United States Patent [19]

Maynard et al.

[11] **3,866,235**

[45] **Feb. 11, 1975**

[54] **DEPOSITORY FOR IMPRINTING AND STORING ENVELOPES CONTAINING PAPER CURRENCY AND/OR COINS**

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[73] Assignee: **The Mosler Safe Company,** Hamilton, Ohio

[22] Filed: **May 10, 1973**

[21] Appl. No.: **359,116**

[52] **U.S. Cl.** **346/22,** 109/66, 194/DIG. 9, 232/44

[51] **Int. Cl.** **E05g**

[58] **Field of Search** ..... 346/22; 232/43.3, 43.1, 232/44; 109/58, 66; 194/DIG. 9 B, DIG. 16, 194/18, 4 R, 2; 101/66

[56] **References Cited**

UNITED STATES PATENTS

1,259,399	3/1918	Hipwell et al.	346/33 R
1,506,491	8/1924	Kline	346/22
1,949,283	2/1934	Murtaugh	194/2
2,030,313	2/1936	Murtaugh	101/71
2,842,308	7/1958	Massengill	232/44

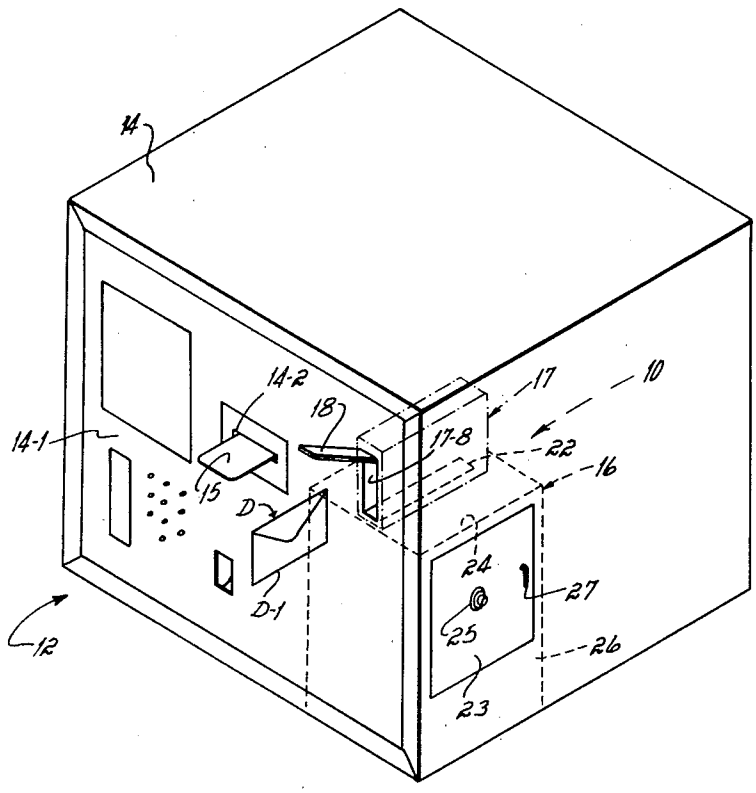
Primary Examiner—Joseph W. Hartary

Attorney, Agent, or Firm—Wood, Herron & Evans

[57] **ABSTRACT**

A depository for imprinting with the date, deposit number, etc. an envelope containing paper currency and/or coins and thereafter storing the imprinted envelope, including a combined envelope receptacle and transfer unit for receiving and temporarily storing in a vertical disposition a deposited envelope and while so vertically stored imprinting it with the date and deposit number, and a vault provided with a slot in the top surface which, when the combined receptacle and transfer unit is mounted atop the vault, underlies an open bottom provided in the receptacle and transfer unit. The combined receptacle and transfer unit is provided with a door through which a deposited article can be inserted into the unit for printing, while vertically disposed, and a trap door overlying the slot in the vault top for allowing the deposited article, following printing, to pass under the force of gravity into the vault when the trap door is moved to its open position. The printer within the combined receptacle and transfer unit is located a sufficient distance above the open floor of the unit to insure that any coins in the deposit envelope will, under the force of gravity, fall into the bottom of the envelope and thereby be located below the printer such that they do not interfere with the printing operation.

2 Claims, 8 Drawing Figures



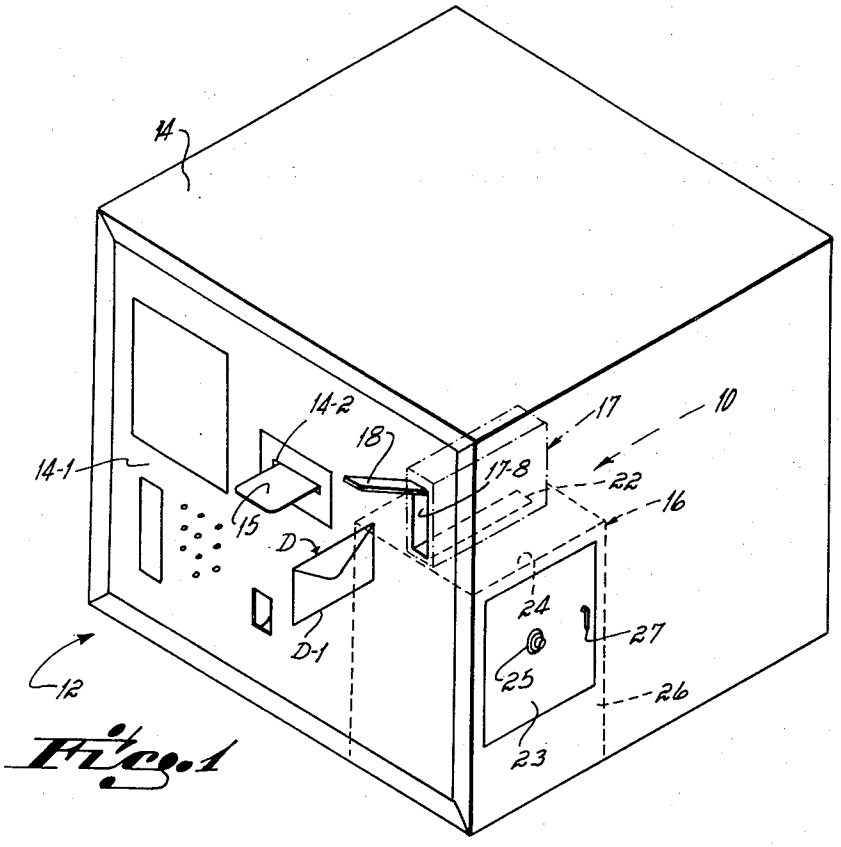

14
14-2
18
17
10
14-1
17-8
22
16
15
D
24
27
25
26
D-1
12
23

Fig. 1

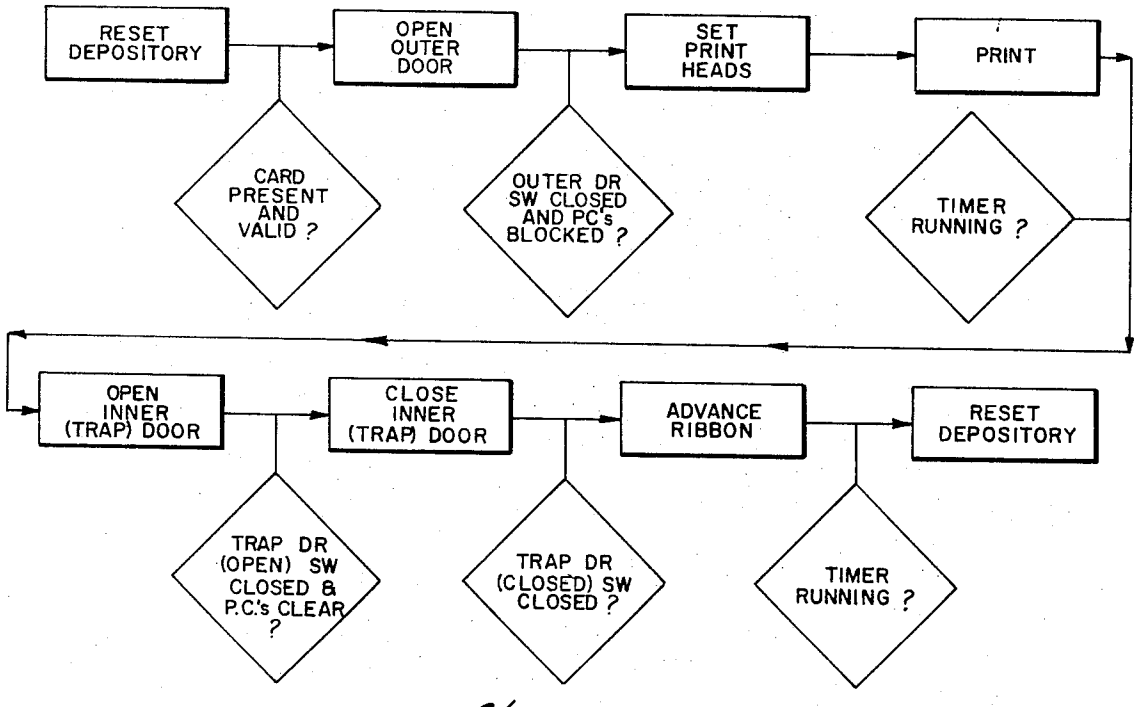
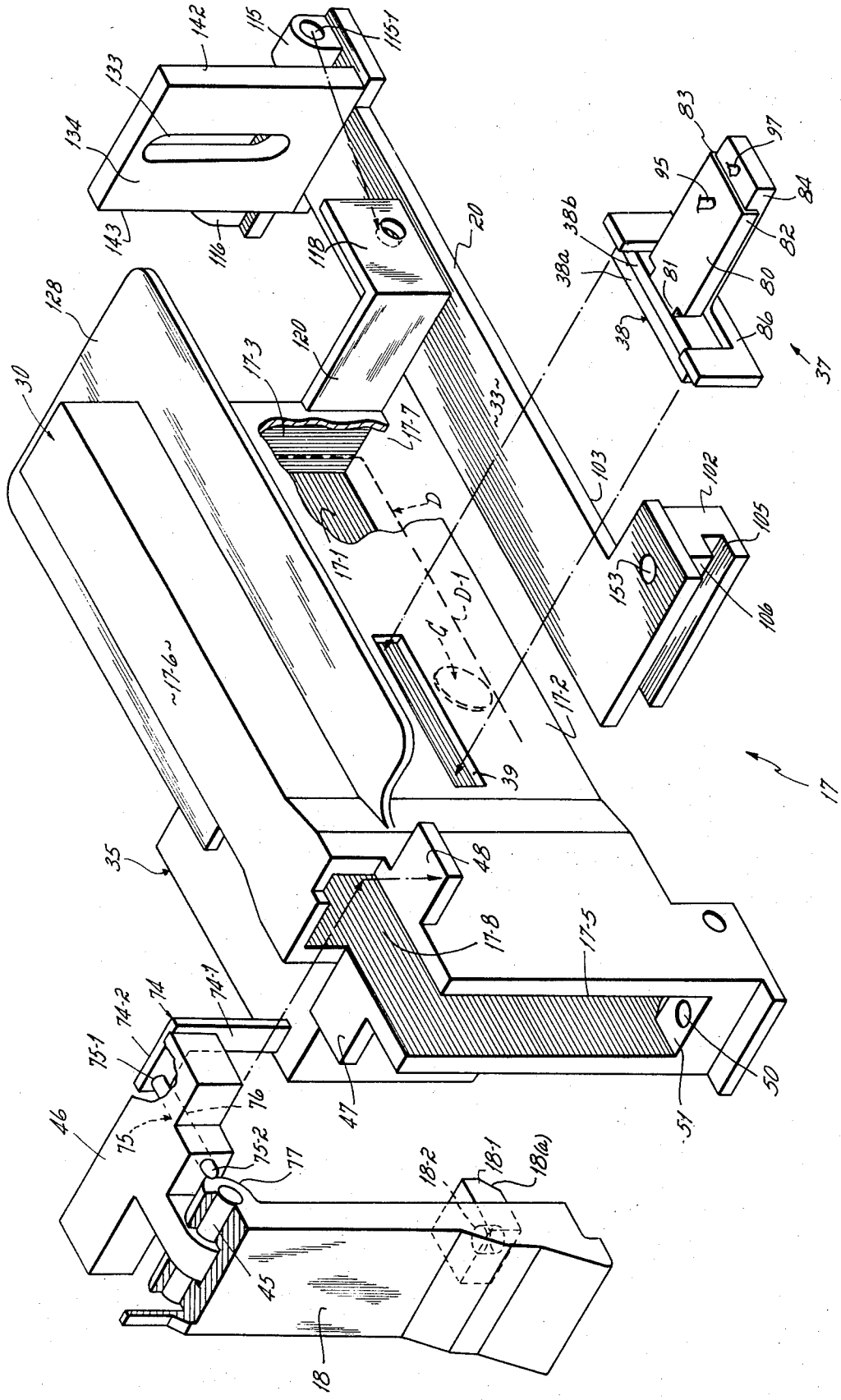

RESET DEPOSITORY
OPEN OUTER DOOR
SET PRINT HEADS
PRINT
CARD PRESENT AND VALID ?
OUTER DR SW CLOSED AND PC's BLOCKED ?
TIMER RUNNING ?
OPEN INNER (TRAP) DOOR
CLOSE INNER (TRAP) DOOR
ADVANCE RIBBON
RESET DEPOSITORY
TRAP DR (OPEN) SW CLOSED & P.C.'s CLEAR ?
TRAP DR (CLOSED) SW CLOSED ?
TIMER RUNNING ?

Fig. 8


142
115
115-1
133
134
143
116
118
20
128
30
120
17-3
17-7
17-1
33
38a
38b
83
97
95
84
82
81
80
38
86
37
103
102
105
153
106
D
D-1
17-6
17-2
39
35
48
17-8
17-5
74-1
74-2
74
75-1
75
76
75-2
77
46
47
50
51
45
18-2
18-1
18(a)
18
17
Fig. 2

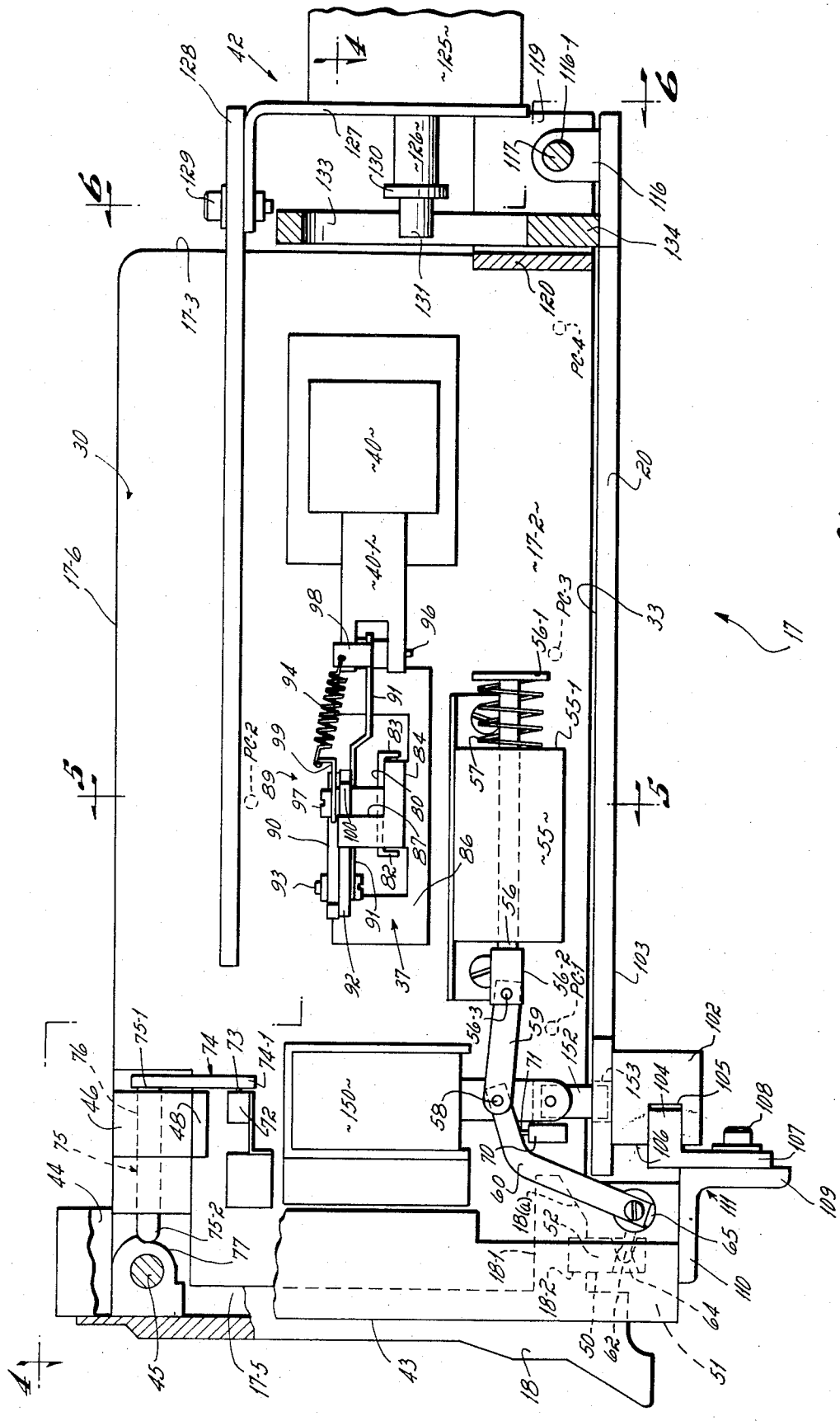


Fig. 3

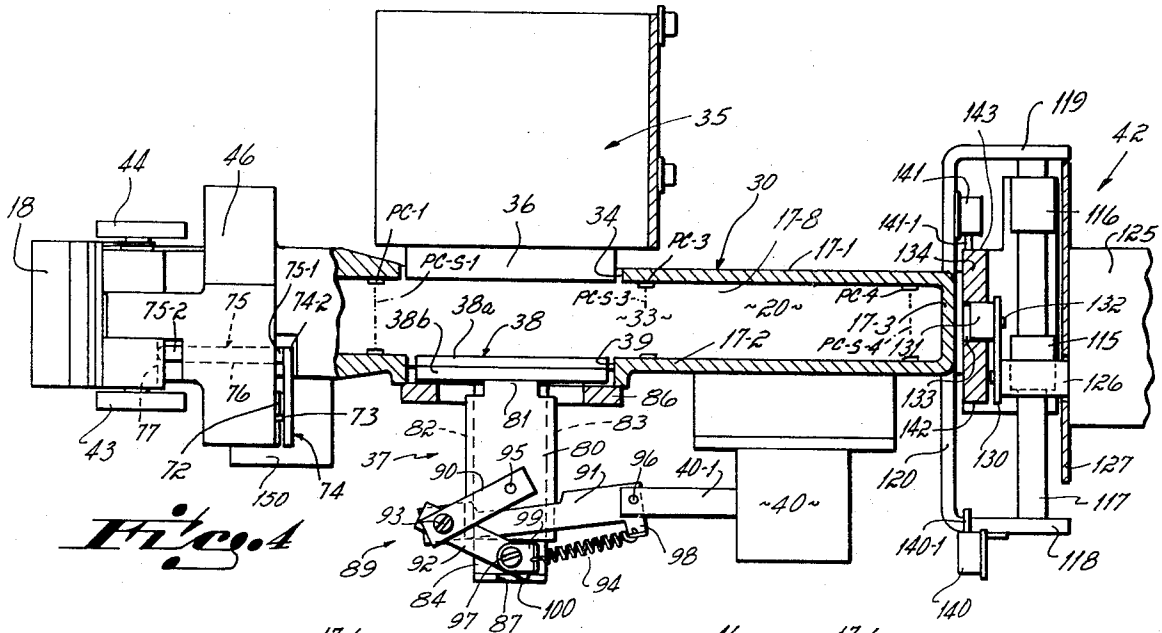


Fig. 4

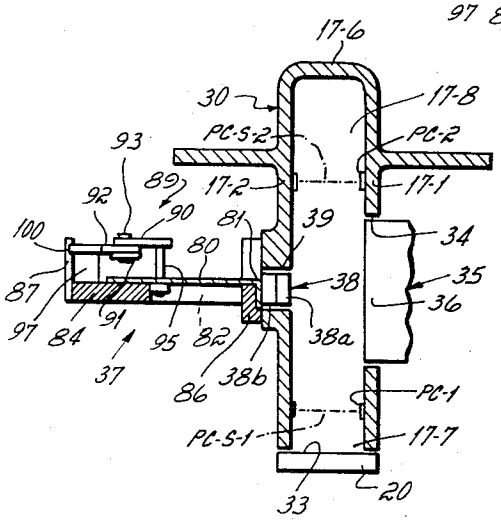


Fig. 5

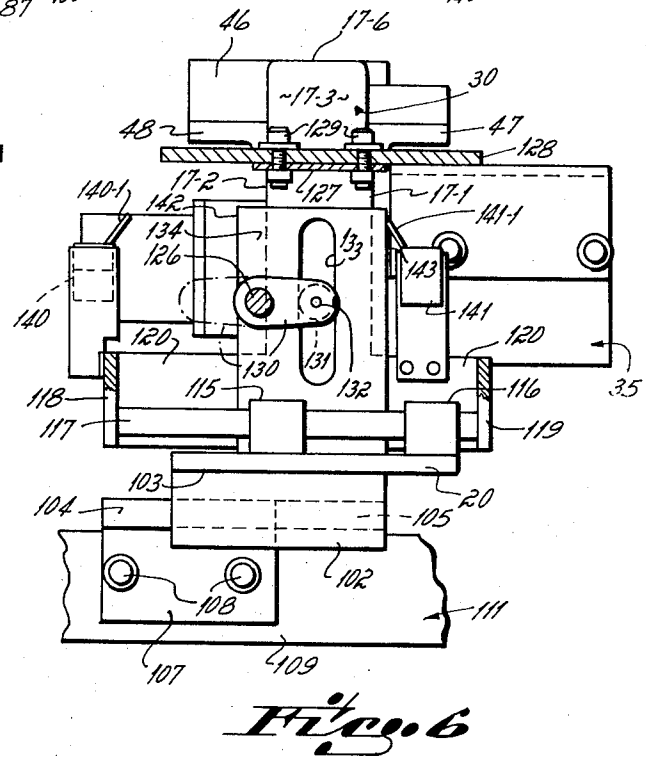


Fig. 6

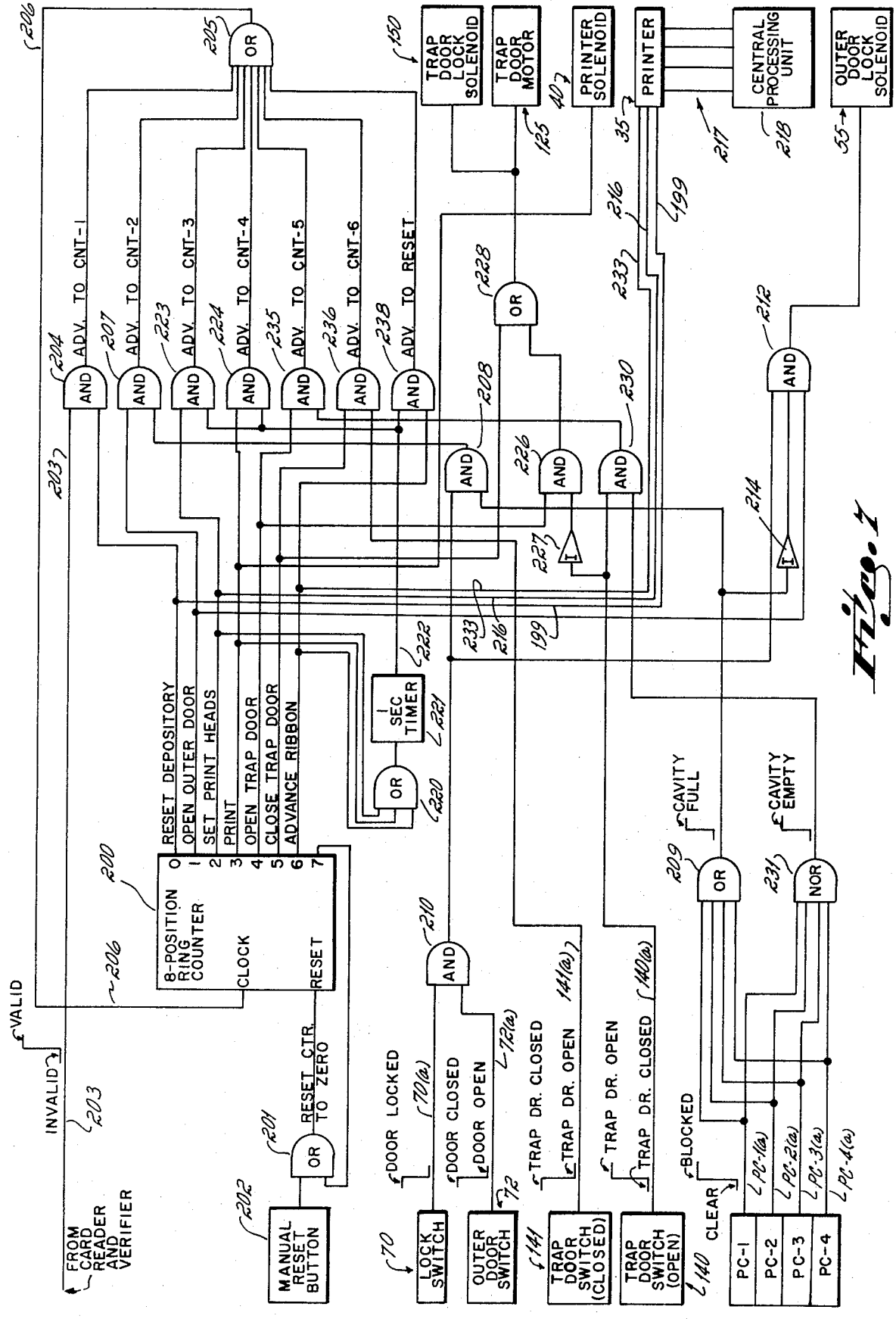

FROM CARD READER AND VERIFIER
VALID
INVALID
MANUAL RESET BUTTON
RESET CTR. TO ZERO
OR
AND
ADV. TO CNT-1
ADV. TO CNT-2
ADV. TO CNT-3
ADV. TO CNT-4
ADV. TO CNT-5
ADV. TO CNT-6
ADV. TO RESET
8-POSITION RING COUNTER
RESET DEPOSITORY
OPEN OUTER DOOR
SET PRINT HEADS
PRINT
OPEN TRAP DOOR
CLOSE TRAP DOOR
ADVANCE RIBBON
CLOCK
RESET
1 SEC TIMER
NOT
DOOR LOCKED
DOOR CLOSED
DOOR OPEN
TRAP DR. CLOSED
TRAP DR. OPEN
BLOCKED
CLEAR
LOCK SWITCH
OUTER DOOR SWITCH
TRAP DOOR SWITCH (CLOSED)
TRAP DOOR SWITCH (OPEN)
CAVITY FULL
CAVITY EMPTY
NOR
PC-1
PC-2
PC-3
PC-4
TRAP DOOR LOCK SOLENOID
TRAP DOOR MOTOR
PRINTER SOLENOID
PRINTER
CENTRAL PROCESSING UNIT
OUTER DOOR LOCK SOLENOID

Fig. 1

DEPOSITORY FOR IMPRINTING AND STORING ENVELOPES CONTAINING PAPER CURRENCY AND/OR COINS

This invention relates to a depository for valuables, such as money in the form of paper currency and/or coins, and more particularly to bank depositories for envelopes containing coins which imprint on the deposited envelope reference information such as the date, deposit number, or the like.

Bank depositories of the type designed to receive and store valuables, particularly envelopes containing cash in the form of paper currency and coins, typically include a vault, which is nothing more than an armored container, and some form of receptacle and transfer device into which the deposited envelope is inserted by the bank customer for subsequent transfer to the vault via a suitably located transfer slot therein. The use of a receptacle and transfer device in association with a vault prevents the bank customer depositing the item from having direct access to the vault via the transfer slot provided therein through which the deposited item passes in the course of being input to the vault. Typically, the receptacle and transfer unit has a first or insertion door which, when opened, permits the deposited item to be inserted into the receptacle and transfer unit, and a second or trap door covering the vault transfer slot which is closed to deny the customer access to the vault when the insertion door is open. The trap door opens when the insertion door is closed following insertion of the deposit, permitting the deposited item to pass into the vault via the transfer slot. The customer is denied access to the vault during this transfer time by the insertion door which, as noted, is closed when the trap door is open.

It has been found desirable to imprint on deposited items the date of the deposit and/or a deposit number to distinguish one deposit from another. The depositing bank customer is usually provided a receipt by the depository which also bears an imprint of the date and deposit number as a record of the deposit. In systems of the type designed to imprint the deposit with the date and/or deposit number, a problem arises when the item deposited, such as an envelope, contains money in the form of coins. Specifically, the coins, since typically inserted in the envelope in random fashion, cause the deposited envelope to have a non-uniform thickness. Should the envelope, in the area in which the printing element contacts it to form the imprint, be non-uniform in thickness, improper coaction, particularly non-uniformity of contact, between the print head and the print receiving surface of the envelope may result, causing the imprint of the date and deposit number to be illegible or otherwise unsatisfactory.

It has been an objective of this invention to provide a depository for envelopes containing money, particularly coins, which provides a uniformly high quality imprint of a deposit number, date or the like on the envelope. This objective has been accomplished in accordance with certain of the principles of this invention by providing, in combination with a vault, a combined receptacle and transfer unit which is configured to receive a coin-containing deposit envelope in only a generally vertical disposition and which further is provided with a printer located therein which imprints only the upper portion of the inserted vertically disposed envelope, which imprinted and inserted envelope then falls

into an underlying vault through a slot in the vault top normally covered by a trap door. By reason of this invention, particularly the utilization of a unit which receives the deposited envelope in only a vertical position and a printer which imprints the inserted envelope in only the upper portion thereof, coins in the envelope, under the weight of gravity, fall to the bottom thereof to a point below the printer, and when so located, do not interfere with the imprinting operation.

An advantage of this invention is that it places absolutely no reliance on the customer for proper operation, such as requiring the customer to insert the coins in the envelope in a predetermined manner or to insert the envelope into the depository in any specific fashion. A satisfactory imprint of date and deposit number will be obtained regardless of whether the customer inserts the envelope in upside down, rightside up, frontwards or backwards, and irrespective of the manner in which the coins are loaded into the envelope. Since the receptacle and transfer unit into which the envelope is inserted can only receive an envelope which is vertically disposed, and since all coins fall to the bottom of the envelope below the level of the printer, there is no possibility of the customer inserting the coins into the envelope, or the envelope into the unit, in a manner which will prevent a proper imprint. The invention also does not require a specially constructed envelope. It is only essential that the envelope fit into the combined receptacle and transfer unit, and have a height which at least equals the distance the printer is spaced above the trap door upon which the lower edge of the inserted envelope is supported.

The foregoing and other advantages and features of the invention will become more readily apparent from a detailed description thereof taken in conjunction with the drawings in which:

FIG. **1** is a perspective view of an automated banking station incorporating the depository of this invention;

FIG. **2** is a perspective view, partially cut-away and exploded, of the item receptacle and transfer unit which constitutes one of the components of the depository of this invention;

FIG. **3** is a right side elevational view of the item receptacle and transfer unit;

FIG. **4** is a cross-sectional view taken along line **4—4** of FIG. **3**;

FIG. **5** is a cross-sectional view taken along line **5—5** of FIG. **3**;

FIG. **6** is a cross-sectional view taken along line **6—6** of FIG. **3**; and

FIG. **7** is a schematic logic circuit diagram of one form of controller for the moving elements of the item receptacle and transfer unit.

FIG. **8** is a flow chart, in block diagram format, of the operational sequence of the controller of FIG. **7**;

With reference to FIG. **1**, a depository **10** embodying the principles of this invention is shown incorporated in an automated banking station **12** which, in addition to the depository for receiving and storing deposits of valuables such as money in the form of currency, checks and/or coins, also includes apparatus for dispensing money to properly authenticated banking customers. The automated banking station **12** has a cabinet **14** enclosing all components thereof, including the depository **10** and any money dispensing apparatus which may also be provided. A control panel **14-1**, constituting the front of the automatic banking station cab-

inet 14, is equipped with the various controls necessary for operating the depository 10 and any money dispensing equipment provided in the automated banking station 12. Typically, the control panel 14-1 includes a slot 14-2 for receiving an identification card 15 issued to customers of the bank entitled to utilize the depository 10 and/or money dispensing apparatus incorporated in the automated banking station 12.

As best depicted in FIG. 1, the depository 10 is located within the automated banking station 12 in one corner thereof and includes a vault 16, and a combined receptacle and transfer unit 17 which temporarily stores a deposit item D to be imprinted with data to be described before transferring it to the vault 16 below. The combined receptacle and transfer unit 17 is provided with a door 18 to facilitate insertion of the deposit D, such as an envelope containing currency and coins, into an interior cavity 17-8 thereof having an open bottom 17-7 normally blocked by a trap door 20 (shown in FIGS. 2–6). Within this cavity 17-8, the deposited envelope D is imprinted with appropriate information, such as the date and a deposit reference number, which may also be printed on a receipt issued the depositor as evidence of his deposit. Following imprinting of a deposited envelope D, which occurs only after the door 18 has been closed following insertion of the envelope into the combined receptable and transfer unit 17, the trap door 20 (shown in FIGS. 2–6) opens, allowing the deposited and imprinted envelope to fall downwardly under the weight of gravity from the cavity 17-8 of the combined receptacle and transfer unit 17 into the vault 16 via a transfer slot 22 formed in the vault top 24 which underlies the open bottom 17-7 of the receptacle and transfer unit.

Access to the interior of the vault 16 for removal of accumulated deposits stored therein is provided by an access door 23 formed in the side 26 of the vault. The access door 24 is provided with a suitable combination lock 25 and handle 27. The vault 16, including access door 23 with combination lock 25 and handle 27, is conventional in all respects except that a transfer slot 22 has been formed in the top 24.

The combined receptacle and transfer unit 17, considered in more detail in connection with FIGS. 2–6, includes a housing 30 having spaced parallel, vertical side walls 17-1 and 17-2 located on opposite sides of the transfer slot 22 formed in the vault top 24, a vertical rear end wall 17-3, an open vertical front 17-5 which is selectively closable by the door 18, a horizontal top 17-6 and the open horizontal bottom 17-7. Cooperating with the open bottom 17-7 of the combined receptacle and transfer unit 17 is the trap door 20 which is movable, by a motorized actuator 42 in a manner to be described, between a blocking position wherein its upper surface 33 underlies the open bottom 17-7 and an unblocking position laterally displaced from the open bottom 17-7. The side walls 17-1 and 17-2, rear and front ends 17-3 and 17-5, top 17-6 and open bottom 17-7 combine to define cavity 17-8 which is both narrow and vertical. With the cavity 17-8 so configured, a flat deposit item D, for example, an envelope containing currency and coins, when inserted into the cavity via open front 17-5, will be supported therein in only a generally vertically disposed position, with the lowermost extremity or edge D-1 thereof supported on the upper surface 33 of the trap door 20. When so supported, money in the deposit envelope D in the form of coins C will, under the weight of gravity, fall to the bottom D-1 of the envelope.

Mounted proximate the side wall 17-1 is a printer 35 having a print head 36 communicating with the cavity 17-8 via an opening 34 formed in side wall 17-1. Cooperating with the print head 36 is a platen assembly 37 mounted proximate the housing wall 17-2 at a point opposite the printer 35. The platen assembly 37 includes a horizontally movable platen 38 which projects through an opening 39 in side wall 17-2 such that when actuated by solenoid 40 it moves horizontally across the cavity 17-8 toward the print head 36 to imprint, on the flat imprint-receiving surface of the flat deposit envelope D located therebetween, the information contained in print head 36. The openings 34 and 39 in side walls 17-1 and 17-2 are vertically spaced above the housing open bottom 17-7 a distance sufficient to insure that any coins C in the bottom of the deposit envelope D will be located below the point where the print head 36 and platen 38 contact the deposit envelope in the course of imprinting it. This insures that the imprinting process will not be impeded and the imprint rendered partially or completely illegible by the presence of coins in the deposited envelope at the point where the imprint is made. Coins, if present in the region of the imprint, can produce non-uniformity in the thickness of the envelope in the region thereof receiving the imprint, causing non-uniform contact between the print-receiving surface of the envelope and the character-bearing surface of the print head, in turn producing an imperfect imprint on the envelope.

The open front end 17-5 of the combined receptacle and transfer unit 17 is selectively blocked and unblocked by the door 18 which is generally in the form of an elongated panel. The upper edge of the door 18 is pivotally mounted by a horizontal hinge pin 45 to a hinge pin mounting block 46. The hinge pin mounting block 46 is secured to the upper front corner of the housing 17 via suitable fasteners (not shown) which secure the block 46 to tabs 47 and 48 which extend horizontally from the housing side walls 17-1 and 17-2, respectively. Plates 43 and 44 secured to side walls 17-1 and 17-2 adjacent the front end 17-5 abut the ends of the hinge pin 45 to prevent axial movement thereof, and also serve as side jams for door 18. The hinged door 18 is movable between a vertical, or closed, position shown in FIG. 3 in which the deposit insertion opening 17-5 is blocked or closed, and a generally horizontal position shown in FIG. 1 in which the insertion opening 17-5 is unblocked to permit an envelope D to be inserted into the cavity 17-8 via insertion opening 17-5.

Extending from the rear surface of the door 18 into the cavity 17-8 adjacent the bottom thereof is a block 18-1 having a vertical recess or hole 18-2 therein. The recess 18-2, when the door 18 is in its closed position shown in FIG. 3, overlies a vertical bore 50 formed in a bridging element 51 which is integral with and spans the housing sides 17-1 and 17-2 in the lower front region thereof. A housing door locking pin 52 is vertically slidable in the bore 50 via an actuating mechanism, to be described, between an upper position shown in FIG. 3 in which the upper end of the lock pin 52 seats in the recess 18-2 of the door block 18-1, locking the door 18 in the closed position, and a lower position (not shown) in which the upper end of the lock pin 52 is withdrawn

from the recess **18-2** in door block **18-1** to unlock the door **18.**

The housing door lock pin actuator, considered in more detail with reference to FIG. **3,** includes a solenoid **55** mounted to housing side wall **17-2.** Solenoid **55** has a horizontally disposed armature **56** which is biased to a rearward position by a compression spring **57** located between an enlarged head **56-1** of the armature **56** and the rear end **55-1** of the solenoid. Secured to the front end of the armature **56** is a vertically slotted yoke **56-2** which pivotally mounts via horizontal pin **56-3** one end of a link **59,** the other end of which is pivotally connected via transverse pin **58** to the upper end of an angled link **60.** Extending generally perpendicularly from the lower end of angled link **60** and rigidly fixed with respect thereto is a short link **62** having a rounded free end **62-1** which is pivotally received in a horizontal cross slot **64** formed in the lower portion of the vertically shiftable lock pin **52.** The links **60** and **62** effectively form a bellcrank in the sense that these links pivot about a horizontal axis constituted by a pin **65** anchored in bridging element **51.** When the solenoid **55** is de-energized and the armature **56** urged to its rearward position by the spring **57** as shown in FIG. **3,** links **59, 60** and **62** assume the position shown in FIG. **3** to position the lock pin **52** in its upper position with the upper end thereof in recess **18-2** of door lock **18-1** to lock the door **18** in its closed position. Upon energization of the solenoid **55,** the armature **56** is urged frontwardly, that is leftwardly as viewed in FIG. **3.** Leftward movement of the armature **56,** via link **59,** pivots link **60** counterclockwise about pin **65** in turn pivoting link **62** counterclockwise to lower lock pin **52** such that the upper end thereof retracts from the recess **18-2** formed in door block **18-1** of door **18,** effectively unlocking the housing door.

An electrical switch **70** having a vertically movable switch actuator **71** projecting from the top thereof is mounted to housing side wall **17-1** at a point such that switch actuator **71** is actuated by the lower edge of link **60** when the solenoid armature **56** has moved to the lock position shown in FIG. **3.** In this way, switch **70** can be used as a sensor to detect when the housing door locking pin **52** is in its lowermost position and the housing door **18** unlocked and/or when the locking pin **52** is in its uppermost position and the door **18,** if closed, in a locked position.

A switch **72** having a horizontally moving switch actuator **73** is mounted to housing side wall **17-2** and cooperates with the depending leg **74-1** of a horizontally movable L-shaped bar **74** whose horizontal leg **74-2** is fixed to the end **75-1** of a rod **75** horizontally slidable in a bore **76** formed in hinge pin mounting block **46.** The free-end **75-2** of rod **75** is rounded and engages a cam **77** formed integral with the upper portion of the door **18.** Cam **77** rotates in a clockwise direction about hinge pin **45,** as viewed in FIG. **3,** when the door **18** moves from its closed position to its open position. Clockwise movement of the cam **77** from the position shown in FIG. **3** as a consequence of opening the door **18** urges the rod **75** rearwardly, that is, rightwardly as viewed in FIG. **3,** which in turn shifts L-shaped bar **74** rightwardly. Rightward movement of the bar **74** actuates switch arm **73** of switch **72** making it possible to sense when the housing door **18** is fully closed and/or partially or completely open.

The print head assembly **35,** which may take any conventional form, has a print head **36** extending into the cavity **17-8** via opening **34** in a manner described earlier, such that embossed characters representative of the desired information to be imprinted upon the vertically disposed envelope located in cavity **17-8** are presented in a vertical plane flush with the inner vertical surface of housing wall **17-1.** Preferably the embossed characters included in the print head **36** would provide an imprint of the current date as well as a deposit reference number, which may also be imprinted on a receipt issued to the customer following a deposit. The reference number may be the depositor's account number as read from a card **15** inserted into the automated banking station **12** via slot **14-2** and/or a serial number generated in the print head assembly **35** which indexes one numerical unit following each deposit such that successively increasing serial numbers are imprinted on successive deposit envelopes inserted into the cavity **17-8** as a consequence of successive deposit operations. A print head assembly manufactured by Practical Automation Inc., Trap Falls Road, Shelton, Conn. 06484, including components designated Models CM10P/Z/5 (wheel "A") and PCR–9, has been found to operate satisfactorily.

The platen assembly **37,** as indicated, includes a horizontally movable platen **38** actuated by a platen solenoid **40.** The platen **38** has a vertical planar resilient layer **38***a* such as hard rubber, and a rigid backing plate **38***b*, preferably formed of metal to which the resilient layer **38***a* is laminated. Secured to and extending horizontally from the outer surface of platen backing plate **38***b* is an elongated generally flat, horizontally disposed movable slide member **80,** the inner end **81** of which is bent downwardly and secured to the outer central portion of the backing plate **38***b* as seen best in FIGS. **2,** 4 and **5.** The movable slide member **80** has a vertical cross-section which is in the form of an inverted U-shape, having downturned margins **82** and **83** integral with the longitudinal edges of the slide member **80.** Stationarily mounted to the housing side wall **17-2** and extending perpendicularly outward therefrom is an elongated guide block **84.** The stationary guide block **84** has its inner end formed integral with a U-shaped bracket **86** which is secured to housing side wall **17-2** by any suitable means, such as by fasteners (not shown). Extending upwardly from the outer forward corner of the stationary guide block **84** is a tab or stop **87.** The movable slide member **80** slidably seats on the upper surface of the stationary guide block **84** with the downwardly extending margins **82** and **83** of the slide member **80** disposed exteriorly and parallel to the longitudinal edges of the stationary block **84,** limiting movement of the slide member **80** to a direction parallel to the length of the block **84.**

Inward movement of the slide member **80,** and hence of the platen **38,** is produced by a toggle mechanism **89** actuated by the solenoid **40.** The toggle mechanism **89** consists of three links **90, 91** and **92** which are pivotally connected to each other by a common pin **93** which passes vertically thorugh the links. The other ends of links **90, 91** and **92** are pivotally connected to the movable slide member **80,** the movable solenoid armature **40-1** and the stationary outer end of the guide block **84** by pins **95, 96** and **97,** respectively. A tension spring **94** connected between tabs **98** and **99** secured to pins **96** and **97,** respectively, biases the links **90, 91** and **92** of

the toggle mechanism **89** and the armature **40-1** of the solenoid **40** to the normal position shown in FIG. **4**. In this position, the slide **80** which is movable horizontally in a direction perpendicular to the housing wall **17-2**, is in its outermost, or retracted, position. As shown in FIG. **4**, in this retracted position, the inner vertical surface of the resilient layer **38***a* secured to platen backing plate **38***b* is flush with the inner vertical surface of the housing wall **17-2**.

Upon energization of the solenoid **40**, the armature **40-1** moves horizontally in a rearwardly direction, that is, rightwardly as viewed in FIG. **4**, in turn shifting the toggle link **91** rightwardly. Movement of the toggle link **91** in the manner indicated advances the pin **93** rightwardly, since pin **97** is mounted to the outer end of stationary guide block **84** and does not move. Movement of pin **93** in the manner indicated causes the pin **95**, and hence the slide member **80** having mounted to it the platen **38** at its inner end, to move into the cavity **17-8** (upwardly as viewed in FIG. **4**). Movement of the platen **38** in this manner advances the platen across the cavity **17-8** toward the print head **36**. Continued advancement of the platen **38** in the manner indicated under the action of the solenoid **40** causes a vertically disposed envelope D inserted in the cavity **17-8** to become sandwiched between the vertical surface of resilient laminate **38***a* and the vertical character plane of the print head **36** to produce an imprint on the flat, vertically disposed print-receiving surface of the envelope. Upon de-energization of the solenoid **40**, the spring **94**, which is in its extended position when the solenoid **40** is energized, returns the toggle link **91** to the normal position shown in FIG. **3**, which in turn retracts the slide **80** to the normal position shown in FIG. **3** wherein the inner vertical surface of the resilient platen layer **38***a* is flush with the inner vertical surface of the housing wall **17-2**. The end **100** of the link **92** abuts the vertical stop **87** extending upwardly from the outer end of guide block **84** when the link **92** rotates to a position perpendicular to the housing wall **17-2**, which occurs when the solenoid **40** is energized, to prevent the pin **93** from moving "over center," that is, to a point rightwardly, as viewed in FIG. **4**, of an imaginary line joining pins **95** and **97**.

The trap door **20** is mounted for horizontal lateral sliding movement between a position blocking housing bottom **17-7** and a position outboard of the housing, that is, below the housing as viewed in FIG. **4**. The mounting structure for the horizontally sliding trap door **20** includes a guide block **102** secured to the bottom surface **103** of the trap door **20** proximate the forward end thereof. Guide block **102** has a horizontal slot **105** formed in the front vertical surface **106** thereof. Guide slot **105** formed in block **102** receives a stationary horizontally rearwardly extending lip **104** formed integral with the upper edge of a vertical plate **107** secured by fasteners **108** to the rear vertical surface of a leg **109** formed integral with a horizontal leg **110** which together form an angle bracket **111**. Horizontal leg **110** of the angle blanket **111** is fastened to the bridging element **51** of the housing **17**. Stationary horizontal guide ledge **106** supports the forward end of the trap door **20** for horizontal sliding movement via guide block **102** mounted for movement with the forward portion of a trap door **20**.

Secured to the upper surface **33** of the rear portion of the trap door **20** are two guide blocks **115** and **116** having horizontal bores **115-1** and **116-1** therethrough which are coaxial and disposed perpendicular to housing walls **17-1** and **17-2**. Slidably positioned within bores **115-1** and **116-1** of guide blocks **115** and **116** is a stationary guide rod **117** which is horizontally disposed perpendicular to housing walls **17-1** and **17-2**. Guide rod **117** has its opposite ends anchored in rearwardly extending ears **118** and **119** integral with opposite ends of a horizontally disposed bracket **120** mounted to the housing wall **17-3** along the lower portion thereof. Thus, the rear end of trap door **20** is constrained to horizontal sliding movement by the stationary horizontal guide rod **117** slidably engaging bores **115-1** and **116-1** of guide blocks **115** and **116** secured to the upper surface **33** of the trap door **20** at the rear end thereof.

The trap door motorized actuator **42** includes a motor **125** having a horizontal forwardly extending rotatable shaft **126**. The motor **125** is stationarily mounted to the housing **17** via an L-shaped bracket **127**, the lower leg of which mounts to the face of the motor while the upper leg mounts via a fastener **129** to a horizontally rearwardly extending bracket **128** formed integral with the housing **17**. Fixed for rotation with the free end of the motor shaft **126** is a link **130**, the free end of which is provided with a roller **131** rotationarily secured thereto via a pin **132**. The roller **131** is positioned for vertical sliding movement in a slot **133** formed in a vertical plate **134** the lower end of which is secured to the upper surface **33** of the trap door **20** between the guide rod **117** and vertical rear wall **17-3** of the housing **17**.

Upon energization of the motor **125** and rotation of the motor output shaft **126**, the link **130** rotates with the shaft **126** causing the roller **131** to move through an arc of approximately 180° from the position shown in solid lines in FIG. **6** to the position shown in dotted lines in FIG. **6**. In the course of this rotation of link **130**, the plate **134**, and hence the trap door **20**, translate laterally to the left, as viewed in FIG. **6**, from a closed position wherein the plate **20** blocks housing opening **17-7** to an open position wherein the plate is displaced laterally of the housing opening **17-7** permitting the housing cavity **17-8** to communicate with the interior of the vault **16** via the transfer slot **22** which in use underlies the open bottom **17-7** of the housing. Closure of the trap door is accomplished by rotating the motor shaft **126** 180° in either direction, which repositions the roller **131** from the dotted line position shown in FIG. **6** corresponding to the open trap door condition to the solid line position shown in FIG. **6** corresponding to the closed trap door condition.

To de-energize the motor **125** after the vertical plate **134** and hence the trap door **20** have moved to the open and closed positions, limit switches **140** and **141**, respectively, are provided. Limit switch **140** has a movable actuator **140-1** which is actuated by edge **142** of plate **134** when the plate and, hence, the trap door **20** have moved to the open position. Actuation of switch arm **140-1** by plate edge **142** is effective to de-energize the motor **125** to terminate further opening motion of the trap door. Switch **141** is provided with a movable actuator **141-1** which is actuated by the vertical edge **143** of plate **134** when the plate **134** and, hence, the trap door **20** have moved to the closed position. Actuation of switch arm **141-1** terminates energization of the

motor **125** to terminate closing motion of the plate **134** and, hence, of the trap door **20.**

To lock the trap door **20** in the closed position, that is, in a position underlying the open housing bottom **17-7** and overlying the transfer slot **22** formed in the vault top **24,** a solenoid **150** and lock pin **152** are provided. The solenoid **150** is mounted to the housing wall **17-2** in a position such that its armature **150-1** is vertically disposed. Connected to the lower end of the solenoid armature **150-1** is the upper end of the lock pin **152.** The lower end of the lock pin **152** overlies an aperture or recess **153** formed in the forward end of the trap door **20.** Under normal conditions when the solenoid **150** is de-energized, the armature **150-1** is in its lower extended position shown in FIG. **3,** with the result that the lock pin **152** has its lower end positioned in recess **153,** formed in the forward end of the trap door plate **20.** Upon energization of the solenoid **150,** the armature **150-1** is drawn upwardly to retract the lower end of the lock pin **152** from within the recess **153** formed in the lower end of the trap door **20,** as a consequence of which the trap door **20** is unlocked.

In practice it has been found advantageous to construct the combined receptacle and transfer unit **17** as a sub-assembly separate and distinct from the vault **16.** In this way, by merely providing the top **24** of a conventional vault with a transfer slot of the type shown in FIG. **1** and identified as slot **22,** and by then securing a combined receptacle and transfer unit **17** to the upper surface of the vault in which the transfer slot is formed, with the open bottom **17-7** of the unit **17** overlying the transfer slot **22,** the depository of this invention is readily fabricated. Thus, with a combined receptacle and transfer unit **17** of the type described, a conventional vault can be easily modified such that when combined with the receptacle and transfer unit **17** it forms a depository constructed in accordance with this invention.

In operation, upon insertion of an authorized identification card **15** into the control panel slot **14-2** of the automated banking station **12,** an electrical signal is generated which is effective to energize the normally de-energized solenoid **55.** Energization of solenoid **55** is effective, in a manner described earlier, to retract the lock pin **52** from the recess **18-2** formed in block **18-1** of door **18,** unlocking the housing door and thereby enabling the bank customer to move it from the closed vertical position shown in FIG. **3** to the open horizontal position shown in FIG. **1.** With the housing door unlocked and open, a depository envelope D can be inserted into the housing cavity **17-8** wherein it is positioned in a generally vertical disposition with its flat imprint receiving surface generally vertically disposed proximate the print head **36.**

Opening of the housing door **18** rotates the cam **77** from the position shown in FIG. **3** to, in a manner described previously, actuate switch **72.** With switch **72** actuated, a signal is provided indicating that the door **18** is open. This signal, in combination with a signal provided by switch **141** indicating that the trap door **20** is closed, is used to prevent the motor **125** from becoming energized to open the trap door. Thus, as long as the door **18** is open, the trap door actuator **42** is disabled and since the trap door is in the closed position, access to the vault cannot be had via the open door **18.**

Closure of the door **18** following insertion of a depository envelope D into the cavity **17-8** activates the switch **72** causing the solenoid **55** to become de-energized. With solenoid **55** de-energized, the compression spring **57,** in a manner described, effectively causes the lock pin **52** to move upwardly to its locking door position in engagement with the recess **18-2** in slot **18-1** secured to door **18.** Switch **70** senses that the locking pin **52** is in its elevated locking position and as a consequence generates an electrical signal which is used to energize the printer solenoid **40** which, in a manner described earlier, causes the platen **38** to be urged toward the print head **36** and imprint the envelope vertically disposed therebetween. Upon completion of the imprinting cycle, the solenoid **150** is energized to elevate lock pin **152** and unlock trap door **20.** Additionally, motor **125** is energized to open the trap door **20.** Upon arrival of the trap door at the fully open position, the switch **140** is actuated to de-energize the motor **125.** With the trap door **30** in its open position, the imprinted deposit envelope D in the housing cavity **17-8** drops under the force of gravity into the vault **16** via the transfer slot **22** formed in the vault top **24.** The motor **125** is again energized, following a suitable predetermined delay designed to allow the envelope D to enter the vault **16,** and the trap door **20** is moved to its closed position overlying transfer slot **22.** When the trap door has reached the fully closed position, switch **141** is actuated to de-energize the motor. Additionally, the trap door lock pin solenoid **150** is de-energized, allowing the lock pin **152** to drop into the recess **153** formed in the forward end of the trap door **20,** locking the trap door in the closed position.

With reference to FIGS. **7** and **8,** a description of the operational sequence of the various elements of the item receptacle and transfer unit **17** is now provided. In the stand-by mode of operation, that is, when the device is awaiting usage by a customer, the door **18** is in the closed position, with the actuator **73** of switch **72** depressed, closing the contacts of this switch, providing a logical 1 signal level on line **72**(*a*). Additionally, the door **18** is locked by virtue of pin **52** being in its upward position as a consequence of solenoid **55** being de-energized and its armature **56** urged rightwardly by spring **57.** Since the solenoid **55** is de-energized, the actuator **71** of switch **70** is in its depressed position, closing the contacts of this switch, providing a logical 1 signal level on line **70**(*a*). In the stand-by condition, the trap door **33** is also in its closed position, underlying cavity **17-8,** as depicted in FIGS. **5** and **6.** The trap door motor **125,** which drives the trap door **33** between its open and closed positions, is de-energized, and the actuator **141-1** of limit switch **143** is tripped, closing the contacts of this switch, providing a logical 1 signal level on line **141**(*a*). The actuator **140-1** of switch **140** is not tripped, allowing the contacts of this switch to remain open, providing a logical 0 signal level on line **140**(*a*). Additionally, the trap door **33** is locked by reason of the pin **152** being in its lower position as a consequence of solenoid **150** being de-energized. Phototransducers PC-**1,** PC-**2,** PC-**3,** and PC-**4** (FIGS. **3–5** and **7**) are irradiated by suitable aligned light sources S_1, S_2, S_3, and S_4 assuming cavity **17-8** is empty, providing logical 0 signals on their respective output lines PC-**1**(*a*), PC-**2**(*a*), PC-**3**(*a*) and PC-**4**(*a*), respectively. An eight-position binary ring counter **200** with output terminals **0, 1, 2, 3, 4, 5, 6** and **7** is in its stand-by, or reset, condition with a logical 1 signal level at output terminal 0, and logical 0 signal levels at the remaining output ter-

minals. Ring counter **200** is placed in the stand-by, or reset, condition automatically at the end of a depository cycle when the counter advances from count 6 to count 7, whereupon the logical 1 output from counter terminal **7** is input via an OR-gate **201** to the reset terminal of the counter. This resets the ring counter to count 0, in which a logical 1 is present on counter output terminal **0.** This logical 1 signal is input to the printer **35** via line **199,** to reset all print wheels thereof to zero. Alternatively, the ring counter **200** can be reset by activation of a manual reset button **202,** which when actuated applies a logical 1 signal to the reset terminal of the counter via OR-gate **201.**

In operation, upon insertion of a card **15** in slot **14-2** of the banking unit **14,** and assuming the inserted card is valid, a logical 1 signal is applied to line **203.** The logical 1 signal on line **203** is input to AND-gate **204,** the other input terminal of which has applied to it a logical 1 signal as a consequence of the ring counter **200** being in the reset state with a logical 1 at its counter output terminal **0.** With logical 1 signals on both input lines to AND-gate **204,** a logical 1 output is provided on the output line thereof, which in turn is input to an OR-gate **205** providing on OR-gate output line **206** a logical 1 signal which is applied to a clock input of the ring counter **200,** advancing the ring counter from count 0 to a count 1. With the ring counter **200** at count 1, a logical 1 level is present on ring counter output terminal **1.**

The logical 1 signal at ring counter output terminal **1** is applied to an AND-gate **212.** Another input to AND-gate **212** is provided by an AND-gate **210** which is responsive to switch **72** controlled by door **18** and lock pin switch **70.** If the door **18** is closed and locked, logical 1 signals are applied to both terminals of AND-gate **210** via lines **72**(*a*) and **70**(*a*), *providing a logical* 1 signal from the output of AND-gate **210** to AND-gate **212.** The third input to AND-gate **212** is applied via an inverter **214** from an OR-gate **209,** the inputs of which are provided by phototransducers PC-1 through PC-4. Phototransducers PC-1 through PC-4 provide a logical 0 to OR-gate **208** when their respective phototransducers are not blocked by an item in the depository cavity **17-8** and provide a logical 1 on their respective output lines when their respective phototransducers are blocked by an item in the cavity. Assuming the cavity **17-8** is empty and all four phototransducers PC-1 through PC-4 are in an unblocked or clear state, logical 0's are input on all the input lines to OR-gate **209,** providing a logical 0 output signal therefrom which, via inverter **214,** provides a logical 1 input to AND-gate **212.** With logical 1 signals on all three inputs to AND-gate **212,** a logical 1 output signal is provided thereby to the door lock solenoid **55** energizing this solenoid to unlock the door. The door **18** can now be opened and an item inserted into the cavity **17-8,** which will result in blocking one or more of the phototransducers PC-1 through PC-4. Once door **18** is opened, switch **72** is tripped, placing a logical 0 signal on line **72**(*a*) which, via AND-gates **210** and **212,** de-energizes door lock solenoid **55,** causing pin **52** to raise. By reason of cam surface **18**(*a*) on door **18,** the door can be closed even though lock pin **52** is raised.

With an item in the cavity **17-8** and one or more of the phototransducers PC-1 through PC-4 blocked, a logical 1 signal is output from OR-gate **209** to the AND-gate **208.** Assuming the door **18** has been closed following insertion of an item in cavity **17-8,** and with solenoid **55** de-energized, a logical 1 signal is applied to AND-gate **208** from the output of AND-gate **210** since logical 1 signals are input to AND-gate **210** from both switch **72** and switch **70.** With logical 1 signals applied to both inputs of AND-gate **208,** a logical 1 signal is output from AND-gate **208** to the AND-gate **207,** the other input of which has a logical 1 applied to it from ring counter terminal **1.** With logical 1 signals applied to both inputs of AND-gate **207,** an output is provided from this AND-gate to OR-gate **205,** which via line **206** provides a clock input to ring counter **200** to advance the counter to the count **2** position, providing a logical 1 level at ring counter terminal **2.**

With ring counter **200** now in the count 2 position, a logical 1 signal is applied to the printer **35** via line **216** which sets the embossed print wheels of the printer to correspond to information provided to the printer on lines **217** from a central processing unit associated with the banking terminal. The central processing unit **218** provides on its output lines **217** signals to the printer **35** corresponding to the desired serial number and date which is to be imprinted on the deposited item.

The logical 1 output from the ring counter terminal **2** is also applied to an OR-gate **220** which provides on its output line a logical 1 signal to a 1-second timer **221,** providing a 1-second duration logical 0 signal on line **222** to inhibit AND-gate **223** for 1 second. At the end of the 1-second interval established by timer **221,** a logical 1 signal is again present on line **222.** With a logical 1 now present on line **222,** and a logical 1 signal present at ring counter terminal **2,** AND-gate **223** provides a logical 1 output signal to OR-gate **205** which, via line **206,** provides a clock input to the ring counter **200** to advance the ring counter to its count 3 state providing a logical 1 output at counter terminal **3.**

With the counter **200** in the count 3 state, a logical 1 signal is applied to OR-gate **220** which provides on its output line to the timer **221** a logical 1 signal, providing in turn on line **222** a 1-second duration logical 0 signal. The 1-second duration logical 0 signal on line **222** inhibits AND-gate **224** for one-second during which time the logical 1 output from the ring counter terminal **3** is applied to the printer solenoid **40** to advance the platen **38** toward the print surface **36** and imprint the deposited item. At the end of the 1-second interval established by timer **221,** the signal on timer output line **222** returns to a logical 1 state with the result that both inputs to AND-gate **224** are at a logical 1 level and a logical 1 is output therefrom to an OR-gate **205** which via line **206** provides a clock input to the ring counter **200** to advance the counter to a count 4 state.

With the counter **200** in a count 4 state, a logical 1 is provided at ring counter output terminal **4** which in turn is applied to AND-gate **226,** the other terminal of which is connected via an inverter **227** to the trap door switch **140** via line **140**(*a*). Assuming the trap door **33** is closed, switch **140** is de-actuated and its switch contacts open, providing on line **140**(*a*) a logical 0 signal which, via inverter **227,** provides a logical 1 input to the other input of AND-gate **226.** AND-gate **226,** with both inputs thereto at logical 1 levels, provides on its output line a logical 1 signal which via OR-gate **228** provides a logical 1 signal to the trap door solenoid **150,** energizing this solenoid and elevating pin **152** to unlock the trap door.

The output from OR-gate **228**, which is at a logical 1 level, is also input to the trap door motor **125**, energizing this motor which then translates horizontally the trap door **33** from the closed position underlying the cavity **17-8** to its open position. When the trap door **33** reaches its open position, the switch **140** is actuated, closing its contacts which provide a logical 1 signal on line **140**(*a*) which upon inversion by inverter **227** provides a logical 0 to AND-gate **226**, returning the output of this AND-gate to a logical 0 which via OR-gate **228** deenergizes the motor **125** and the trap door solenoid **150**.

Opening of the trap door **33** and actuation of the switch **140** also provides an input to AND-gate **230**. Assuming the item deposited in the cavity **17-8** has now dropped through the slot **22** into the cavity of the vault **16**, a logical 1 will be output from NOR-gate **231** since phototransducers PC-1 through PC-4 are all unblocked because the cavity **17-8** is empty. This logical 1 output constitutes the other input to AND-gate **230**. With the trap door **33** in its fully open position and the cavity **17-8** empty, AND-gate **230** provides a logical 1 output to AND-gate **235** which in turn provides a logical 1 output to OR-gate **205** which, via line **206**, provides a clock input to ring counter **200** to advance the ring counter to a count 5 state whereupon a logical 1 signal is output from ring counter terminal **5**.

The output from counter terminal **5** is applied via OR-gate **228** to the trap door lock solenoid **150** energizing this solenoid to elevate lock pin **152** and also to the trap door motor **125** energizing this motor which then closes the trap door. When the trap door **33** has fully closed, switch **141** is tripped closing its contacts to provide a logical 1 signal on line **141**(*a*) which is input to AND-gate **236** whose other input is also at a logical 1 level as a consequence of the ring counter being in the count **5** state. AND-gate **236** then provides a logical 1 signal on its output line to OR-gate **205** which via line **206** applies a clock input to the ring counter to advance the ring counter to the count 6 state, providing a logical 1 output signal at ring counter terminal **6**.

The logical 1 signal from ring counter terminal **6** is applied via OR-gate **220** to the timer **221** providing a 1-second logical 0 level signal to AND-gate **238** disabling this AND-gate for 1 second. During the disablement of AND-gate **238** a logical 1 signal from ring counter terminal **6** is applied via line **233** to a ribbon solenoid (not shown) in the printer **35** to advance the ribbon of the printer. At the end of the 1-second interval provided by timer **221**, output line **222** reverts to a logical 1 state. At this time, both inputs to AND-gate **238** are at a logical 1 level, providing from this AND-gate a logical 1 signal to OR-gate **205**, which via line **206** provides a clock input to ring counter **200** advancing the ring counter to a count 7 state. With the ring counter **200** in the count 7 position, a logical 1 level is applied at counter terminal **7** which, via OR-gate **201**, is applied to the counter reset input to reset the counter to its count 0, or reset, state with a logical 1 at counter terminal 0. The logical 1 at counter terminal **0** resets the printer **35** via line **199**. The controller is now in its stand-by state.

In practice, it has been found that on occasion if the deposited envelope has not had its flap properly sealed, the flap will engage the inside wall of the cavity **17-8** and prevent the deposited envelope from falling through slot **22** into the underlying vault **16** when the trap door **33** is momentarily opened. If desired, and to insure that the cavity **17-8** will be emptied following deposit of an envelope which has an improperly sealed flap, the circuit of FIG. 7 may be suitably modified in a manner well known to those skilled in the art to operate such that following closure of the trap door **33** if one or more of the phototransducers PC-1 through PC-4 is blocked, the imprinting platen **38** will cycle three or four times in rapid succession. This will be effective to press the unsealed envelope flap against the body of the envelope insuring that it will drop into the underlying vault **16** through the slot **22** when the trap door **33** is again momentarily opened following the multiple and rapid cycling of the platen **38**.

Having described our invention, we claim:

1. A depository for receiving and storing items having a generally flat shape with a flat imprint receiving surface thereon comprising, in combination:

a vault for storing received items, said vault having an item transfer opening through which an item can be transferred for storage in said vault, said vault including an access opening with a door to facilitate selective access to said vault for removal of items stored therein;

a housing disposed above said vault, said housing including spaced generally vertically disposed side walls, a top wall, a rear wall and a bottom opening communicating directly with said transfer opening, said transfer opening being at least as large as said bottom opening;

said housing having a manually accessible insertion opening selectably closable with a manually accessible housing door disposed at the opposite end of said housing from said rear wall;

said housing having a generally horizontally slidable trap door mounted for movement between a blocked and an open position, said trap door comprising a floor for said housing when disposed at its blocked position to prevent access through said transfer opening to said vault and permitting items to freely fall from said housing through said bottom opening and said transfer opening directly into said vault when said trap door is disposed at its open position;

said side walls, said top wall, said rear wall, and said trap door at its blocked position collectively comprising a receptacle for receiving flat items manually inserted directly into said receptacle through said insertion opening and temporarily storing said flat items in a generally vertical position with the flat surfaces of the item disposed generally parallel to said side walls;

item detector means disposed within said item receptacle to detect the presence of an item said item receptacle, said item detector producing an item present signal when an item is detected within said item receptacle;

a door closed detector for detecting when said housing door is closed and producing a door closed signal;

control means responsive to said door closed signal and said item present signal to sequentially generate a lock door signal, a printer actuate signal, and an open trap door signal;

a selectably operable door lock operative in response to said lock door signal to lock said housing door to prevent access to said housing;

a printer disposed proximate one said side wall for imprinting one said flat surface of an item in said receptacle, said printer being actuated by receipt of said printer actuate signal, said printer being disposed at a point above said trap door; and

a trap door actuator operable in response to said open trap door signal to slide said trap door from its blocked to its open position and then back to its blocked position.

2. The depository of claim 1 wherein:

said flat items are adapted to receive coins, said coins being movable within said item so as to rest within said item adjacent said trap door and said printer is disposed a sufficient distance above said trap door so that said coins will not interfere with the operation of said printer.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,866,235
DATED : February 11, 1975
INVENTOR(S) : Robert W. Maynard et al

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 61, change "thorugh" to --through--.

Column 11, line 42, change "208" to --209--.

Column 14, line 57, insert "within" between the words "item" and "said".

Signed and Sealed this

thirtieth Day of September 1975

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks

UNITED STATES PATENT OFFICE

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