Feb. 26, 1963 B. F. McGEE 3,078,789

DEPOSITORIES

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FIG. 1

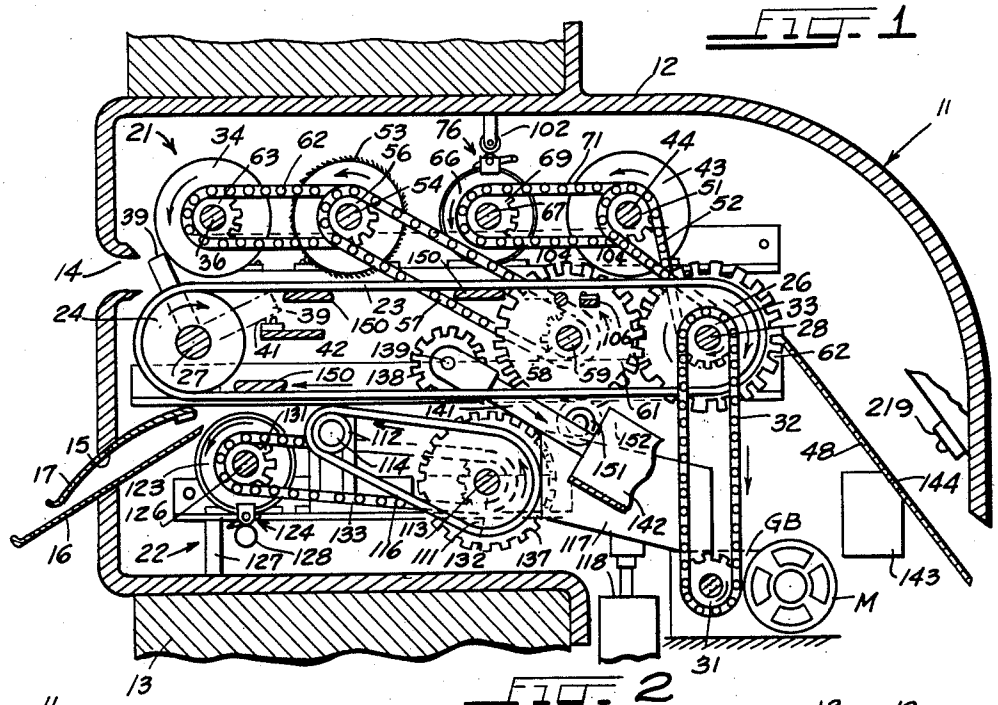
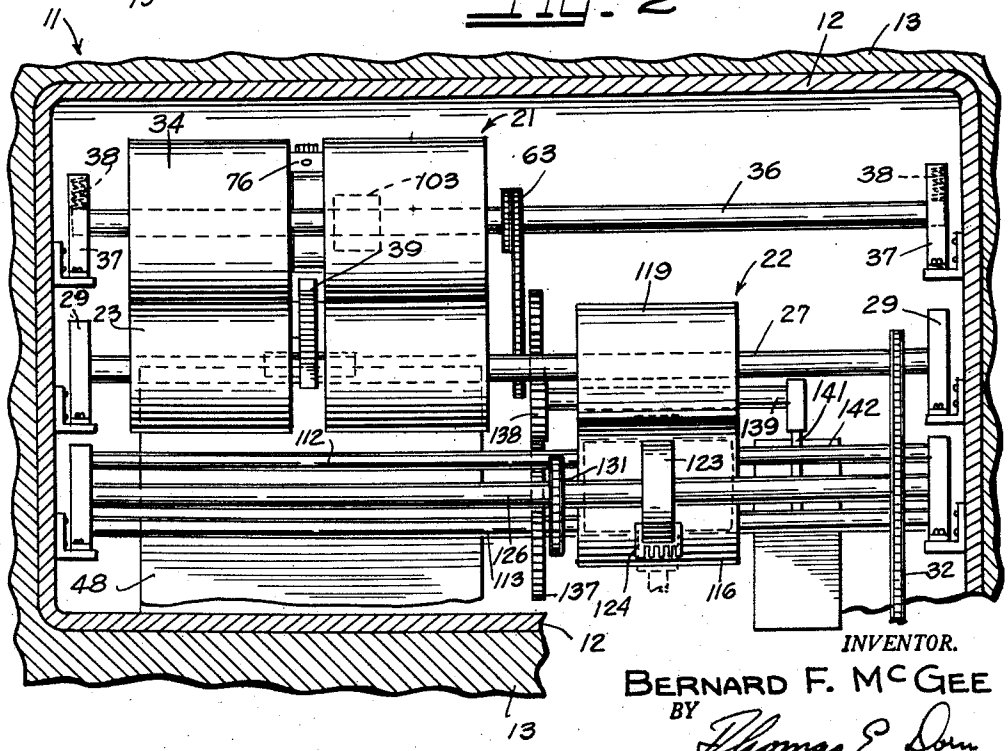


FIG. 2



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FIG. 3

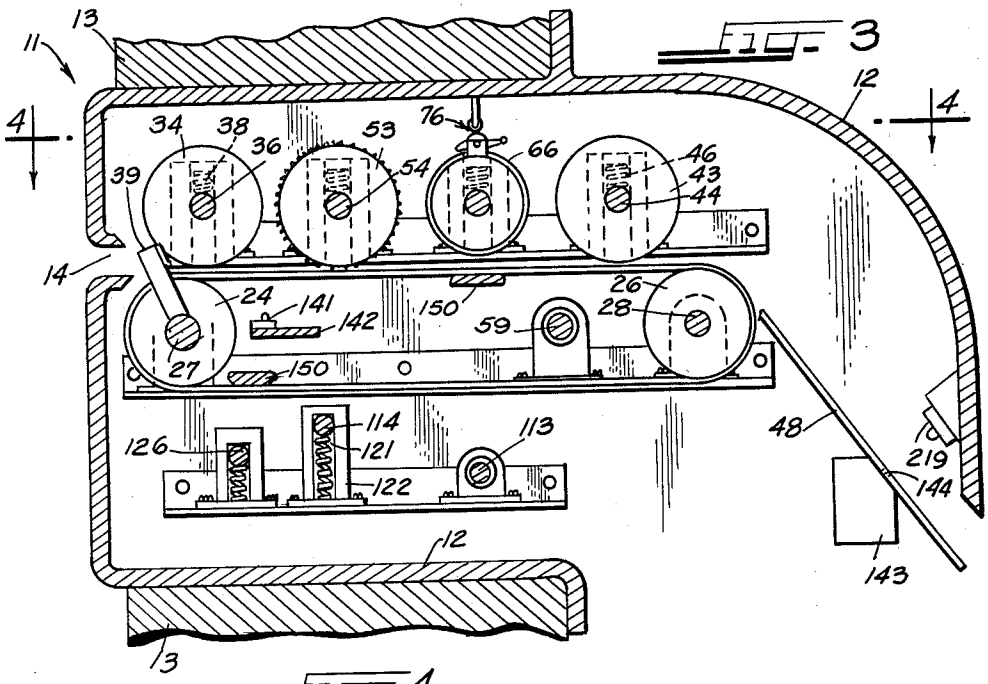


FIG. 4

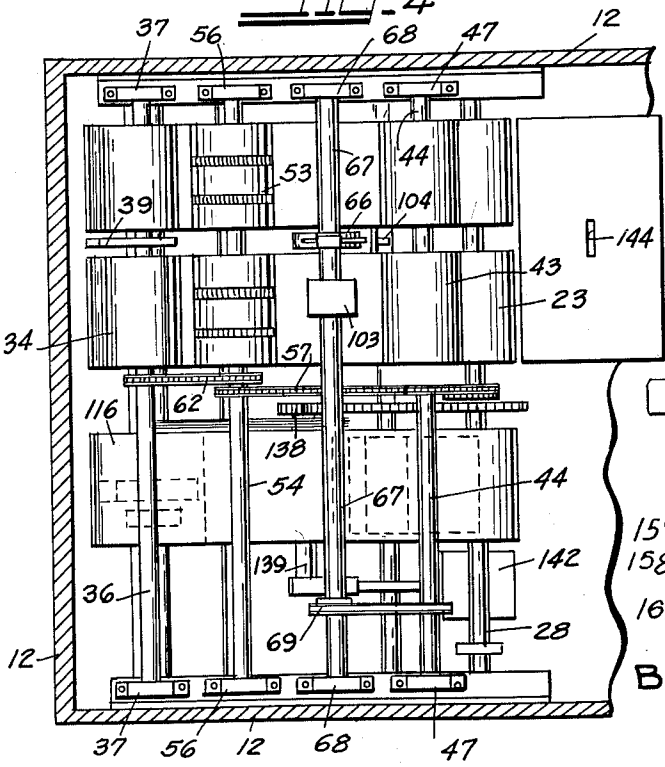
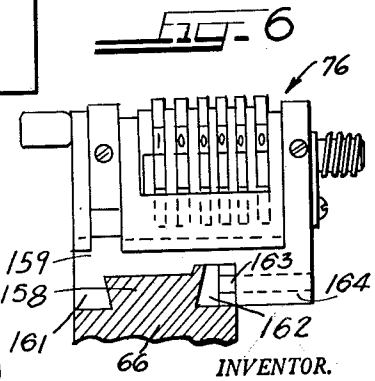


FIG. 6



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FIG. 5

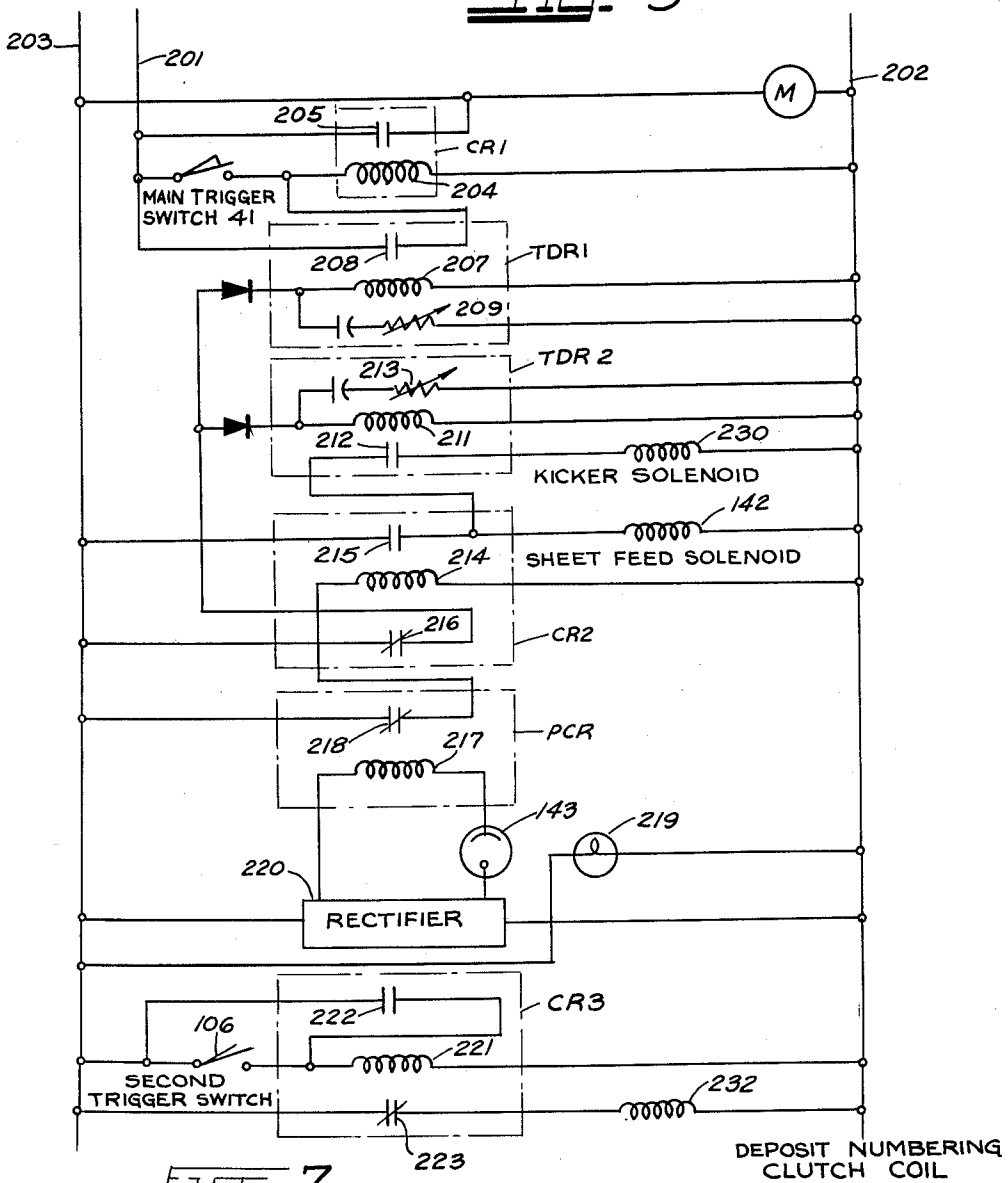
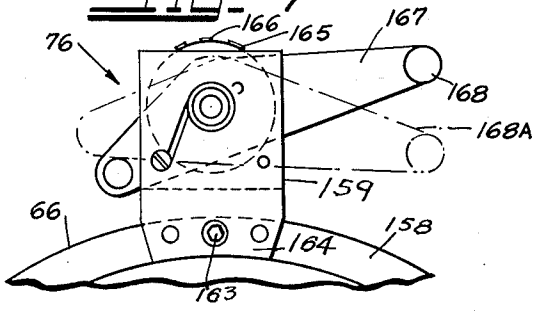


FIG. 7



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DEPOSITORIES

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6 Claims. (Cl. 101—66)

This invention relates to a depository and particularly to a protective system for night depositories for banks.

Various types of arrangements have been utilized by banks for the acceptance of customer deposits during hours when the banks are not open for business. In one commonly used arrangement the customer merely drops an envelope or like package containing a deposit through a slotted opening in a door or a wall of the building in which the bank is situated. As can be expected, such an arrangement is highly susceptible to pilfering. Furthermore, inasmuch as no receipt is issued, such an arrangement is also likely to lead to contradictory claims by a customer and a bank as to whether or not a deposit was actually made.

It has been proposed to utilize both protective devices for deposit vaults and mechanisms for issuing deposit receipts, but such devices and mechanisms have generally entailed relatively complex arrangements which require operation in a particular manner at the time of deposit. Some of the mechanisms require the use of a particular kind of envelope which includes an attached receipt form that is severed from the envelope at the time of deposit. In others, operation of the mechanism is predicated upon the weighing of a specific quantity of coins or the like.

It is a primary object of this invention to construct a depository which effectively overcomes such problems as encountered with depositories heretofore known. Other objects of the present invention, related to the foregoing object, are to construct a depository which effectively prevents withdrawal of an envelope or like deposit article once the article has been inserted into the depository. Another object is to afford a depository which automatically issues a numbered receipt corresponding to a number given the package bearing the deposit.

A protection system for a depository constructed in accordance with the present invention incorporates both a transport mechanism for automatically transferring a deposit article from an inlet opening to a storage area and receipt delivery apparatus for ejecting a receipt from the depository through an outlet opening in response to movement of a deposit from the inlet opening to the storage area. The transport mechanism includes spaced-apart conveyor members effective to engage a package therebetween; these conveyor members may comprise a conveyor belt and a series of rollers disposed in spaced relation to the outer surface of the conveyor belt. An electric motor and drive mechanism are provided for driving both the conveyor belt and the rollers. A trigger member or other sensing device is mounted adjacent the inlet opening, and is utilized to close a switch upon insertion of a deposit through the inlet slot to energize the motor and thereby initiate operation of the transport mechanism. Thus, the transport mechanism is driven only at such times as a deposit is placed within the depository. To incorporate the foregoing structural features in a novel depository is another object of the present invention.

It is a specific object of the present invention to include a roller formed with a serrated or similar outer periphery in the transport mechanism in a manner such that the serrated periphery engages each deposit article to prevent withdrawal of the deposit once it has been inserted through the inlet opening of the depository. In this manner, the serrated surface effectively serves to drive the package through the transport mechanism and additionally serves to shred or tear the package containing the deposit should an attempt be made to tamper with the depository, as by withdrawing the package. The serrated roller may also be incorporated in an alarm or other safety device.

A chute or like structure is disposed adjacent the outlet end of the transport mechanism for directing a package to the storage area of the depository. A sensing apparatus which preferably includes a photo-electric sensing device, is utilized for sensing the passage of a package through the chute. The sensing apparatus is operatively associated with an electrical control system for driving the receipt-issuing apparatus. The sensing apparatus is disposed a sufficient distance from the outlet end of the transport mechanism to insure that a package containing a deposit is passed completely therethrough prior to energization of the control system and thus prior to actuation of the receipt-issuing apparatus. Thus, a receipt is delivered to the customer only after a package bearing a deposit is safely disposed within the depository; and to incorporate the foregoing in a novel depository is yet another object of the present invention.

Still further objects of the present invention are: to construct a protection system for a depository which embodies relatively simple structural elements; to associate the various structural elements of the depository in a compact arrangement so that the depository can be conveniently mounted within a building wall; and to arrange the component parts of the depository in a manner such that various parts are shielded from outside tampering to thereby minimize problems of malfunctioning of the depository.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what is now considered to be the best mode contemplated for applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

FIG. 1 is a side elevation view, partly in section, of a depository constructed in accordance with one embodiment of the present invention;

FIG. 2 is a front elevation view, partly in section, of the depository illustrated in FIG. 1;

FIG. 3 is a sectional elevation view illustrating details of the resilient mounting for the roller shafts of the depository illustrated in FIG. 1;

FIG. 4 is a plan view of the depository illustrated in FIG. 1;

FIG. 5 is a schematic representation of an electrical control circuit for the depository illustrated in FIG. 1;

FIG. 6 is a schematic detail view of a front elevation of a numbering mechanism utilized in the depository illustrated in FIG. 1; and

FIG. 7 is a fragmentary detail view of a side elevation of the numbering mechanism illustrated in FIG. 6.

In FIGS. 1–4 a depository constructed in accordance with one embodiment of the present invention is indicated generally by the reference numeral **11**. The depository **11** is contained within an outer casing **12** which is, in turn, mounted within a suitable opening formed in a building wall **13**. As best viewed in FIG. 1, the casing **12** is formed with a slotted opening **14** for the reception of envelopes or like deposit articles containing coins, currency, checks, business papers, and the like.

This inlet opening is, of course, disposed in the exterior or street side of the depository and building wall, and a second opening 15 mounting a chute 16 and a guide clip 17 therein is also formed in the exterior surface of the casing 12 and affords an outlet opening for the delivery of receipts.

The depository 11 comprises two principal mechanisms—a transport mechanism, indicated generally by the reference numeral 21, for transferring an envelope or like deposit article from the inlet opening 14 to a storage area, and a receipt-issuing mechanism, indicated generally by the reference numeral 22, for issuing a receipt through the outlet opening 15 in response to the movement of an envelope or like package from the inlet opening to the storage area of the depository. Both of the transport mechanisms 21 and 22 are adapted to be driven by an electric motor M through chain or belt drives in a manner described in detail hereinafter. One important feature of the present invention is a control system, incorporated in the depository 11, for driving the receipt-issuing mechanism 22 by interconnecting the receipt-issuing mechanism with the transport mechanism 21 only after a deposit has passed a predetermined point in its travel from the inlet opening 14 to the storage area; this control system is also described in detail hereinafter.

The transport mechanism 21 includes a conveyor belt 23 which is mounted on rollers 24 and 26. The rollers 24 and 26 are in turn mounted for rotation with respective shafts 27 and 28, and the shafts 27 and 28 are journalled for rotation within support blocks 29 affixed to opposite side walls of the casing 12. The motor M is operatively associated with a gear box GB to rotate a main drive sprocket 31 whenever the control circuit for the motor M is energized. The main drive sprocket 31 is in turn connected to drive the conveyor belt 23 by a drive chain 32 and a sprocket 33 that is keyed or otherwise fixed for rotation with the shaft 28 of the conveyor belt mechanism. The conveyor belt itself is preferably provided with a high-friction inner surface to afford a positive driving relation between the belt 23 and the rollers 24 and 26.

The transport mechanism 21 also includes a feed roller 34 mounted on a shaft 36 adjacent the inlet opening 14. The shaft 36 is journalled for rotation within support blocks 37 affixed to opposite side walls of the casing 12. As best viewed in FIG. 1, it is seen that the roller 34 is normally held in engagement with the conveyor belt 23. Inasmuch as envelopes or packages of varying thickness must be accepted for deposit by the depository 11, means are incorporated in the support for the roller shaft 36 to provide for limited movement of the rollers 34 with respect to the conveyor belt 33 thereby permitting the insertion of envelopes and packages of varying thickness into the depository. Preferably, such means comprises a spring-biased bearing arrangement 38 for each of the support blocks 37. However, other apparatus may be utilized to accomplish the same result.

In accordance with the present invention a sensing device is incorporated in the depository 11 adjacent the inlet opening 14 for sensing the insertion of an envelope or package within the inlet opening 14 and energizing the control circuit for the motor M to initiate operation of the transport mechanism 21. This sensing device comprises a trigger element 39 which is pivotally mounted on the shaft 27 for rotation through an arc indicated by the full and dashed outlines of the trigger member 39. The sensing means also includes a switch 41 mounted on a fixed frame member 42. As shown in FIG. 1, insertion of an envelope or like package through the inlet opening 14 is effective to cause the trigger member 39 to engage the switch 41. As is explained in detail hereinafter with specific reference to FIG. 5, actuation of the switch 41 is effective to initiate a complete sequence of operations terminating in delivery of a numbered receipt through the outlet opening 15.

An ejection roller 43 is mounted adjacent the end of the conveyor belt 23 mounted on the roller 26. The roller 43 is rotatable with a shaft 44, and the shaft 44 is resiliently mounted at opposite ends by spring-biased bearing structures 46 contained within support blocks 47 affixed to the opposite side walls of the casing 12 (see FIGS. 3 and 4). Thus, the roller 43 is movable to a limited extent toward or away from the conveyor belt 23 in the same manner as the roller 34. The roller 43 serves two functions—it maintains the envelope or other deposit article in engagement with the conveyor belt 23 and also serves to eject the envelope into a chute 48 leading to a storage area. Each of the rollers 34 and 43 may be formed with rubber surfaces for providing firm frictional contact with the envelope or other article passed through the transport mechanism 21. A sprocket 51 is affixed to the shaft 44, and a drive chain 52 interconnects the sprocket 51 and shaft 44 for rotation with the shaft 28.

Means are incorporated in the transport mechanism 21 for preventing withdrawal of an envelope or like package from the depository 11 once the envelope has been inserted through the inlet opening 14 and into the transport mechanism 21. Such means comprise a roller 53 formed with a serrated or similar outer periphery. The roller 53 is mounted on a shaft 54 which is, in turn, resiliently supported at opposite ends within a pair of support blocks 56 affixed to the opposite side walls of the casing 12 in the same manner as the shafts 36 and 44. Thus, the serrated periphery of the roller 53 is maintained in pressure contact with the envelope or package being transferred through the transport mechanism 21 and effectively aids in moving such an envelope or package through the transport mechanism. Furthermore, the serrated periphery insures that the envelope or package cannot be withdrawn from the depository 11 once it has been inserted therein.

Thus, the roller 53 serves as a protective device which guards against pilfering from or tampering with the depository 11. The roller 53 is chain-driven from the main drive sprocket 31. Thus, as illustrated in FIG. 1, a sprocket 56 is affixed to the shaft 54 and a chain drive 57 extends from the sprocket 56 to a sprocket 58 mounted on a shaft 59. A gear 61 is also mounted on the shaft 59 and meshes with a gear 62 mounted on the same shaft 28 as the sprocket 33. Thus, rotation of the main drive sprocket 31 is effective to rotate the shaft 28 to drive the gear 61 and sprocket 58 and thereby rotate the shaft 54 bearing the roller 53. Additionally, a drive chain 62 extends about a sprocket 63 keyed to the shaft 36 for rotating the shaft 36 with the shaft 54. It should be understood that a gear-belt or timing belt drive arrangement may be used, instead of the chain drives described hereinabove, if desired, or other drive systems may be adopted without departing from the invention.

Each envelope or package inserted through the inlet opening 14 is given an identifying number. For the purpose of imprinting such an identifying number on the deposit article as it is transferred through the transport mechanism 21, a numbering wheel 66 is mounted on a shaft 67 intermediate the rollers 53 and 43. As in the case of the mounting for the shafts 36 and 44, the shaft 67 is permitted a limited degree of movement toward and away from the conveyor belt 23 by means of spring-biased bearing mounts contained in the support blocks 68 affixed to the side walls of the casing 12 at the opposite ends of the shaft 67. A gear 69 is affixed to the shaft 67 and a drive chain 71 is provided for driving the numbering wheel 66 with the shaft 44.

The numbering wheel 66 mounts a numbering machine 76 of conventional construction thereon; the numbering machine 76 is shown in detail in FIGS. 6 and 7. As shown in these figures, the wheel 66 is provided with a

peripheral wedge-shaped land 158 extending around the major portion thereof. One side of the base 159 of the numbering machine 76 is provided with a complementary mounting shoulder 161 which engages one side of the wedge-shaped land 158. The other side of the land 158 is engaged by a clamping member 162 which is mounted upon an Allen head screw 163, the screw 163 being threaded into a shoulder 164 projecting from the base 159 of the numbering machine. Thus, the land 158 is clamped between the members 161 and 162, and the two clamping members serve to hold the numbering machine firmly upon the wheel 66. On the other hand, it is a simple matter to adjust the angular position of the numbering machine 157 upon the wheel 66. This may be accomplished simply by loosening the set screw 163, thereby permitting the entire unit to be slidably moved around the periphery of the mounting ring 155 to any desired position. When properly located, of course, the numbering machine is secured to the mounting ring simply by tightening the set screw 163.

The numbering machine 76 is of conventional construction and includes a series of number printing type wheels 165 and a suitable indexing mechanism. The indexing mechanism for changing the numerals present at the print position 166 of the type wheels (FIG. 7) includes an indexing lever 167 having a cam follower 168 mounted at one end thereof. To change the number at the print position 166 by one digit, the lever 167 is moved pivotally from its normal or unactuated position, as shown in solid lines in FIG. 7, to an alternate or indexing position 168A. Numbering machines of this general type are well known in the art; a suitable numbering machine, for example, is manufactured by the Wetter Numbering Machine Co. of New York and sold by them under the designation of Model 500.

The indexing lever 167 is tripped, by engagement with the deposit article, each time the numbering wheel 66 is rotated through one complete cycle or revolution, to index the numbers presented by the type wheels 165. An ink roller 102 of conventional construction is suitably mounted in the depository adjacent the numbering wheel 66 for inking the type characters presented by the numbering machine 76. Of course, it may be necessary to provide a more complex ink train, where many deposits are received in a short period of time; in most instances, however, a single fountain roller should be adequate.

While the deposits transferred through the transport mechanism 21 will generally be of a standard configuration, it is desirable that the numbering wheel 66 be adapted for operation with envelopes or packages of other than a standard or uniform configuration in a manner such that only one identifying number is given to any one deposit article transferred through the transport mechanism 21. For this purpose an electrically actuated clutch 103 is included in the drive for the numbering wheel 66. The clutch may be of conventional construction and permits the portion of the shaft 67 mounting the gear 69 to rotate freely with respect to the portion of the shaft 67 mounting the numbering wheel 66 until such time as the clutch coil is electrically energized to engage the clutch and cause the numbering wheel 66 to rotate with the gear 69. The control circuit for the clutch is described in detail with reference to FIG. 5, but it may be noted that the mode of operation of the clutch 103 and the numbering wheel 66 is such that the numbering machine 76 is returned to the home position illustrated in FIG. 1 after the numbering wheel 66 has been rotated through only one revolution for any particular envelope or package transferred through the transport mechanism 21. To provide such a mode of operation of the clutch 103 and numbering wheel 66, sensing means, which include a pivotally mounted trigger element 104 and switch 106 similar to the trigger member 39 and switch 41 described hereinabove, are disposed in the path of transfer of the envelope or like package. The location of the trigger element 104 is chosen such that movement of the envelope or package along the conveyor belt 23 rotates the trigger member 104 into engagement with the switch 106 to de-energize the clutch 103 as the numbering machine 76 reaches the home position illustrated in FIG. 1.

The receipt-issuing mechanism 22 includes a pair of rollers 111 and 112 mounted on respective shafts 113 and 114. A conveyor belt 116 is mounted on the rollers 111 and 112. A hopper 17, containing a supply of receipts therein, is supported on a pedestal 118 so as to be disposed closely adjacent to one end of the conveyor belt 116. The receipt issuing mechanism 22 may also include a second conveyor belt 119 (see FIG. 2) mounted on rollers on the same shafts 27 and 28 which drive the conveyor belt 23. Thus, as best viewed in FIG. 2, the receipt transport mechanism 22 preferably includes upper and lower conveyor belts 119 and 116 which are adapted to grip a receipt slip therebetween. It may be noted that, as illustrated in FIG. 3, the shaft 114 is permitted a limited degree of vertical movement by means of a spring-biased bearing arrangement 121 contained within support blocks 122.

The receipt mechanism 22 also includes a numbering wheel 123 mounting a numbering machine 124 thereon. The numbering wheel 123 is mounted on a shaft 126 so that the wheel 123 is interposed between the conveyor belt 116 and chute 16 in the outlet opening 15. The numbering wheel 123 and numbering machine 124 are essentially similar in construction and operation to the numbering wheel 66 and numbering machine 76 described hereinabove with relation to the transport mechanism 21. A cam 127 similar to the cam 101 projects upwardly from a lower surface of the casing 12, as viewed in FIG. 1, for tripping the indexing lever of the numbering machine 124 to index the numbers presented thereon on each cycle of operation of the wheel 123. An inking roller 128 is also mounted adjacent the wheel 123 for inking the type characters presented by the numbering machine 124. Inasmuch as standard size receipts are to be issued by the receipt transport mechanism 22 the numbering wheel 123 may be positioned with respect to the hopper 117 so that the numbering wheel 123 makes only one revolution each time the receipt transport mechanism 22 is driven. However, if desired, an electrically actuated clutch may be incorporated in the drive for the numbering wheel 123 to insure that the numbering wheel 123 makes but a single revolution in any one cycle of operation of the receipt mechanism 22. Sprockets 131 and 132 are keyed for rotation with the respective shafts 136 and 113 and are interconnected by a drive chain or belt 133 so that rotation of the shaft 113 and drive of the conveyor belt 116 occurs simultaneously with rotation of the numbering wheel 123.

The main drive shaft 113 of the receipt transport mechanism 22 is, in turn, adapted to be driven directly from the transport mechanism 21, but only after an envelope or package has reached a predetermined point in its travel between the inlet opening 14 and the storage area, as mentioned hereinabove. The means accomplishing such direct drive include the gear 61 affixed to the shaft 59 and a gear 137 affixed to the shaft 113. An idler gear 138 is journalled for rotation within a pair of spaced lugs 139 disposed at one end of a retractable arm 141. Movement of the arm 141 is under the control of a solenoid 142 so that energization of the solenoid 142 is effective to retract the arm 141 in the direction indicated by the arrow in FIG. 1 to a position wherein the idler gear 138 meshes with both of the gears 61 and 137 to thereby afford a drive between the transport mechanism 21 and 22.

Energization of the solenoid 142 is under the control of sensing means which include a photo-electric device 143 mounted in the chute 48. Thus, the chute 48 is formed with a slit 144 and the photocell 143 is mounted on the under side of the chute 48 in alignment with the

aperture 144, as illustrated in FIG. 1. A lamp 219 is effective to direct a light beam through the aperture 144 to the photocell 143 to maintain the photocell 143 in an energized condition. In this condition of operation, the solenoid 142 is maintained de-energized so that the gear 138 is positioned as illustrated in FIG. 1 and the receipt transport mechanism 22 is not driven.

The receipt transport mechanism 22 also includes a kicker wheel 151 for engaging the uppermost sheet of the stack of receipts contained within the hopper 117 and delivering such a sheet to the conveyor belt 116. The kicker wheel 151 is preferably adapted to be continuously rotated as by a drive belt or chain 152 interconnecting the kicker wheel for rotation with the shaft 28. In such a case, the support shaft for the kicker wheel 152 is adapted to be swung in an arc toward and away from the hopper 117 under the control of a kicker solenoid in the same manner as the gear 138 is moved into and out of engagement with the gears 61 and 137 described hereinabove. Alternatively, the kicker wheel 151 may be continuously engaged with the stack of receipts in the hopper 117 and periodically energized for rotation by an electrically actuated clutch similar to the clutch 103 described hereinabove. In either event, the kicker wheel 151 is actuated to feed only a single receipt to the conveyor belt 116 for any one envelope or like package inserted within the inlet opening 114. The control circuit which effectively accomplishes such a mode of operation of the kicker wheel 151 is described hereinafter with reference to FIG. 5.

As illustrated in FIG. 1, one or more shoes 150 may be adjustably positionable along the inner periphery of the conveyor belt 23 to support the conveyor belt and to provide printing anvils for the numbering machines 76 and 124.

The present invention also contemplates the use of a one-way clutch, such as a conventional sprag clutch, a ratchet brake, or similar apparatus for preventing rotation of the various rollers and wheels in a direction opposite that indicated by the arrows in FIG. 1 to thereby provide an additional safeguard against the withdrawal of an envelope or like package from the inlet opening 14. Such a one-way clutch or similar apparatus can be conveniently incorporated in the gear box GB. Also, an alarm system may be incorporated in the depository 11 for giving an audible or visible signal in the event that such reverse rotation of the rollers is attempted, as by an attempted withdrawal of an envelope or package from the inlet slot 14.

To summarize briefly the mechanical aspects of the depository structure illustrated in FIGS. 1–4 of the drawings, operation of the depository is initiated by insertion of an envelope or other deposit article through the inlet opening 14. Such action causes the trigger member 39 to engage the switch 41 and energize the motor M to drive the transport mechanism 21 in the manner indicated by the arrows in FIG. 1. The envelope is gripped between the feed roller 34 and the conveyor belt 23 and moved into engagement with the serrated roller 53. Continued drive of the transport mechanism 21 moves the envelope or package beneath the numbering wheel 66 and an identifying number is printed thereon. Subsequently, the envelope trips the trigger 104 to close the switch 106 and de-energize the clutch 103. However, the drive for the transport mechanism 21 is uninterrupted and the deposit is ejected from the transport mechanism 21 by the action of the ejection roller 43. As the envelope moves down the chute 48, it interrupts the light beam between the lamp 219 and the switch 143 to initiate a sequence of operations which include actuation of the kicker roller 151 and energization of the solenoid 142 to drive the receipt transport mechanism 22. A receipt is delivered from the top of the stack within the hopper 117 to the conveyor belt 116 and subsequently to the numbering roller 123. The numbering roller 123 is effective to imprint an identifying number on the receipt corresponding to the number printed on the deposit envelope by the numbering roller 66. Thereafter, the numbered receipt is delivered to the chute 16 and out the outlet opening 15. At the completion of such delivery of a numbered receipt through the outlet opening 15, time delay relays or other suitable electrical control means are effective to de-energize the motor M and the other component parts of the electrical control circuit.

The electrical control circuit illustrated in FIG. 5 comprises a pair of main electrical lines 201 and 202 which may, for example, be connected to a conventional 60-cycle 120-volt supply source. The control circuit further includes a secondary bus or conductor 203, which comprises a part of the main energizing circuit and is utilized to energize all but one of the control relays and other operating devices of the control circuit, as described in detail hereinafter. The major control components are three conventional control relays identified as CR1, CR2, CR3, a pair of time delay relays designated as TDR1 and TDR2, and a photocell-actuated relay identified as the relay PCR. All of these relays are of known type, and each may be replaced by any conventional relay or similar device capable of carrying out the required operating functions.

The main control relay CR1 comprises an operating coil 204 and a pair of normally open contacts 205. The operating coil 204 of the relay is connected, at one terminal, to the main line 202, the other terminal of the coil being connected through the main trigger switch 41 to the power line 201. The main trigger switch is the switch 41 at the entrance part of the protective device which is closed upon the insertion of a deposit envelope into the night depository. The contacts 205 of the relay CR1 afford an energizing circuit for the secondary power line 203, being connected in series with a circuit between the main power line 201 and the secondary line 203.

The time delay relay TDR1 includes an operating coil 207 and a pair of normally open contacts 208. The relay is provided with a conventional time delay circuit, including a variable resistor 209 for adjusting the time delay characteristics of the relay. The contacts 208 of the time delay relay TDR1 are connected in series with the coil 204 of the control relay CR1 in a holding circuit that is connected in parallel with the switch 41. This holding circuit is utilized to keep the control relay CR1 energized after the main switch 41 has opened, as described in more detail hereinafter.

The time delay relay TDR2 is essentially similar to relay TDR1, and comprises an operating coil 211 and a pair of normally open contacts 212. This relay is also preferably provided with means for adjusting the time delay operating characteristic of the relay, the means in this instance being shown as a variable resistor 213. The second control relay CR2, on the other hand, comprises a conventional operating relay which is provided with an operating coil 214, a pair of normally open contacts 215, and a pair of normally closed contacts 216. The normally open contacts 215 of the control relay CR2 are connected in series with the solenoid 142 which controls the receipt-issuing mechanism 22. Thus, the contacts 215 are connected in series with the solenoid 142 between the auxiliary power line 203 and the main power line 202. The normally open contacts 215 of the relay CR2 are also connected in an energizing circuit for a solenoid 230, the normally open contacts 212 of the time delay relay TDR2 also being connected in series in this circuit. The solenoid 230 is the solenoid which controls operation of the kicker wheel 151 to eject a single receipt from the receipt magazine or hopper 117 at the beginning of a receipt-issuing cycle. The normally closed contacts 216 of the control relay CR2, on the other hand, are connected in an energizing circuit for the operating coils 207 and 211 of the two time delay relays, this circuit beginning at the secondary power line 203 and extending

through the normally closed contacts 216 and through each of the operating coils 207 and 211 to the main power line 202.

The photocell-operated relay PCR is provided with an operating coil 217 and a pair of normally closed contacts 218. The operating coil 217 of this relay is connected in series with a photocell 143, the photocell and relay coil being energized from a power supply or rectifier 220 that is connected across the power lines 202 and 203. The normally closed contacts 218 of the relay PCR, on the other hand, are connected in an energizing circuit for the control relay CR2, this circuit including, in sequence, the secondary power line 203, the normally closed contacts 218, the relay operating coil 214, and the main power line 202.

The final control relay for the control system of FIG. 5, the relay CR3, comprises an operating coil 221, a pair of normally open contacts 222, and a pair of normally closed contacts 223. The operating coil 221 is connected across the power lines 202 and 203 in an energizing circuit which includes, in series, the second trigger switch 106. The switch 106 is disposed adjacent the main conveyor in position to be triggered by a deposit envelope after the envelope has moved a predetermined distance into the night depository. The normally open contacts 222 of the relay CR3 are connected in parallel with the switch 106 to afford a holding circuit for the relay. The normally closed contacts 223, on the other hand, are connected in series with a deposit numbering clutch coil 232 in an energizing circuit that extends between the power lines 202 and 203. This clutch coil controls the clutch 103 which drives the numbering device 76 that applies a serial number to the deposit envelope.

Operation of the control system illustrated in FIG. 5 is, of course, initiated by closing of the main switch 41, this switch being closed when a deposit envelope is first inserted into the night depository. The closing of the trigger switch 41 energizes the operating coil 204 of the main control relay CR1, thereby closing the relay contacts 205. The closing of the contacts 205 connects the main bus 201 to the secondary power line 203, affording a means for energizing the other control devices of the control system. Furthermore, closing of these contacts 205 is effective to energize the main drive motor M of the night depository protective device 11.

With power applied to the secondary power line 203, the lamp 219 for the photo-electric sensing system is energized. Furthermore, the rectifier 220 is energized, supplying power to the photocell circuit comprising the photocell 143 and the operating coil 217 of the photocell relay PCR. Because the photocell 143 is illuminated by the lamp 219, the relay PCR is energized, with the result that the normally closed contacts 218 of the photo-electrically operated relay are opened. Consequently, control relay CR2 cannot be energized. Since the control relay CR2 is not yet energized, each of the time delay relays TDR1 and TDR2 is energized, the operating coils 207 and 211 of these two relays being connected across the power lines 202 and 203 through the normally closed contacts 216 of the relay CR2.

Actuation of the time delay relay TDR1 closes the contacts 208, establishing a holding circuit for the main control relay CR1 through the contacts 208. Accordingly, when the switch 41 subsequently opens, the motor M is not de-energized and the secondary power line 203 is not de-energized. Rather, the main control relay CR1 is held in its actuated or energized condition until the time delay relay TDR1 drops out, as described hereinafter. Energization of the time delay relay TDR2 closes the contacts 212 of this relay, but the kicker solenoid 230 is not energized because the operating circuit thereof remains open, the contacts 215 of the control relay CR2 not having been closed as yet.

Th actuation of the control relay CR1 by closing of the main trigger switch 41 is also effective to energize the operating coil 232 for the clutch 103 that controls the deposit numbering operation. Thus, at the beginning of operation of a control system, this clutch coil is energized through the normally closed contacts 223 of the control relay CR3. The clutch remains energized until the deposit envelope advances into the protective device to an extent sufficient to close the second trigger switch 106 connected in the energizing circuit of the control relay CR3. When this happens, the contacts 223 are opened, de-energizing the clutch coil 232 and interrupting operation of the numbering device 76 which applies numbers to the deposit envelopes. The second trigger switch 106 is positioned at a location such that the clutch coil is de-energized in time to interrupt operation of the numbering mechanism at its initial or "home" position, so that it will be ready for the next numbering operation. Energization of the control relay CR3 is also effective to close the contacts 222, providing a holding circuit which maintains this relay energized until the end of a complete control operation.

Thereafter, the deposit envelope passes between the lamp 219 and the photocell 143 as it is impelled down the chute 48 to the night depository vault. As a consequence, the relay PCR is de-energized and the normally closed contacts 218 of this relay are permitted to close. The closing of the contacts 218 affords an energizing circuit for the control relay CR2, the operating coil 214 of the relay CR2 being connected in series with the contacts 218 across the power lines 202 and 203. Energization of the control relay CR2 is effective to close the normally open contacts 215 and to open the contacts 216.

When the relay CR2 is energized, the closing of the contacts 215 is effective to energize both the sheet feed solenoid 142 and the kicker solenoid 230. The opening of the contacts 216 of the relay CR2, on the other hand, is effective to de-energize the operating coils 207 and 211 of the two time delay relays TDR1 and TDR2. However, these relays do not drop out immediately, due to their time-delay operating characteristics; rather, the contacts 208 and 212 remain closed.

After a very short interval of time, sufficient only to initiate movement of the top blank from the stack of receipt blanks in the hopper 117, the time delay relay TDR2 drops out, de-energizing the kicker solenoid 230. Consequently, the kicker device 151 is not effective to feed a second receipt blank into the receipt-issuing station of the protective device.

Subsequently, after a substantially greater period of time, the time delay relay TDR1 drops out, so that the contacts 208 are opened. When this happens, the energizing circuit for the main control relay CR1 is opened, so that the secondary power line 203 is de-energized, due to opening of the relay contacts 205. Of course, the motor M is also de-energized. With the operating circuit to the secondary power line 203 opened, all of the other control and operating devices of the system illustrated in FIG. 5 are effectively de-energized, so that the complete control circuit is effectively returned to its initial operating condition and is ready for the next deposit to be made. It may be that the time delay interval required for the time delay relay TDR1, corresponding to the time required to number and issue a receipt, will exceed the time required for the deposit envelope to pass between the lamp 219 and the photocell 143, depending upon the operating speed of the receipt-issuing portion of the protective device. If this is the case, it may be necessary to provide for some time delay in opening of the contacts 218. However, in most instances, using deposit envelopes of any standard size, the time required for the envelope to pass completely between the lamp 219 and the photocell 143 should be adequate to complete the receipt-numbering operation.

It will be recognized that the described A.C. powered control system of FIG. 5 could be readily replaced by a

D.C. actuated control system, without in any way changing the basic control arrangement. In any application where an auxiliary D.C. or A.C. supply is available, it may be preferable to connect the control circuit to the auxiliary power system to assure operation in the event of a power failure. Furthermore, it is not necessary to use the particular control circuit of FIG. 5; any generally equivalent control scheme may be adopted without in any way departing from the invention.

Hence, while I have described and illustrated the preferred embodiment of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a depository of the kind having an inlet opening for receiving articles to be deposited, a protection system comprising: transport means for automatically transferring a deposit article from said inlet opening toward a storage area, said transport means including opposed conveyor members for frictionally engaging an article therebetween; power means for driving said conveyor members; means, including a sensing device disposed adjacent said inlet opening, for sensing the placement of an article therein and energizing said power means to drive said conveyor members; receipt-issuing means for issuing a receipt from said depository in response to the movement of an article from said inlet opening toward said storage area, each of said transport and receipt-issuing means including a numbering device for applying correlated numbers to each article and the corresponding receipt; and means for actuating said receipt-issuing means only after a deposit article has passed completely through said transport means, including a photosensitive sensing device located a substantial distance from said transport means and ahead of said storage area.

2. In a depository of the kind having an inlet opening for receiving articles to be deposited, a protection system comprising: transport means for automatically transferring a deposit article from said inlet opening toward a storage area, said transport means including opposed conveyor members for frictionally engaging an article therebetween; power means for driving said conveyor members; means, including a sensing device disposed adjacent said inlet opening, for sensing the placement of an article therein and energizing said power means to drive said conveyor members; receipt-issuing means for issuing a receipt; sensing means, comprising a photoelectric sensing device, for sensing the transfer of a deposit article from said transport means to said storage area; and control means, operatively associated with said sensing means, for actuating said receipt-issuing means in response to movement of a deposit article past said sensing means, said photoelectric device being spaced from said transport means by a distance sufficient to assure complete passage of a deposit article therethrough before the receipt-issuing means is actuated.

3. In a depository of the kind having an inlet opening for receiving articles to be deposited, a protection system comprising: transport means for automatically transferring a deposit article from said inlet opening to a storage area, said transport means including opposed conveyor members for frictionally engaging an article therebetween; power means for driving said conveyor members; means, including a sensing device disposed adjacent said inlet opening, for sensing the placement of an article therein and energizing said power means to drive said conveyor members; a chute for conducting an article from the transport means to the storage area; receipt-issuing means for issuing a receipt from said depository through an outlet opening in said depository; sensing means, including a photo-electric sensing device disposed in said chute, for sensing the transfer of an article from said transport means through said chute; and electrically actuated control means operatively associated with said sensing means, for driving said receipt-issuing mechanism in response to movement of an article past said photo-electric sensing device, said photo-electric device being located a sufficient distance from said transport means to insure that an article is passed completely therethrough prior to energization of the receipt-issuing means by said control means.

4. In a depository of the kind having an inlet opening for receiving articles to be deposited, a protection system comprising: transport means for automatically transferring a deposit article from said inlet opening toward a storage area, said transport means including a conveyor belt member, a plurality of drive roll members, and means for resiliently biasing said drive roll members toward said conveyor belt to frictionally engage an article between said roll and belt members; power means for driving said conveyor belt and roller members; means, comprising a sensing switch located adjacent said inlet opening, for sensing the placement of an article therein and energizing said power means in response thereto; a connecting passageway, through which deposit articles are passed from said transport means to said storage area; a second sensing device, comprising a photocell located in said passageway, for sensing movement of a deposit article completely beyond a predetermined point in said passageway; and means, actuated by said second sensing device, for issuing a receipt from said depository in response to the movement of an article from said inlet opening into said storage area.

5. In a bank or similar depository of the kind having an inlet opening for receiving articles to be deposited, a protective system comprising: transport means for automatically transferring a deposit article from said inlet opening to a storage area, said transport means including opposed conveyor members for frictionally engaging an article therebetween; power means including gear and chain drive means for driving said conveyor members; sensing means, including a sensing device located adjacent said inlet opening, for sensing the placement of a deposit article therein and energizing said power means to drive said conveyor members; receipt-issuing means for issuing a receipt from said depository through an outlet opening, said receipt-issuing means including a receipt transport, and gear and chain drive means for driving said receipt transport; additional gear means movable into meshing engagement with the gear means of both of said transports for interconnecting said receipt transport for drive with said package transport means; and control means responsive to the movement of a deposit article from said transport means for moving said additional gear means into said meshing engagement.

6. In a depository having an inlet opening for receiving articles to be deposited, a protective system comprising: transport means for automatically transferring a package from said inlet opening toward a storage area; power means for driving said transport means; sensing means, located adjacent said inlet opening, for sensing the placement of an article therein and for energizing said power means to drive said transport means; receipt-issuing means for issuing a receipt from said depository; numbering means for applying correlated numbers to a deposit article and a corresponding receipt; means for preventing withdrawal of a package from said inlet opening, including a roller formed with a serrated periphery; second sensing means comprising a photoelectric sensing device located intermediate said transport means and said storage area, for sensing the transfer of a deposit article from said transport means to said storage area; and control means operatively associated with said second sensing means for driving said receipt-issuing means in response to movement of a deposit article past said second sensing means, said second sensing means and said control means being arranged to prevent actuation of said

receipt-issuing means until after a deposit article has cleared said transport means.

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