the machine.

In the exemplary embodiment each of the note storage areas is in operative connection with a picker mechanism 234, 236, 238, 240, 242 and 244. Each of these picker mechanisms are selectively operative responsive to controller 64 to selectively dispense notes or other sheets from the corresponding storage area responsive to appropriate inputs to input devices of the user interface. In some exemplary embodiments the picker mechanisms used may be similar to the picker mechanism 86 used to separate sheets from a stack in the cash acceptor mechanism 80.

In the exemplary embodiment a vertically extending transport 246 is in operative connection with the picker mechanisms and a presenter mechanism 248. In operation of the machine the presenter mechanism is operative to receive sheets dispensed by the picker mechanisms and to move the sheets upward through the transport 246 to accumulate the sheets into a stack schematically indicated 250. After the desired sheets have been accumulated, the presenter mechanism is operative to move the stack toward the cash dispensing opening 38 while the controller is operative to open the cash dispensing gate 42. This enables the stack of sheets to be dispensed to a user of the machine.

It should be understood that while in the exemplary embodiment the cash dispensing mechanism 220 has been described as dispensing various denominations of currency notes, in other embodiments the cash dispensing mechanism may
dispense other types of sheets. These may include, for example, travelers checks, stamps, vouchers, scrip, gift certificates, or other documents. Further, in some embodiments the ATM may be operative to dispense combinations of both notes and other documents as may be requested by the user. Of course the mechanisms shown are exemplary and in other embodiments other approaches may be used.

In operation of the exemplary ATM 10, a user operating the machine provides inputs sufficient to identify the user's account through the input devices of the machine. This may include, for example, providing a card and/or alpha-numeric data through the input devices which can be correlated through operation of the controller in the machine and/or by interaction with a remote computer to determine a financial account of the user. The controller thereafter operates the output devices of the machine so as to prompt the user to provide inputs and to select a particular type of transaction or provide other inputs. In situations where the user wishes to conduct a cash accepting transaction, the ATM operates responsive to the controller 64 to open the gate 44 to the chute 82 which enables the user to provide a stack of notes or other documents into the machine.

In response to the user providing the stack of documents 84 and/or in response to inputs from the user, the cash acceptor mechanism 80 operates to unstack the documents through operation of the picker mechanism 86 and to determine at least one of the characteristics of each document through operation of the validator device 88. The determined characteristics of the documents may cause valid or acceptable documents to be routed through operation of the routing device 92 into the escrow device 94 where they may be temporarily stored. Also, the controller may operate the routing device 92 to direct suspect documents such as invalid documents or probable counterfeit notes to the transport 86 and the storage area 100.

In the exemplary embodiment once the documents have been moved past the validator, the controller may operate to advise the user of the machine's determination with regard to the documents through outputs through one or more output devices. In some exemplary embodiments the user may be offered the option to recover the valid or invalid documents or both. This may be accomplished by the
escrow device delivering the documents to the same or different transports such that the documents may be returned to the chute or other area of the machine that is accessible to the user. Likewise if the option is offered, invalid documents may likewise be routed back to the user. Of course various approaches may be used depending on the particular machine configuration and the programming associated with the controller.

In the exemplary transaction, if the documents determined to be valid are to be stored within the machine, the controller operates responsive to inputs from the user and/or its programming to cause the escrow device 94 to deliver the documents. The documents are directed by the routing device 92 through the cash accepting opening 102 in the chest in which they are transported and stored in the appropriate sheet handling mechanisms or in an appropriate bulk storage container. In the exemplary embodiment the user's account is credited for valid sheets deposited. Information is collected concerning any invalid sheets provided by the user so that if the sheets are later determined to be valid, the user may be credited or alternatively the user may be contacted to determine the source of the invalid sheets. Of course as can be appreciated, this transaction is exemplary and in other embodiments other approaches may be used.

Using the exemplary ATM 10 a user may also conduct cash dispensing transactions. This may be done either during the same session as a cash accepting transaction or as part of a separate session. In such a transaction the user of the ATM provides inputs to the input devices that are sufficient to identify one or more accounts of the user and/or other identifying inputs. Responsive to prompts through the output devices, the user provides inputs indicating that they wish to conduct a transaction involving the dispense of notes or other types of sheets, and the amount, nature or character of the sheets that the user has requested.

Responsive to the inputs from the user the controller 64 is operative to cause the cash dispenser mechanism 220 and the picker mechanisms located therein to deliver the requested sheets to the presenter mechanism 248, which is operative to accumulate the requested sheets into a stack 250. Once the sheets are accumulated, the sheets are moved outward to the user as the gate mechanism is opened.
Hereafter the controller operates to cause the value of the dispensed cash or other sheets to be charged to the user's account.

It should be understood that the transactions described are exemplary and additional types of transactions may be carried out through operation of various embodiments. In addition as previously discussed, mechanisms that are operative to both accept and dispense cash such as those described in the incorporated disclosures may be utilized as substitutes for, or in addition to, the mechanisms described herein so as to carry out transactions. Other types of transaction function devices may be included in some embodiments. For example as previously discussed, embodiments of the invention may be operative to image and validate checks. In such cases it may be desirable for the machine to have the capability to cancel the check or destroy the check so there is no risk that the check may be later be stolen and used fraudulently. In some embodiments suitable mechanisms may be provided for carrying out such functions. In addition it may be desirable in some embodiments to have the machine produce bank checks, travelers checks, tickets or other documents and suitable mechanisms may be provided for producing such documents in the selected amounts. Further, in alternative embodiments features used by merchants such as devices for accepting deposit bags, dispensing rolled coin and other devices may be incorporated into an ATM or other automated banking machine having features described herein. As can also be appreciated, features of the exemplary ATM may also be used in numerous other types of automated banking machines.

Exemplary embodiments of the invention include light emitting devices 17, 31, 41, 43 and 45. In the exemplary embodiment the light emitting devices are positioned in areas on the user interface at locations associated with particular transaction function devices. For example, light emitting device 31 is associated with the receipt printer 30 and light emitting device 17 is associated with the card reader 16. In the exemplary embodiment the light emitting devices are in operative connection with the one or more controllers in the machine. In addition, such devices are capable of emitting light of selected colors at particular times during the
transaction responsive to the operative condition of the transaction function device of the ATM with which the light emitting device is associated.

In the exemplary embodiment the light emitting devices include an array of LEDs of different colors embedded on a flexible circuit. For example, Figure 22 represents light emitting device 31. However, it should be understood that in the exemplary embodiment all the light emitting devices are generally similar. Light emitting device 31 includes an array of LEDs 304 connected through a circuit on a flexible substrate such as a polyimide film, for example, DuPont Kapton® material, and includes a flexible connector portion 306. The flexible connector terminates in an electrical connector 308. Electrical connector 308 is releasably connectible to a driving circuit or other electrical circuit in the machine which operably connects to one or more controllers for purposes of controlling the illumination of the light emitting device.

As shown in Figure 23, in the exemplary embodiment the light emitting device includes three different color LEDs. These LEDs are red, green and yellow, which are represented by "R," "G," and "Y" in the figures as shown. As represented in Figure 23, in the exemplary embodiment the LEDs are in an array such that LEDs of only one color are vertically aligned along a single line of the light emitting device. For example, as shown in Figure 23, a line 310 comprises a line of vertically aligned red LEDs. As shown in Figure 23, a line 312 is a line of only green LEDs, and a line 314 of only yellow LEDs. As shown in Figure 23, in the exemplary embodiment the lines repeat so that there are five vertical lines of each color LED. It should be understood that while in the exemplary embodiment the LEDs of each color are arranged in vertically aligned relation, in other embodiments other arrangements such as horizontal alignment or other matrices of LEDs may be used. It should also be appreciated that although the LEDs are connected electrically in series as shown in Figure 24, the electrical connections on the flexible circuit provide for spaced vertically aligned pairs of LEDs of only one color.

As shown in Figure 25, in the exemplary embodiment the light emitting devices are supported in a flexible web. The web is thin in the preferred embodiment, having a thickness of approximately 1.20 millimeters. This facilitates
the positioning of the light emitting devices on the user interface. In the exemplary embodiment, LEDs which are represented 316 and 318 are mounted on a base layer 320 including the circuit on a flexible substrate. An outer layer 322 which in the exemplary embodiment comprises a polyester layer overlies the LEDs. A spacer 324 extends between the base layer and the outer layer. As best shown in Figure 23 multiple spacers may be used. In the exemplary embodiment the spacers are positioned outboard of the LEDs and include openings 326 to facilitate positioning the light emitting devices on the machine. This may include, for example, extending pins, studs, or fastening devices through the openings so as to secure the light emitting devices in the proper position. Further, in the exemplary embodiment the release layer includes an underlying adhesive layer 328. The adhesive layer enables attaching of a light emitting device to a selected area within the machine. The adhesive layer is initially exposed for purposes of attaching the light emitting device by removal of an adhesive release layer 330 as shown in Figure 25.

In an exemplary embodiment the light emitting devices are attached to components of the machine with which they are associated. This may be done, for example, by using modular construction for the transaction function devices within the machine and attaching the particular light emitting device to the associated module. For example, Figure 18 shows the cash accepting device 80 which is arranged as a modular device for purposes of processing sheets that may be received in the machine. In the exemplary embodiment the associated light emitting device 41 is mounted in supporting connection with the module. The adjacent fascia area of the machine provides an opening through which the light emitting device may be viewed when it is in the operative position. In some embodiments the fascia of the machine may include a transparent or translucent material separating the light emitting device from the exterior of the machine. However in other embodiments the light emitting devices may be exposed on the exterior of the machine. The attachment of the light emitting devices directly to the modular components of the machine may facilitate assembly and service of the machine. Placing the light emitting device directly on the module of the transaction function device with which
it is associated, may reduce the amount of wiring and connectors needed for purposes of assembly and service.

In the exemplary embodiment the multicolor light emitting devices are operated under the control of one or more controllers in the machine. Each light emitting device is operated to emit light of a selected color and/or in a selected manner responsive to the operative condition of an associated transaction function device. For example, exemplary machines may be selectively programmable to emit a particular color light responsive to a given operative condition. For example, the light emitting device adjacent to the card reader may emit green light when it is ready to receive the card of a user, and then change to a yellow light after the card has been received therein. Alternatively or in addition, lights of a different color may flash or alternate to reflect conditions of a particular device. Further, for example, in the event of an improper action such as a user attempting to insert a card into the card reader incorrectly, the controller may be programmed to have the associated light emitting device emit red light or otherwise flash a color of light so as to indicate to the user that they have done something improper. Similarly, if a particular transaction function device is malfunctioning or not available, red light may be output.

In some exemplary embodiments the controller may be programmed so as to illuminate the light emitting devices to guide a user in operation of the machine. This may include, for example, illuminating or flashing a particular colored light to indicate a required user activity at a particular location on the machine. For example, at a particular time in the transaction the controller may cause to be output on the display an indication to the customer that they are to take their receipt. When the machine has delivered the receipt, the controller may operate to cause the light emitting device 31 associated with the receipt delivery to illuminate, flash or otherwise indicate to the user that activity is required by the user in the area of the receipt delivery slot.

In some exemplary embodiments the controller may be programmed to cause the light emitting devices to selectively illuminate intermittently and for a different duration depending on the operative condition of an associated device. For
example, if a user provides inputs so as to request a cash-dispensing transaction, the light emitting device 43 adjacent to the cash dispensing opening may illuminate in a yellow condition as the machine operates internally to move bills toward the cash dispensing opening. Thereafter as the bills are pushed through the opening and presented to the user, the controller may cause the color of the light emitting device to change to green. In addition, the controller may cause the green light to flash so as to draw the user's attention to the fact that the money is ready to be taken. Further, in an exemplary embodiment, if the user has not taken their cash after a certain time and the machine is programmed to retract it, the controller may cause the light emitting device to flash or may operate so as to flash different colors in an alternating fashion so as to capture the attention of the user prior to the money being retracted.

In other embodiments, the colors emitted by the light emitting devices may be selectively programmed based on aesthetic reasons. For example, if the entity which operates the machine has particular trade dress involving certain colors the controller may be programmed to have the light emitting devices correspond with that trade dress. Thus, for example, if the particular entity's trade dress color is green, the machine may be programmed to utilize the green LEDs as lead-through indicators in prompting the user in how to operate the machine. Likewise if a different operating entity with a similar machine utilizes yellow as part of their trade dress scheme, the controller may be programmed to illuminate the yellow LEDs in the light emitting devices as the lead-through indicators.

It should further be understood that although the use of three color of light emitting devices is shown, this is exemplary and in other embodiments additional types of light emitting devices may be provided. In addition it should be understood that although light emitting devices in the exemplary embodiment are arranged so that only one color may be output from a given light emitting device at a given time, in other embodiments provision may be made to illuminate multiple color LEDs simultaneously. In such arrangements, LEDs in primary colors may be included so as to achieve ranges of hue through color combinations. This may be done by illuminating multiple light emitting sources simultaneously and/or varying the
intensity of such sources through operation of a controller so as to achieve various colors. This may include, for example, providing for a gradual change in the hue of the light emitting device in accordance with the status of the associated transaction function device. This may include, for example, providing an indication to the user of the status of the completion of a particular task. It should also be understood that although LEDs are used as the light source in the exemplary embodiment, in other embodiments of the invention other approaches may be used. It should be understood that the structures and operations described are exemplary and numerous other structures and methods may be encompassed within the scope of the present invention.

In the exemplary embodiment of ATM 10, provision is made to facilitate a user's operation of the machine and to minimize the risk of persons improperly observing a user or their activities. Such undesirable activities may include, for example, unauthorized persons observing the user's input of their PIN number or other data. As shown in Figure 26, fascia 12 of the exemplary embodiment includes a recessed area 332 in which the display, function keys, card reader and receipt outlet are positioned. This recessed area 332 is illuminated by a light source 334. Light source 334 provides illumination generally in the downward direction so as to enable the user to more readily view the locations of the input and output devices on the fascia of the machine.

In the exemplary embodiment the fascia 12 includes a top panel portion 336 which is positioned generally above the light source 334 and the user interface of the machine. As represented in Figure 26, the top panel portion includes a pair of convex mirrors 338, 340. The convex mirrors 338, 340 are generally horizontally disposed and are positioned at opposed sides of the user interface.

As represented in Figure 27, a user 342 operating the ATM 10 will generally have their body aligned with the user interface 15 of the machine. As a result, the user is generally enabled to view in the convex mirrors an area behind the user generally indicated 343. The user is enabled to do this by looking in the mirrors 338 and 340 to the user's left and right, respectively. By looking in these mirrors, the user is enabled to generally see what is going on behind them as well as in a
transverse direction from the area directly behind the user. This may enable the user to determine if one or more persons are in their proximity as well as whether such persons may be attempting to observe the user or their inputs to the ATM. In some embodiments where the ATM is operated in an external environment, lighting sources may be provided in the area 343 to facilitate the user's observation of persons who may be present therein.

It should be understood that the arrangement shown is exemplary and in other embodiments other mirror or observation arrangements may be used. In addition, in some embodiments provision may be made to maintain the cleanliness of the mirrors so as to reduce the risk that the user's ability to observe surrounding activities is impaired. These provisions may include, for example, automated devices which wipe the surface of the mirrors periodically. These may be external wiping devices or in some embodiments internal wiping devices. This may be accomplished, for example, by having the convex mirrors be part of a rotatable member that may be periodically rotated within the fascia so as to expose a new external surface. Cleaning devices on the interior of the fascia may operate to wipe contaminants from the surface of the mirror as it passes internally such that further rotation exposes a clean mirror surface to the user. Of course these approaches are exemplary and in other embodiments other approaches may be used. Further, the principles discussed may be used with other types of automated banking machines and in other circumstances other than those described in connection with the exemplary embodiment.

Thus the automated banking machine and system of the exemplary embodiments may achieve one or more of the above stated objectives, eliminate difficulties encountered in the use of prior devices and systems, solve problems and attain the desirable results described herein.

In the foregoing description certain terms have been used for brevity, clarity and understanding, however no unnecessary limitations are to be implied therefrom because such terms are for descriptive purposes and are intended to be broadly construed. Moreover, the descriptions and illustrations herein are by way of examples and the invention is not limited to the details shown and described.
In the following claims any feature described as a means for performing a function shall be construed as encompassing any means capable of performing the recited function, and shall not be deemed limited to the particular means shown in the foregoing description or mere equivalents thereof.

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

We claim:

1. An automated banking machine apparatus comprising:

   a housing, the housing including a secure chest portion;

   at least one first input device adapted to receive identifying inputs
   from a user;

   at least one output device adapted to provide instructions to a user
   operating the machine;

   at least one second input device adapted for receiving instructions
   from a user;

   a cash acceptor mechanism adapted to receive a stack comprising a
   plurality of notes from a user, to separate each of the notes from the
   stack, to evaluate each note and to segregate suspected invalid notes
   from valid notes, wherein the cash acceptor mechanism is movably
   mounted in supporting connection with the chest portion, and
   wherein the cash acceptor mechanism is adapted to pass valid notes
   downward through a cash acceptor opening in the chest portion, and
   wherein the sheet acceptor is movable relative to the opening.

2. The apparatus according to claim 1 and further comprising:

   a note dispenser mechanism, wherein the note dispenser mechanism
   extends in the chest portion, and wherein when the cash acceptor
   mechanism is in an operative position the note dispenser mechanism
within the chest portion extends in generally side-by-side relation with the cash acceptor mechanism outside the chest portion.

3. The apparatus according to claim 1 and further comprising a note storage mechanism within the secure chest portion and beneath the cash acceptor opening, wherein the note storage mechanism is operative to store notes within the chest portion that have been passed through the cash acceptor opening.

4. The apparatus according to claim 3 wherein the note storage mechanism is operative to store notes that have been passed through the cash acceptor opening in accordance with the denomination of such notes.

5. The apparatus according to claim 3 and further comprising a generally horizontally extending transport within the chest portion, wherein notes that have passed downwardly through the cash acceptor opening are moved generally horizontally through the transport toward the note storage mechanism.

6. The apparatus according to claim 5 and further comprising a security plate positioned in the chest portion vertically intermediate of the horizontal transport and the note storage mechanism.

7. The apparatus according to claim 6 wherein the cash acceptor mechanism comprises a driving member, and wherein the horizontal transport is in operative connection with a driven member, and wherein the driven member is accessible from outside the chest portion, and wherein in the operative position of the cash acceptor mechanism the driving member is in engagement with the driven member, whereby the horizontal transport is operatively connected with the driving member.
8. The apparatus according to claim 7 wherein in the operative position of the cash acceptor mechanism the driving member engages the driven member through the cash acceptor opening.

9. The apparatus according to claim 2 wherein the chest portion is generally L-shaped in cross section.

10. The apparatus according to claim 1 wherein the cash acceptor mechanism further comprises an escrow device, wherein the escrow device is operative to store notes determined to be valid prior to passing the valid notes through the cash acceptor opening.

11. The apparatus according to claim 10 wherein the chest portion bounds an interior area and wherein the cash acceptor mechanism includes a suspect note storage area, wherein notes in the suspect note storage area are removable without accessing the interior area of the chest portion.

12. The apparatus according to claim 10 wherein the housing includes a top portion within the housing and outside the chest portion, and wherein the cash acceptor mechanism in the operative position is positioned in the top portion of the housing, and wherein the cash acceptor mechanism is accessible within the housing by opening the first lock.

13. The apparatus according to claim 12 wherein the suspect note storage area is accessible within the top portion of the housing by opening a second block.

14. The apparatus according to claim 12 wherein in the open condition of the top portion of the housing, the cash acceptor mechanism is movable to extend outside the housing.
15. The apparatus according to claim 14 wherein in moving the cash acceptor mechanism from the operative position to the position extending outside the housing, the cash acceptor mechanism is moved both vertically and horizontally.

16. The apparatus according to claim 15 and further comprising a fascia in supporting connection with the housing, and wherein the fascia includes an opening, and wherein the cash acceptor mechanism comprises a chute for receiving notes from a user, and wherein in the operative position of the cash acceptor mechanism the chute extends in the fascia opening.

17. The apparatus according to claim 16 and further comprising a resilient gasket, and wherein in the operative position of the cash acceptor mechanism the gasket extends in fluid tight relation between the chute and the fascia.

18. The apparatus according to claim 17 wherein the chute is bounded interiorly by a lower surface and wherein the lower surface includes at least one water capturing opening, and wherein the water capturing opening is in operative connection with a drain fluidly connected to outside the housing.

19. The apparatus according to claim 18 wherein the chute is bounded by a movable gate, and wherein the at least one water capturing opening is positioned interiorly of the gate.

20. The apparatus according to claim 18 wherein the at least one water capturing opening comprises at least one trough that extends across a lower surface of the chute.

21. The apparatus according to claim 18 wherein the at least one water capturing opening is connected to the drain through at least one flexible tube, wherein the cash acceptor mechanism is movable relative to the housing while
maintaining fluid engagement between the at least one water capturing opening and the drain.

22. An automated banking machine apparatus comprising:

a housing, including a chest portion including an interior area;

a user interface in supporting connection with the housing;

a cash dispenser adapted to selectively dispense notes stored in the interior area of the chest portion to users of the machine;

a cash acceptor mechanism, wherein the cash acceptor mechanism is movably mounted within the housing and outside the chest portion, and wherein in an operative position the cash acceptor mechanism is operative to receive notes input to the machine by users and to pass notes downward into the interior area of the chest portion.

23. The apparatus according to claim 22 wherein the chest portion is bounded by a generally vertically extending wall within the housing, and wherein the cash acceptor mechanism is mounted to move generally parallel to the vertically extending wall.

24. The apparatus according to claim 22 wherein the chest portion includes a cash accepting opening, and wherein the cash acceptor mechanism is operative to pass notes downward through the cash accepting opening, and further comprising a security member in supporting connection with the chest portion and positioned vertically below the cash accepting opening, in the interior area of the chest portion below the security member.
25. The apparatus according to claim 24 wherein the transport device comprises a horizontal transport extending in the interior area.

26. The apparatus according to claim 24 wherein the transport device is in operative connection with a driven member, and wherein the cash acceptor mechanism includes a driving member, and wherein the driving member is in operative engagement with the driven member.

27. The apparatus according to claim 22 wherein the cash acceptor mechanism is operative to segregate suspect notes from valid notes and to place the suspect notes in a storage area outside the chest portion.

28. The apparatus according to claim 27 wherein the housing includes a top portion, wherein the top portion extends in the housing outside the chest portion, wherein the cash acceptor mechanism extends in the top portion, and further comprising a first lock and a second lock, wherein the first lock enables accessing the top portion, and after the top portion has been accessed, the second lock enables accessing the suspect note storage area.

29. The apparatus according to claim 27 wherein the cash acceptor mechanism is adapted to receive a stack of notes input to the machine by a user, and to separate each of the notes from the stack, and to cause valid notes to move toward the interior area of the chest portion and suspect notes to move toward the suspect note storage area.

30. The apparatus according to claim 29 wherein the cash acceptor mechanism comprises an escrow device, wherein the escrow device is operative to store notes determined to be valid prior to the valid notes being moved to the interior area of the chest portion.
31. The apparatus according to claim 29 and further comprising a chute, wherein the notes comprising the stack are unstacked in the chute.

32. The apparatus according to claim 31 and further comprising a fascia in supporting connection with the housing, and wherein the chute extends through an opening in the fascia.

33. The apparatus according to claim 32 and wherein the chute is movable relative to the fascia and further comprising a resilient gasket, wherein the resilient gasket engages the chute and the fascia in fluid tight relation.

34. The apparatus according to claim 32 and further comprising a fluid capture opening in the chute, wherein the fluid capture opening is adapted to conduct water out of the chute.

35. A method comprising:

a) unlocking a first lock of a housing of an automated banking machine including a chest portion and a top portion outside and extending above the chest portion, wherein the chest portion houses a cash dispenser adapted to dispense cash from the machine, and wherein the top housing portion includes a cash acceptor mechanism adapted to segregate valid notes from suspect invalid notes input to the machine by users, and wherein the cash acceptor mechanism is operative to cause valid notes to pass to within the chest portion, and suspect invalid notes to pass to a suspect note area in the top housing portion, wherein unlocking the first lock enables access to the top housing portion;
b) unlocking a second lock accessible within the top housing portion, wherein unlocking a second lock enables accessing the suspect note storage area.

c) subsequent to (b) removing notes from the suspect note storage area.

37. The method according to claim 35 wherein the chest portion includes a generally horizontally extending wall including a cash accepting opening, wherein notes determined to be valid notes by the cash acceptor mechanism pass through the cash accepting opening, and further comprising:

c) subsequent to (a) moving the cash acceptor mechanism horizontally in supporting connection with the horizontally extending wall such that a cash accepting mechanism extends out of the housing from the top portion.

38. The method according to claim 37 wherein the chest portion is bounded within the housing by a vertically extending wall and wherein (c) comprises moving the cash accepting mechanism generally parallel to the vertically extending wall.

39. The method according to claim 37 wherein the cash acceptor mechanism includes a driving member, and wherein the machine further includes a driven member adapted responsive to movement thereof to cause notes to move in a transport extending in the chest portion, and wherein (c) includes disengaging the driving member and the driven member.

40. The method according to claim 38 and subsequent to (c):
d) moving a service panel in supporting connection with the cash acceptor mechanism to enable access to an internal device of the cash acceptor mechanism.

41. The method according to claim 40 wherein prior to being moved in (d) the service panel extends generally parallel to the vertically extending wall.

42. The method according to claim 41 wherein (d) comprises rotatably moving the service panel in supporting connection with the cash acceptor mechanism.

43. The method according to claim 41 wherein (d) comprises moving the service panel relative to the cash acceptor mechanism and generally parallel to the vertically extending wall.

44. The method according to claim 40 and further comprising:

e) accessing the internal device of the cash acceptor mechanism.

45. The method according to claim 44 and further comprising:

f) moving the service panel in supporting connection with the cash acceptor mechanism to prevent access to the internal device, wherein the service panel extends generally parallel to the vertically extending wall.

46. The method according to claim 45 and further comprising:

g) moving the cash acceptor mechanism in supporting connection with the horizontally extending wall into the housing.
47. The method according to claim 46 and subsequent to (g) further comprising:

h) locking the first lock to prevent access to the top housing area.

48. The method according to claim 35 wherein the cash dispenser within the chest portion and the cash acceptor mechanism outside the chest portion extend in side-by-side relation, and further comprising:

c) opening a lock enabling access to an interior area of the chest portion;

d) accessing the cash dispenser in the interior area of the chest portion.

49. The method according to claim 47 and further comprising:

receiving at least one identifying input through at least one input device on a user interface of the automated banking machine;

dispensing cash to the user from the machine through operation of the cash dispenser.

50. A method comprising:

a) unlocking a first lock of a housing of an automated banking machine including a chest portion and a top housing portion outside the chest portion, wherein the chest portion houses a cash dispenser adapted to dispense cash from the machine, and wherein the top housing portion includes a cash acceptor
mechanism adapted to segregate valid notes from suspect invalid notes input to the machine by users, and wherein the cash acceptor mechanism is operative to cause valid notes to pass to within the chest portion through a cash accepting opening in a horizontally extending wall of the chest portion, and suspect invalid notes to pass through a suspect note storage area in the top housing portion, wherein unlocking the first lock enables access to the top housing portion;

b) subsequent to (a) moving the cash acceptor mechanism horizontally in supporting connection with the horizontally extending wall such the cash accepting mechanism extends out of the housing from the top portion.

51. The method according to claim 50 wherein the chest portion is bounded within the housing by a generally vertically extended wall, and wherein (b) comprises moving the cash acceptor mechanism generally parallel to the vertically extending wall.

52. The method according to claim 50 wherein the cash acceptor mechanism includes a driving member, and wherein the machine further includes a driven member adapted responsive to movement thereof to cause notes to move in a transport extending in the chest portion, and wherein (b) further includes disengaging the driving member and the driven member.

53. The method according to claim 50 and subsequent to (b):

c) moving a service panel in supporting connection with the cash acceptor mechanism to enable access to an internal device of the cash acceptor mechanism.
54. The method according to claim 53 wherein (c) comprises rotatably moving the service panel in supporting connection with the cash acceptor mechanism.

55. The method according to claim 53 wherein (e) comprises moving the service panel relative to the cash acceptor mechanism and generally parallel to the vertically extending wall.

56. The method according to claim 52 and further comprising:

d) accessing an internal device of the cash acceptor mechanism.

57. The method according to claim 56 and further comprising:

e) moving the service panel in supporting connection with the cash acceptor mechanism to prevent access to the internal device, wherein the service panel extends generally parallel to the vertically extending wall.

58. The method according to claim 57 and further comprising:

f) moving the cash acceptor mechanism in supporting connection with the horizontally extending wall into the housing.

59. The method according to claim 58 and subsequent to (f) further comprising:

g) locking the first lock to prevent access to the top housing area.

60. The method according to claim 50 and further comprising:
c) subsequent to (a) unlocking a second lock accessible within the top housing portion, wherein unlocking the second lock enables accessing the suspect note storage area.

61. The method according to claim 60 and further comprising:

d) subsequent to (c) removing suspect notes from the suspect note storage area.

62. Apparatus comprising:

an automated banking machine including:

a housing;

a user interface in supporting connection with the housing, the user interface including at least one input device and at least one output device, wherein the user interface is adapted to receive identifying inputs usable to identify user accounts, to output indicia usable to operate the machine, and to receive machine transaction inputs responsive to which the machine is operative to carry out at least one transaction function;

a sheet holding area within the housing, wherein the sheet holding area is adapted to hold a stack comprising a plurality of financial instrument sheets in abutting relation;

at least one movable picking member, wherein the at least one picking member is positioned such that a first sheet bounding the stack engages the at least one picking member, and wherein movement of the at least one picking member in a picking direction is operative to urge the first sheet to move relative to the stack in a first direction, and wherein the at least one
picking member includes a plurality of sheet engaging portions adapted to engage the first sheet, and at least one recess wherein the at least one recess extends in the first direction and is intermediate of adjacent sheet engaging portions;

at least one first stripper portion, wherein the at least one first stripper portion extends in generally aligned relation with the at least one recess, wherein the at least one first stripper portion is positioned to engage the first sheet when the first sheet moves in the first direction between the at least one picking member and the at least one first stripper portion, wherein the at least one first stripper portion is not in contact stripping engagement with the at least one sheet engaging portion when the first sheet is not positioned between the at least one picking member and the at least one first stripper portion;

at least one second stripper portion, wherein the at least one second stripper portion engages at least one cooperating sheet engaging portion in contact stripping engagement, and wherein the first sheet is enabled to move in the first direction between the at least one second stripper portion and the at least one cooperating first sheet engaging portion;

wherein responsive to at least one user input to the at least one input device of the user interface, the at least one picking member moves in the picking direction engaging a first face of the first sheet and urging the first sheet to move from the stack in the first direction while the first stripper portion and the second stripper portion engage an opposed face of the first sheet and resist movement of the first sheet in the first direction, wherein sheets included in the stack other than the first sheet are generally prevented from moving from the stack with the first sheet.
63. The apparatus according to claim 62 and further comprising at least one validating device within the housing adapted to determine at least one characteristic of the first sheet after it is moved from the stack.

64. The apparatus according to claim 63 and further comprising a sheet storage mechanism in the housing, and wherein the sheet storage mechanism is operative to store the first sheet with other sheets having the at least one determined characteristic.

65. The apparatus according to claim 64 wherein the housing further comprises a chest portion and the sheet storage mechanism is positioned in the chest portion, and wherein the validating device is positioned outside the chest portion, and wherein the chest portion includes an upper surface within the housing having a sheet accepting opening, and wherein the first sheet is moved toward the sheet storage mechanism generally vertically through the sheet accepting opening.

66. The apparatus according to claim 65 and wherein the sheet storage mechanism includes a sheet transport, and wherein a member driving the transport extends in the sheet accepting opening.

67. The apparatus according to claim 62 wherein engagement of the first sheet with the picking member and the first stripper portion imparts a cross-sectional wave configuration in the sheet extending transversely to the first direction.

68. The apparatus according to claim 62 wherein the first stripper portion extends in the at least one recess, wherein engagement of the first sheet with the picking member and the at least one first stripper portion imparts a cross-sectional wave configuration in the first sheet generally transverse to the first direction.
69. The apparatus according to claim 67 wherein the at least one first stripper portion is positioned relative to the at least one second stripper portion such that as the first sheet moves in the first direction in engagement with the plurality of sheet engaging portions, the first sheet engages the at least one first stripper portion prior to engaging the at least one second stripper portion.

70. The apparatus according to claim 62 wherein the at least one picking member comprises a generally cylindrical picking member, and wherein the at least one recess comprises an annular recess in the picking member.

71. The apparatus according to claim 70 wherein the at least one first stripper portion extends in the annular recess.

72. The apparatus according to claim 71 and further comprising a first stripper roll, and wherein the first stripper portion comprises a first stripper surface of the first stripper roll.

73. The apparatus according to claim 62 wherein the first stripper surface extends into the annular recess.

74. The apparatus according to claim 70 wherein the sheet engaging portion includes a high friction arcuate segment on the picking member.

75. The apparatus according to claim 74 wherein the high friction arcuate segment extends less than a full circumference of the picking member.

76. The apparatus according to claim 74 and further comprising a second stripper roll, wherein the second stripper roll includes the second stripper portion, and wherein the second stripper roll engages the high friction arcuate segment in contact stripping engagement when the first sheet is not extending between the picking member and the second stripper roll.
77. The apparatus according to claim 73 wherein the sheet engaging portions include a high friction arcuate segment in supporting connection with the picking member.

78. The apparatus according to claim 77 wherein the high friction arcuate segment extends less than a full circumference of the picking member.

79. The apparatus according to claim 78 and further comprising a second stripper roll, wherein the second stripper roll includes the second stripper portion, and wherein the second stripper roll engages the high friction arcuate segment in contact stripping engagement when the first sheet is not extending between the picking member and the second stripper roll.

80. The apparatus according to claim 79 wherein the first sheet engaging portion including the high friction arcuate segment is generally centered transversely on the picking member relative to the first sheet, and wherein the first sheet engaging portion is bounded on the picking member on each side transversely by an annular recess.

81. The apparatus according to claim 80 wherein the first stripper roll is in operative connection with a first one-way clutch, and the second stripper roll is in operative connection with a second one-way clutch, wherein the first and second one-way clutch each resist cooperative movement of the first and second stripper rolls with the first sheet as the first sheet moves in the first direction, but enable cooperative movement of the first and second stripper rolls when the first sheet moves in a second direction opposed of the first direction.

82. The apparatus according to claim 62 wherein the housing comprises a chute therein, wherein the cute includes the sheet holding area including the stack, and wherein the chute is accessible from outside the machine.
83. The apparatus according to claim 82 wherein the chute is bounded interiorly by a lower surface, and wherein the first sheet when positioned in the stack is in supporting connection with the lower surface.

84. The apparatus according to claim 83 wherein the lower surface of the chute includes at least one water capturing opening and wherein the at least one water capturing opening is in fluid communication with a drain in fluid connection with an area outside the machine.

85. The apparatus according to claim 83 and further comprising at least one moving member within the interior of the chute, wherein the at least one moving member engages the opposed face of the first sheet and urges the first sheet to move in the first direction.

86. The apparatus according to claim 85 wherein the at least one moving member is operative to urge the first sheet to move in the first direction responsive to the at least one user input.

87. The apparatus according to claim 83 wherein the chute is bounded in a direction generally transverse to the lower surface by at least one engaging surface, wherein engagement of the stack with the at least one engaging surface is operative to splay the stack in the first direction.

88. The apparatus according to claim 87 and further comprising an idler roll positioned in the chute, and wherein the at least one engaging surface comprises a surface of the idler roll.

89. The apparatus according to claim 88 and further comprising a movable gate in supporting connection with the housing, wherein access to an interior area of the chute is controlled by the gate.
90. The apparatus according to claim 62 wherein the financial instrument sheets in the stack include both plastic and paper sheets.

91. The apparatus according to claim 62 wherein the financial instrument sheets in the stack include both currency notes and checks.

92. The apparatus according to claim 62 wherein the financial instrument sheets comprise currency notes.

93. The apparatus according to claim 65 wherein the chest portion includes a generally vertically extending wall extending generally perpendicular relative to the upper surface, and wherein the validating device is movably mounted in supporting connection with the chest portion and is movable generally parallel to the generally vertically extending wall.

94. The apparatus according to claim 93 wherein the validating device includes a movable service panel supported thereon, and wherein in an operative position of the validating device the service panel is positioned adjacent the generally vertically extending wall, whereby opening the service panel to access interior components of the validating device is prevented.

95. The apparatus according to claim 94 wherein the sheet storage mechanism includes a sheet transport, and wherein the validating device includes a driving member, and wherein in the operative position of the validating device the driving member operatively engages the sheet transport.

96. Apparatus comprising:

   an automated banking machine apparatus including:

   a housing
a sheet holding area within the housing adapted to receive a stack comprising a plurality of financial instrument sheets input by a user to the apparatus;

at least one movable picking member adjacent the sheet holding area, wherein the at least one picking member is positioned such that a first sheet bounding the stack engages the at least one picking member, and wherein movement of the at least one picking member in a picking direction is operative to cause the first sheet to move relative to the stack in a first direction, and wherein the at least one picking member includes at least one sheet engaging portion adapted to engage the first sheet, and at least one recess wherein the at least one recess extends in the first direction and is transversely disposed from the at least one sheet engaging portion; at least one first stripper portion, wherein the at least one first stripper portion extends in generally aligned relation with the at least one recess, wherein the at least one first stripper portion is not in contact stripping engagement with a sheet engaging portion when no sheet extends between the at least one picking member and at least one stripper portion, and wherein the at least one first stripper portion is adapted to engage the first sheet when the first sheet moves in the first direction relative to the stack and to enable the first sheet to move between the at least one picking member and at least one first stripper portion;

at least one second stripper portion, wherein the at least one second stripper portion engages in stripping engagement at least one sheet engaging portion when no sheet extends between the at least one picking member and the at least one second stripper portion, and wherein the first sheet is enabled to move in the first direction between the at least one sheet engaging portion and the at least one second stripping portion, and wherein in response to movement of
the at least one picking member in the picking direction the first sheet moves in the first direction and in such movement engages the at least one first stripper portion and the at least one second stripper portion, and wherein sheets included in the stack other than the first sheet are generally prevented from moving from the stack with the first sheet.

97. The apparatus according to claim 96 wherein in moving in the first direction relative to the stack the first sheet engages the at least one first stripper portion prior to engaging the at least one second stripper portion.

98. The apparatus according to claim 97 and further comprising:

a user interface including at least one input device and at least one output device, wherein the user interface is adapted to receive identifying inputs usable to identify users of the machine, to output indicia usable to operate the machine, and to receive transaction inputs responsive to which the machine is operative to carry out at least one transaction function.

at least one currency dispenser device, wherein the at least one currency dispenser device is selectively operative responsive to at least one input to the user interface to dispense currency from the machine.

99. A method comprising:

a) receiving a stack of financial instrument sheets into a housing of an automated banking machine;
b) moving a first sheet bounding the stack in a first direction by engaging a first side of the first sheet with at least one sheet engaging portion of at least one picking member;

c) engaging a second side of the first sheet opposed of the first side, with at least one first stripping portion, wherein the at least one first stripping portion corresponds to at least one recess extending transversely of the at least one sheet engaging portion;

d) engaging the second side the first sheet with at least one second stripping portion, wherein the at least one second stripping portion corresponds in generally opposed engagement with at least one sheet engaging portion;

e) separating the first sheet from the stack by movement of the first sheet in the first direction while in engagement with the at least one sheet engaging portion, at least one first stripping portion and at least one second stripping portion.

100. The method according to claim 99 wherein (c) occurs in advance of (d).

101. The method according to claim 99 and further comprising:

f) determining at least one characteristic of the first sheet after it is removed from the stack through operation of the machine.

102. The method according to claim 101 wherein the financial instrument sheets include notes, and wherein in (f) the at least one characteristic is indicative of note validity.
103. The method according to claim 102 wherein in (f) the at least one characteristic further uniquely identifies a note.

104. The method according to claim 103 wherein the machine further includes a user interface, and further comprising:

receiving at least one identifying input through the user interface;

correlating the at least one identifying input with the at least one characteristic uniquely identifying a note through operation of the machine.

105. The method according to claim 101 wherein the financial instrument sheets include notes, and wherein in (f) the at least one characteristic is indicative of note denomination of the first sheet.

106. The method according to claim 101 and further comprising:

storing the first sheet in the machine with other sheets having the at least one characteristic.

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

\( g \) moving notes determined in (f) as having the at least one characteristic indicative of note validity into a chest portion of the machine.

108. The method according to claim 107 and further comprising:
h) moving notes determined in (f) as not having the at least one characteristic indicative of note validity, into a storage area within a housing of the machine and outside the chest portion.

109. The method according to claim 107 wherein the machine includes a user interface and a note dispenser, and further comprising:

receiving at least one input through an input device of the user interface;

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dispensing at least one note from the machine responsive to the at least one input.

110. The method according to claim 99 wherein the at least one picking member comprises a cylindrical picking member, and wherein in (b) the first sheet is moved by rotating the cylindrical picking member in a first rotational direction.

111. The method according to claim 110 wherein the cylindrical picking member includes at least annular recess, wherein the annular recess is transversely disposed of at least one sheet engaging portion, and wherein in (c) action of the at least one first stripping portion and the at least one annular recess impart a cross-sectional wave configuration to the first sheet.

112. The method according to claim 99 and prior to (d) engaging the at least one second stripping portion with the at least one sheet engaging portion, wherein in (d) the first sheet is moved between the at least one sheet engaging portion and at least one second stripping portion.

113. The method according to claim 110 and further comprising, prior to (e) extending the at least one first stripping portion in the at least one annular recess.
114. The method according to claim 113 wherein the generally cylindrical picking member includes a first sheet engaging portion and a plurality of annular recesses with at least one annular recess disposed on each transverse side of the first sheet engaging portion, and further comprising a plurality of first stripping portions, wherein prior to (c) a plurality of first stripping portions extend in a plurality of annular recesses.

115. The method according to claim 110 wherein the at least one sheet engaging portion includes a high friction arcuate segment extending less than a full circumference of the generally cylindrical picking member, and wherein in (b) the generally cylindrical picking member rotates one rotation in the first rotational direction to separate the first sheet from the stack.

116. The method according to claim 115 wherein the at least one first stripping portion comprises at least one first roll surface, and the at least one second stripping portion comprises at least one second stripping roll surface, wherein in (c), (d) and (e) the at least one first roll surface and the at least one second roll surface remain stationary as the first sheet moves relative thereto in the first direction.

117. The method according to claim 116 and further comprising:

rotating the generally cylindrical picking member in a second rotational direction opposite of the first rotational direction;

rotating the at least one first and at least one second roll surfaces in cooperating relation with the picking member rotating in the second rotational direction to facilitate moving a sheet therebetween in a second direction opposed of the first direction.

118. The method according to claim 105 and further comprising:
receiving at least one account identifying input associated with an account through at least one input device of a user interface of the machine;

crediting the account an amount responsive to the denomination of the first sheet determined in (f).

119. The method comprising:

a) moving a stack of financial instrument sheets in a first direction in a chute of an automated banking machine apparatus;

b) moving a first sheet bounding one side of the stack in the first direction by engaging the first sheet with at least one moving picking member;

c) imparting a transverse wave configuration to the first sheet moving in the first direction by engaging the first sheet between the at least one moving picking member and at least one first stripping member;

d) moving the first sheet in engagement with the at least one picking member between the at least one picking member and at least one second stripping member, wherein prior to the first sheet moving between the at least one picking member and at least second stripping member the picking member and second stripping member are in biased abutting engagement.

120. The method according to claim 119 wherein (c) occurs prior to (d).

121. The method according to claim 120 and further comprising:
e) separating the first sheet from the stack through movement of the at least one picking member, and while the first sheet is engaged with the at least one first stripping member and the at least one second stripping member.

122. The method according to claim 121 and further comprising:

f) determining at least one characteristic of the first sheet after it is separated from the stack through operation of the machine.

123. The method according to claim 122 wherein the sheets include notes, and wherein the at least one characteristic is indicative of genuineness of notes, and further comprising:

g) responsive to the determination in (f), either directing the first sheet in to a chest portion in the machine if the determination in (f) indicates the first sheet is a genuine note, or directing the first sheet into a sheet storage area within the machine but outside the chest portion if the determination in (f) indicates the first sheet is not determined to be a genuine note.

124. The method according to claim 123 and subsequent to (e) and prior to (g) storing the first sheet temporarily in an escrow device in the machine.

125. The method according to claim 124 wherein the machine includes a user interface including at least one input device, a plurality of notes stored in the chest portion, and at least one note dispensing device adapted to dispense notes stored in the chest portion from the machine, and further comprising:

30 receiving at least one input from a user through at least one input device of the user interface;
dispensing at least one note from the machine to the user through operation of the at least one note dispensing device responsive to the at least one input.

126. An automated banking machine apparatus comprising:

a housing;

an opening in the housing, wherein deposit items are accepted into the housing through the opening;

a container within the housing, wherein the container has an interior area, and wherein in an operative position of the container the interior area is in operative connection with the opening such that deposit items passed into the housing through the opening are moveable into the interior area;

a moveable shaker member bounding the interior area of the container, wherein deposit items in the interior area are in supporting connection with the moveable shaker member;

an actuator in operative connection with the shaker member, wherein the actuator is adapted to move the shaker member to cause shaking of deposit items in supporting connection therewith.

127. The apparatus according to claim 126 wherein the moveable shaker member comprises a resilient member.

128. The apparatus according to claim 127 wherein the moveable shaker member comprises a resilient membrane extending across a lower portion of the container.
129. The apparatus according to claim 126 wherein the container is removably mounted within the housing.

130. The apparatus according to claim 129 wherein the container further comprises at least one rollable support.

131. The apparatus according to claim 130 wherein the container further comprises a telescoping handle, wherein the telescoping handle is extendable when the container is moved outside of the housing and is adapted to move the container away from the housing with the container supported on the rollable support.

132. The apparatus according to claim 128 and further comprising a rigid plate extending in underlying relation of the membrane, wherein the actuator operates to move the rigid plate.

133. The apparatus according to claim 132 wherein the container further comprises a bottom wall in underlying the membrane, and wherein the actuator extends in intermediate relation of the membrane and the bottom wall.

134. The apparatus according to claim 133 and further comprising at least one flexible support extending between the bottom wall and the plate.

135. The apparatus according to claim 128 wherein the container comprises an upper wall generally opposed of the bottom wall, the upper wall including an upper wall opening, wherein deposit items entering the interior area pass through the upper wall opening.

136. The apparatus according to claim 135 and further comprising a security plate extending in intermediate relation between the upper wall opening and the membrane.
137. The apparatus according to claim 136 and further comprising a horizontal transport adapted to move deposit items horizontally from the upper wall opening and above the security plate.

138. The apparatus according to claim 126 wherein the machine comprises a chest portion, and wherein the container is removably positionable within the chest portion.

139. The apparatus according to claim 137 wherein the machine further includes a cash acceptor mechanism and a chest portion, wherein the container is removably mounted in the chest portion, and wherein the chest portion includes a cash accepting opening, and wherein the upper wall opening corresponds to the cash accepting opening in an operative position of the container, and wherein the cash acceptor mechanism is mounted in the machine outside and in supporting connection with the chest portion, and wherein the cash acceptor mechanism is adapted to receive notes through the opening in the housing, to determine genuine notes and to pass genuine notes to the interior area of the container through the cash accepting opening.

140. The apparatus according to claim 139 wherein the cash acceptor mechanism includes a driving member, and the horizontal transport is in operative connection with a driven member, and wherein in an operative position the driving member of the cash acceptor mechanism is operative to drive the horizontal transport.

141. The apparatus according to claim 140 wherein the driving member engages the driven member through the cash accepting opening in the chest portion.

142. The apparatus according to claim 139 wherein the cash acceptor mechanism is adapted to identify suspect notes, and wherein the machine includes a suspect note storage area outside the chest portion, and wherein the cash acceptor
mechanism is operative to cause suspect notes to be deposited in the suspect note storage area.

143. The apparatus according to claim 139 wherein the chest portion is generally L-shaped in cross section, and wherein the chest portion houses at least one cash dispenser mechanism, and wherein the cash acceptor mechanism and the cash dispenser mechanism are mounted in generally side-by-side relation.

144. The apparatus according to claim 143 wherein the chest portion includes a vertically extending wall intermediate of the cash acceptor mechanism and the cash dispenser mechanism, and wherein the cash acceptor mechanism is movably mounted in supporting connection with the chest portion in a direction parallel to the vertically extending wall.

145. The apparatus according to claim 144 and further comprising a user interface including at least one input device, and wherein the machine is operative to dispense cash through operation of the cash dispenser mechanism responsive to at least one input to the at least one input device.

146. The apparatus according to claim 145 wherein the container includes at least one rollable support and at least one telescoping handle.

147. An automated banking machine apparatus comprising:
a) a housing;
b) a user interface including at least one input device in supporting connection with the housing;
c) a chest portion within the housing;
d) a cash acceptor device within the housing, and outside and in supporting connection with the chest portion;
e) a cash dispensor mechanism within the housing;
f) a container removably mounted in the chest portion and adapted to receive cash from the cash acceptor device, wherein the container includes an interior area and a movable shaking member bounding the interior area, and an actuator in operative connection with the shaking member.

148. The apparatus according to claim 147 wherein the cash acceptor device is operative to determine if notes received into the housing are genuine, and to pass genuine notes into the interior area of the container through a cash accepting opening in the chest portion.

149. The apparatus according to claim 148 wherein the container includes an upper wall including an upper wall opening, and wherein the upper wall opening corresponds to the cash accepting opening in an operative position of the container within the chest portion, and wherein the container includes a blocking plate disposed interiorly of the container, and a transport adapted to move notes that have entered the container through the upper wall opening horizontally to pass into the interior area below the blocking plate.

150. The apparatus according to claim 148 wherein the housing includes a suspect note storage area outside the chest portion, and wherein the cash acceptor device is operative to cause notes not determined to be genuine to be stored in the suspect note storage area.

151. The apparatus according to claim 149 wherein the cash acceptor device includes a driving member, and wherein the driving member is operative to drive the transport.

152. The apparatus according to claim 148 wherein the chest portion is generally L-shaped in cross section, and wherein the cash dispenser mechanism extends inside the chest portion.