United States Patent

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[54] **PROGRAMMED MULTIPLE STAMP DISPENSING APPARATUS EMPLOYING OPTICAL ELECTRONIC STAMP COUNTING AND AUXILIARY STAMP ROLL CAPACITY**
24 Claims, 7 Drawing Figs.

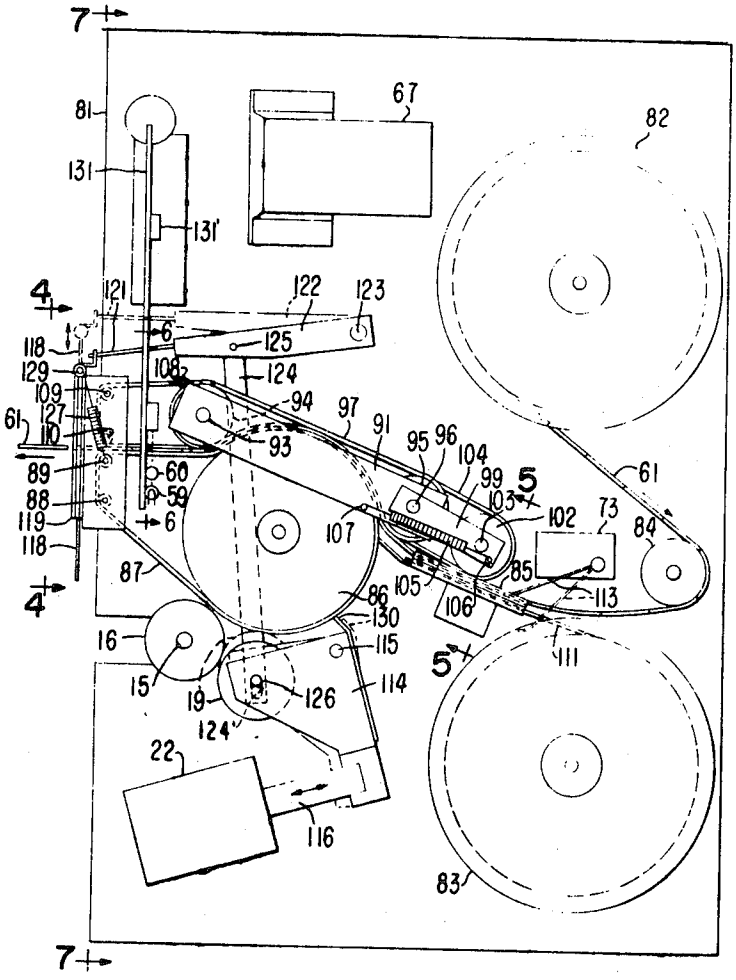
[52] **U.S. Cl.** **194/10,** 221/7, 250/219, 226/11
[51] **Int. Cl.** **G07f 11/66**
[50] **Field of Search** 83/242, 243; 317/124; 194/10; 221/9, 14, 17, 13, 7, 71; 242/55.3, 58; 226/11, 110; 250/219

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ABSTRACT: A coin-activated stamp dispenser apparatus wherein the stamps are driven by a flexible belt drive is described. An auxiliary stamp supply roll is provided, the stamps therefrom being automatically threaded through and dispensed from the dispenser upon depletion of the stamps from a main supply roll. An optical-electronic system is used for both stamp counting and positioning the stamps for cutoff. Electronic counting circuits such as binary counters are used in combination with the optical counter for counting stamps. An electrical program board is utilized for simple and flexible programming of a plurality of stamp dispenser units to permit various denominations of stamps to be dispensed for various coin values.



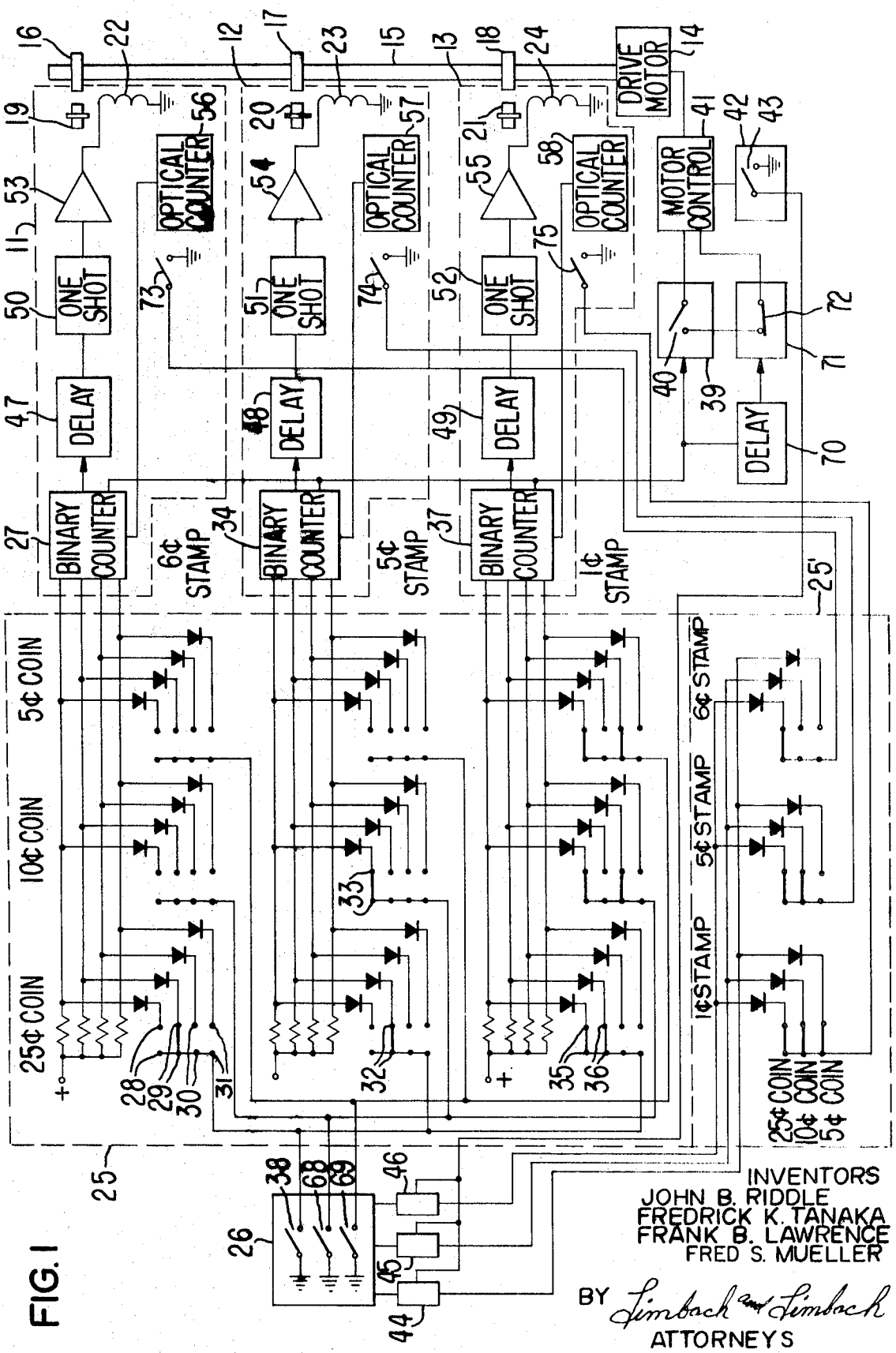


FIG. 1

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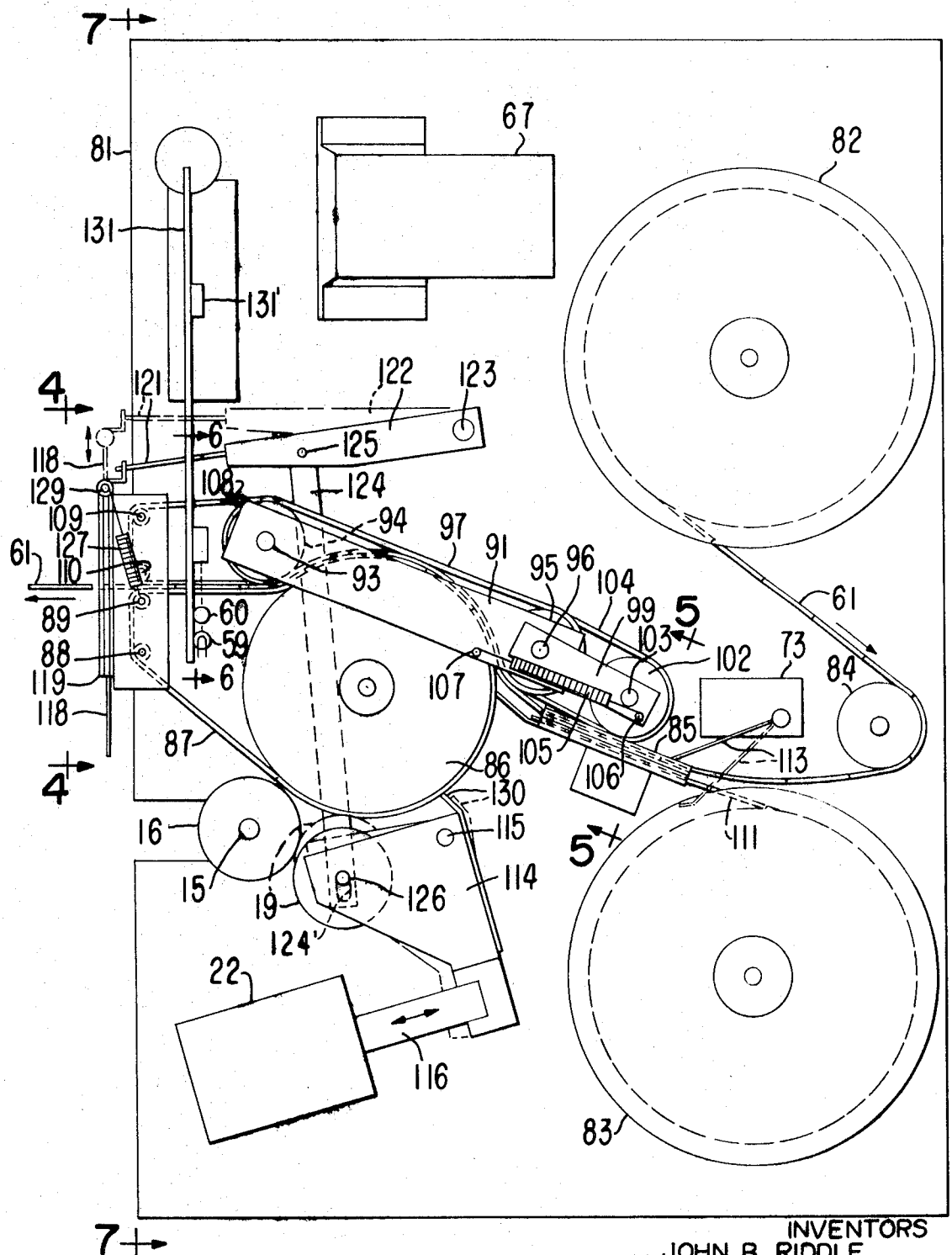
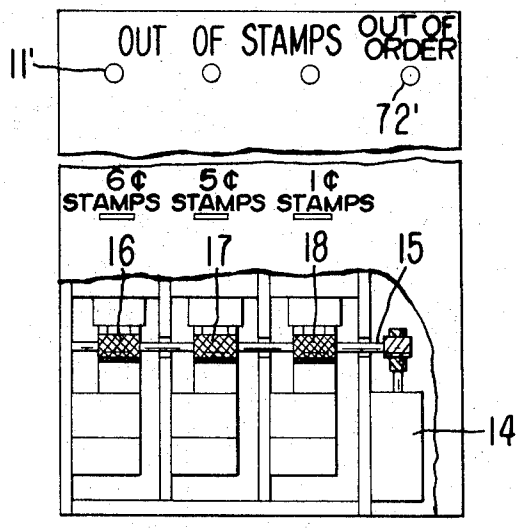


FIG. 2

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FIG. 3



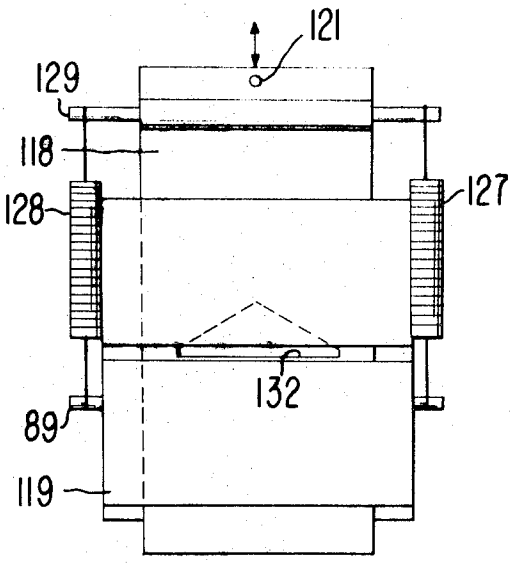
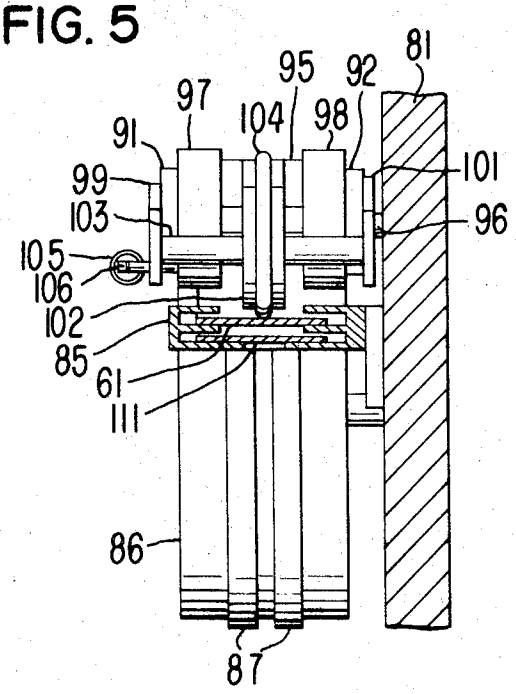


FIG. 4

FIG. 5



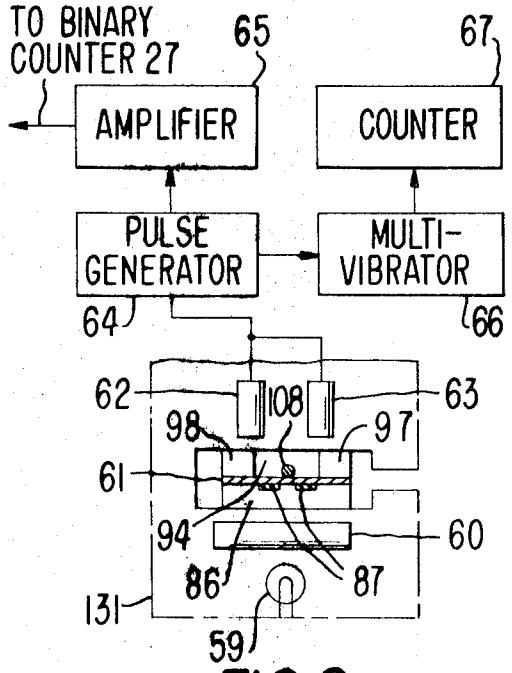
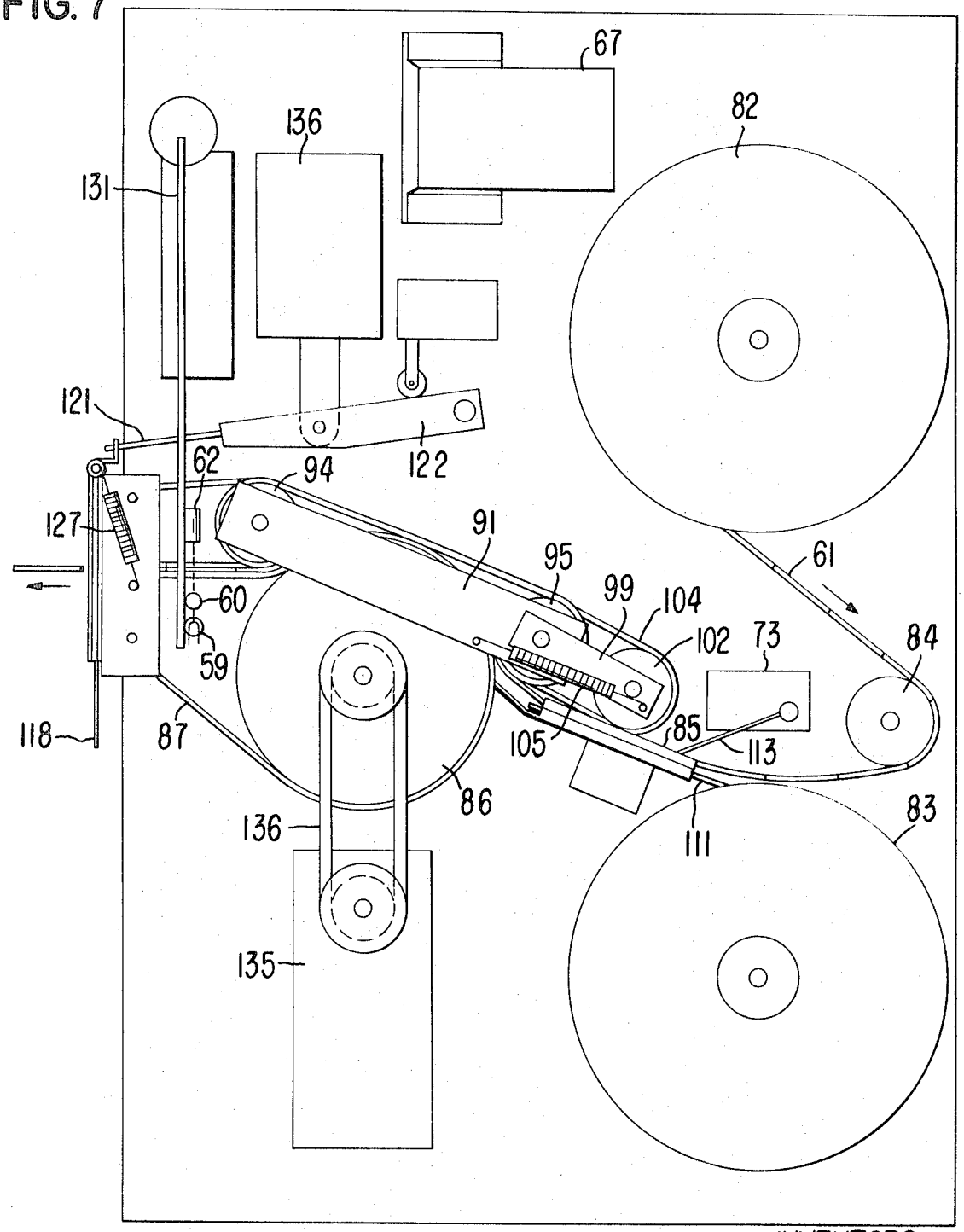


FIG. 6

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FIG. 7



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PROGRAMMED MULTIPLE STAMP DISPENSING APPARATUS EMPLOYING OPTICAL ELECTRONIC STAMP COUNTING AND AUXILIARY STAMP ROLL CAPACITY

BACKGROUND OF THE INVENTION

This invention relates in general to a coin-activated dispensing system and more particularly to a novel, easily programmed stamp-dispensing apparatus arranged to dispense a plurality of stamps of one or more different denominations in response to the receipt of money of one of several different denominations.

In stamp-dispensing machines presently in use the stamps are driven in a takeoff direction from the stamp supply reel by sprockets or finger members which engage the strip of stamps in the perforations between adjacent stamps. The term stamps is used herein and in the appended claims to mean roll dispensed articles, typically imprinted and perforated for separation, of the nature of a postage stamp, including such articles as trading stamps, tickets for theater and sporting events and the like. The stamps are therefore pushed or pulled through the stamp-dispensing mechanism by the moving sprockets or engaging fingers. Often times this results in a tearing of the stamps along the perforations and in a jamming of the stamp strip in the dispenser. Additionally, variations in stamp length caused by changes in manufacturing standards and changes in humidity produce stamp-feeding problems in these machines.

SUMMARY OF THE INVENTION

The present invention employs a novel stamp drive apparatus which does not employ sprockets or fingers engaging the perforations between stamps, but rather employs a flexible drive member, such as a moving rubber belt, which engages the stamps across a substantial portion of their surface and carries the stamps along in an egress movement without the pushing or pulling action at concentrated areas of the stamp inherent in the prior art sprocket or finger drives. This particular stamp drive apparatus permits ease of loading and threading the stamps through the dispenser since it is not necessary to align perforations with sprockets, fingers or the like, but it is only necessary to place the stamps into contact with the belt drive, the belt drive then simply threading and carrying the stamps along through the drive unit.

In prior art dispensing apparatus, the stamps of each particular dispenser unit were contained on a single roll and dispensed therefrom, the stamp dispenser becoming inoperative upon depletion of the stamps from the supply roll. The present invention provides a novel auxiliary upon depletion of the main supply roll, is automatically brought into action to feed the first stamp of the auxiliary roll into the stamp drive mechanism immediately following the last stamp from the main supply roll. This self-threading of the auxiliary stamps into the stamp drive mechanism provides continuous, uninterrupted stamp dispensing in tandem fashion from two individual supply rolls thus doubling the stamp capacity of the unit and obviating the necessity for discarding partially used stamp rolls and refilling the stamp dispenser unit with a new roll of stamps at the beginning of a weekend period or the like.

By providing a main stamp supply roll and an auxiliary stamp supply roll, the problem of accumulating miscellaneous roll ends of various stamp rolls has been eliminated. The stamps from the main supply roll will be fully dispensed before the auxiliary supply roll is brought into operation. Thereafter, when the dispenser is serviced, the auxiliary supply roll may be moved up to the place of the main supply roll and a new reserve supply roll substituted therefor. The stamps will thereafter be dispensed from the remaining stamps on the main supply roll and the auxiliary supply roll brought into operation only when the main supply roll has been fully exhausted.

The prior stamp dispenser apparatus utilized a mechanical counting mechanism to count the number of stamps dispensed. In the present invention a novel noncontacting optical-electronic system is utilized to both accurately count the number of stamps and precisely position the stamps for cutoff of the dispensed stamps from the main stamp roll. This optical means comprises a light source positioned on one side of the stamp strip and an optical detector positioned on the opposite side of the strip, the optical detector operating in response to the passage of the line of perforations between the stamps to activate the stamp counting and stamp cutoff mechanism. This optical counter ensures accurate positioning of the stamps while also offering a degree of latitude in the width of the stamps that may be dispensed from a particular dispenser unit. The optical sensing device controls the operation of the stamp cutoff mechanism to ensure that the stamps will be cut cleanly through the perforations between stamps to separate the dispensed stamps from the main supply roll. The optical-electronic mechanism provides high reliability, long life, and extreme accuracy.

The complexity of the mechanical arrangements used in prior art stamp-dispensing units for counting the number of stamps to be dispensed served to limit the total number of stamps that could be dispensed for a particular coin. The present invention utilizes a simple electronic binary counter system which operates in conjunction with the optical counting device to count the stamps, the binary counter system providing flexible and increased stamp-handling capability. A simple programming of the binary counter will permit stamp dispensing of anywhere from one to 15 or more stamps from each one or all of the stamp dispenser units for a single coin.

Stamp-dispensing machines presently in use will accept coins of several denominations and will dispense one or more stamps of one or more denominations in response to the different coins deposited. The programming of the stamps to be dispensed for the different coins accepted may be changed form time to time, but since these prior art devices utilize mechanical apparatus in the programming, changes in programming become relatively complicated and expensive. Stamp programming in the present invention is accomplished by the simple expedient of selected strapping across the jacks of an electrical programming board. The strapping may consist of manually inserting electric conducting pins in selected holes where each pin serves as the strap between two electrical jacks.

BRIEF DESCRIPTIONS OF THE DRAWINGS

These and other features and advantages of the present invention will become apparent from a perusal of the following specification taken in connection with the drawings wherein:

FIG. 1 is a schematic diagram of the novel stamp dispenser system showing three individual stamp dispenser units operating in response to three separate coin denominations to dispense stamps of three different denominations;

FIG. 2 is an elevational view of one of the individual stamp dispenser units;

FIG. 3 is an elevational view partly cut away showing the stamp dispenser system and three stamp dispenser units in place therein;

FIG. 4 is a view of the stamp knife mechanism taken along section line 4—4 in FIG. 2;

FIG. 5 is a section view of the stamp drive mechanism taken along section line 5—5 in FIG. 2;

FIG. 6 is a combination section view and block diagram of the optical stamp-counting system of the stamp-dispensing units, the section view portion of this figure being taken along section line 6—6 in FIG. 2, and;

FIG. 7 is an elevational view of another embodiment of the stamp dispenser unit of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A description of the stamp dispensing system of the present invention shown in schematic form in FIG. 1 will be given first, also with reference to FIGS. 3 and 6, followed by a description

of one of the novel individual stamp dispenser units shown in detail in FIGS. 2, 4, 5 and 6.

The stamp-dispensing system comprises three separate stamp dispenser units **11**, **12** and **13**, although less than or more than three dispenser units may be utilized. A single main drive motor **14** and drive shaft **15** is provided having three separate drive wheels **16**, **17** and **18** fixedly mounted thereon, each drive wheel being associated with a separate one of the three dispenser units (see FIG. 3). Each dispenser unit has an associated pinch roller **19**, **20** and **21** operable by solenoids **22**, **23** and **24**, respectively, for engaging the separate stamp dispenser units with the drive wheels.

A common stamp program board **25** is utilized to program each of the three dispenser units **11**, **12** and **13** to dispense a particular number of stamps for one or another of the several coins that a coin acceptor **26** is capable of accepting. The coin acceptor **26** includes well-known devices for accepting coins of three different values, but obviously other money acceptors may be used for accepting different coins or paper money if desired.

It is assumed for the purpose of explaining the present invention that this stamp dispenser system will accept 25-cent, 10-cent and 5-cent coins and also that the three stamp dispensers **11**, **12** and **13** will carry 6-cent, 5-cent and 1-cent stamps, respectively. A typical binary counter **27** of the type employed in each of the dispenser units in this system is capable of counting up to 15 stamps and consists of four two-state flip-flops. The flip-flops are connected in series and count in the typical binary sequence 1–2–4–8. Each binary counter is manually preset by means of the program board **25** to count a selected number for each input signal from the coin acceptor **26**.

The upper portion of the program board **25** is arranged in three columns, the 25-cent coin column, the 10-cent coin column, and the 5-cent coin column, and three rows, the 6-cent stamp row, the 5-cent stamp row, and the 1-cent stamp row. Each row has four pairs of jacks in each column and each pair of jacks controls one of the four flip-flop circuits in the associated binary counter. For example, referring to the 6-cent stamp row and the 25-cent coin column, the first pair of jacks **28** will set the binary counter **27** to count one, the second pair **29** to count two, the third pair **30** to count four, and the fourth pair **31** to count eight. Combinations of these jacks pairs will produce other counts; for example, strapping jack pairs **28** and **30** will set the binary counter **27** to count five, strapping jack pairs **28**, **30** and **31** will set the count at **13** and strapping all four jack pairs will set the count at **15**.

In our illustration we have shown a strapping across the second jack pair **29** in the 6-cent stamp row and the 25-cent coin column which will give two 6-cent stamps for a 25-cent coin. In this same row, none of the jack pairs in the 10-cent coin column or the 5-cent coin column are strapped and therefore no 6-cent stamps will be issued on receipt of a 10-cent or a 5-cent coin.

In the 5-cent stamp row, the second pair of jacks **32** in the 25-cent coin column is strapped, the first pair of jacks **33** in the 10-cent coin column is strapped, and none of the pairs of jacks are strapped in the 5-cent coin column. THis strapping sets the binary counter **34** so that, for a 25-cent coin, two 5-cent stamps will be dispensed; for a 10-cent coin one 5-cent stamp will be dispensed; and for a 5-cent coin no 5-cent stamps will be dispensed.

In the 1-cent stamp row, the first and second pairs of jacks **35** and **36** in the 25-cent coin column have been strapped, and the first and third pairs of jacks have been strapped in both the 10-cent and 5-cent coin columns. The binary counter **37** is thus set to count three 1-cent stamps for a 25-cent coin, five 1-cent stamps for a 10-cent coin, and five 1-cent stamps for a 5-cent coin.

Thus, in our illustration, the system has been preset so that for a 25-cent coin, two 6-cent stamps, two 5-cent stamps and three 1-cent stamps will be dispensed; for the 10-cent coin, five 1-cent stamps and one 5-cent stamp will be dispensed; and for the 5-cent coin, five 1-cent stamps will be dispensed.

For convenience, the strapping across jacks may consist of electrically conducting pegs and each jack pair may be two conductors forming surfaces in a hole in a pegboard, the multiple peg holes being arranged in columns and rows in the program board. The pegboard of electrical jacks is continuously made from conventional printed circuit board connectors in which conductor pins are removably inserted to connect opposite contact strips.

In operation, on receipt of a 25-cent coin, the coin acceptor **26** operates to close the circuit through switch **38** to the program board **25**. Since jacks in all three rows in the 25-cent coin column have been strapped, all three stamp dispenser units **11**, **12** and **13** are activated by closing ground through jack pair **29** to binary counter **27**, through jack pair **32** to binary counter **34**, and through jack pairs **35** and **36** to binary counter **37**. The binary counters operate to close a circuit to switch **39** which operates to close contacts **40** and complete a circuit to the drive motor control circuit **41**. The control circuit **41** operates to energize the main drive motor **14** to drive the wheels **16–18** and also operates switch **42** which closes a circuit through contacts **43** to the three coin solenoids **44**, **45**, and **46** coupled to the coin acceptor **26**. Solenoid **44** is associated with the 5-cent coin mechanism and solenoids **45** and **46** with the 10-cent and 25-cent coin mechanisms, respectively, in the coin acceptor **26**. These solenoids operate to disable the coin acceptor **26** from accepting any additional coins, such additional coins being returned to the depositor until such time as the system finishes its current stamp dispensing cycle.

The binary counters **27**, **34** and **37** also close a circuit to the delay circuits **47**, **48**, and **49** which, after a short delay, for example one-half to 1 second, operate to energize the one-shot multivibrator circuits **50**, **51** and **52**, respectively, which transmit an energizing signal through their associated amplifier circuits **53**, **54** and **55**, respectively, to the pinch roller solenoids **22**, **23** and **24**, respectively. The pinch rollers **19–21** are moved into engagement with their associated drive wheels **16–18** and the three dispenser units **11**, **12** and **13** are activated to commence dispensing stamps of all three values. The ½- to 1-second delay provided by delay circuits **47–49** gives the drive motor **14** time to get up to normal speed before the pinch rollers engage the drive wheels.

The stamp counter circuit **56** associated with the stamp dispenser unit **11** and shown in more detail in FIG. **6** will be described, it being understood that the counter units **57** and **58** associated with the stamp dispenser units **12** and **13**, respectively, operate in similar fashion to control the number of stamps being dispensed from their particular dispenser units. The stamp counter unit **56** comprises a source of light **59** and an elongated cylindrical lens **60** which focuses the light into a strip-shaped beam, the light and lens being positioned on one side of the strip of stamps **61** such that the light beam extends transverse the stamp strip. A pair of photocell detectors **62** and **63** are positioned on the other side of the strip of stamps **61** so as to intercept the light beam. The positioning of a stamp between the light source **59** and the photo detectors **62**, **63** will normally cut off or substantially attenuate the light impinging on the photodetectors. However, when the passage of the stamp aligns a line of perforations between adjacent stamps with the light beam, the light passes through the perforations and impinges upon the photo detectors **62**, **63**. The light impinging thereon will cause a current to flow to the pulse generator circuit **64** which operates to transmit a pulse through the amplifier **65** to the binary counter **27**. At the same time, the pulse generator **64** sends a pulse to multivibrator circuit **66** which operates to produce a pulse to a totalizer counter circuit **67**. The totalizer counter **67** is utilized to count the total number of stamps dispensed from the dispenser **11** between refills. A single pulse is sent to the binary counter **27** for each stamp that passes out the egress opening of the stamp dispenser. Since the binary counter **27** has been set to count two by the strapping of the jack pair **29**, it will operate after receipt of the second pulse from the stamp counter unit **56** to remove the energizing signal from the delay circuit **47** to

therefore deenergize the pinch roller solenoid 22 and stop operation of the 6-cent stamp dispenser unit.

During the same period, the 5-cent stamps have been dispensed and the counter 34 has similarly operated in response to pulses from the optical counter 57 to count each 5-cent stamp as it passes out from the dispenser. The binary counter 34 has also been set at the two count by the strapping of a jack pair 32 and it operates on the second pulse from the counter 57 to deenergize the pinch roller solenoid 23 and terminate the dispensing of the 5-cent stamps. The binary counter 37 has been set to count three by the strapping of jack pairs 35 and 36 and it operates to deenergize the pinch roller solenoid 24 after three pulses have been received from the 1-cent stamp counter 58. After the last binary counter, in this case counter 37, has operated to terminate the dispensing of stamps, it removes the energizing signal to switch 39 and the contacts 40 open to open the circuit to the motor control 41 and stop motor 14. The drive motor control circuit 41 also operates to open the contacts at 43 and thus deenergize the coin control solenoids 44, 45 and 46 so that the coin acceptor 26 will be placed in a condition to accept the next coin deposited.

When a 10-cent coin is deposited in the coin acceptor 26, a circuit is closed through contacts 68 to the stamp board 25. Since there is no strapping across any of the pairs of jacks in the 10-cent coin column and 6-cent stamp row, the 6-cent stamp dispenser unit 11 will not be activated by the 10-cent coin. The strapping across the first pair of jacks 33 in the 10-cent coin column and 5-cent stamp row will activate the stamp dispenser unit 12 while the strapping across the second and third pairs of jacks in the 10-cent coin column and 1-cent stamp row will activate the stamp dispenser unit 13. The binary counter circuits 34 and 37 will energize the switch circuit 39 to close contacts 40 and energize the drive motor 14. The motor control circuit 41 will energize the switch 42 to close contacts 43 and operate solenoids 44, 45 and 46 to prevent the coin acceptor 26 from accepting additional coins. The stamp dispenser unit 12 will operate to dispense 5-cent stamps and unit 13 will operate to dispense 1-cent stamps. The binary counter 34 will operate on receipt of the first pulse from the stamp counter 57 to deenergize the stamp dispenser unit 12. The 1-cent stamp dispensing unit 13 will continue to operate until the fourth pulse is received from the optical counter 58 at which time the binary counter 37 will operate to open the circuit to the switch 39, contacts 40 opening the circuit to the motor control unit 41 which operates to deenergize the drive motor 14 and open the circuit at contacts 43 to the solenoids 44–46.

In the case of 5-cent coin being deposited, the circuit in the coin acceptor unit 26 is closed through contacts 69 only to the binary counter 37 of the stamp dispenser unit 13 since there is no strapping of the jacks in the 5-cent or 6-cent stamp columns. Only dispenser 13 will be activated to dispense five stamps.

As indicated above, the binary counters 27, 34 and 37 are preferably solid state counters for counting 16 numbers. Any one of the 16 count conditions may be used as a zero condition so that the output from the counters to switch assembly 39 will cause the motor 41 to operate when any one of the counters 27, 34 and 37 is not in its zero condition.

The binary counters are connected to the optical counters 56, etc. to be advanced one step toward the zero position for each output pulse of the optical counter. Additionally, each of the binary counters has four input terminals by which the counter may be preset a different number of steps away from the zero condition in response to electrical signals at different ones of the input terminals.

The counter 27 is preferably arranged with the zero condition corresponding to a count of 16 with the input terminals connected to preset the counter one, two, four, or eight steps below 16 and with the optical counter connected to the binary counter to advance the binary counter one step for each pulse.

At the time that one or more of the binary counter circuits 27, 34 and 37 operate to close a circuit to the motor control 41, a circuit is also closed to the delay circuit 70. This delay circuit 70 is arranged to operate after a suitable preselected time delay, for example 5 to 8 seconds, to energize a switch circuit 71 which operates to open contacts 72 and thus open the circuit to the motor control circuit 41. The motor control circuit 41 operates to deenergize the drive motor 14 so that no additional stamps will be dispensed from any of the three stamp units 11, 12 or 13. The motor control circuit 41 also operates to maintain circuit 42 energized so that contacts 43 are held closed to retain solenoids 44, 45 and 46 operated so that the coin acceptor 26 will accept no additional coins. The time delay of the delay circuit 70 is chosen so that the contacts 72 will be opened only after the passage of an abnormal length of time for any one or more of the binary counters to remain operating, a situation which would indicate a malfunctioning of or tampering with the system. The delay time of the delay circuit may be adjusted to any suitable time period. Contacts 43 will remain closed until the malfunctioning of the system has been corrected. A suitable alarm signal such as an out-of-order light 72′ (see FIG. 3) may be energized by the motor control circuit upon the opening of the contacts 72.

The lower portion of the stamp program board 25 includes a set of jack pairs which are utilized for providing an "out-of-stamp" feature for this stamp-dispensing system. These jacks are arranged in three columns, a 1-cent stamp column, a 5-cent stamp column and a 6-cent stamp column. The first pair of jacks in each column is a 25-cent coin set, while the second and third pairs of jacks in each column are 10-cent coin and 5-cent coin sets, respectively. If a particular stamp denomination is dispensed from this system by a particular coin denomination, then the jack pair associated with the particular coin and that particular stamp is strapped. In the illustration we have used in describing this invention, all three stamp denominations, i.e. 6-cent, 5-cent and 1-cent stamps, are dispensed on the deposit of a 25-cent coin and, therefore, the first pair of jacks in each of the three stamp columns is strapped. Since a 10-cent coin will result in the delivery of both 5-cent and 1-cent stamps, the second jack pairs in the 5-cent and 1-cent columns are strapped, while the second pair of jacks in the 6 -cent stamp column remains unstrapped. The third pair of jacks in the 1-cent stamp column is strapped while the third pairs of jacks in both the 5-cent stamp column and 6-cent stamp column remain unstrapped. "Out-of-stamp" switches 73, 74 and 75 are provided in each of the stamp-dispensing units, these switch contacts remaining open so long as there are stamps available in the dispenser units for dispensing. However, should stamp dispenser unit 11, for example, run out of 6-cent stamps, the switch contacts 73 will be closed and thus a circuit closed through the first jack pair in the 6-cent stamp column to the 25-cent coin solenoid 46 which operates to disable the coin acceptor 26 from accepting any additional 25-cent coins. All 25-cent coins thereafter deposited in the coin acceptor 26 will be returned to the depositor. In addition, an out-of-stamp signal may be generated, for example by light 11′ (See FIG. 3) to indicate the fact that the dispenser 11 is out of 6-cent stamps. It should be noted that the stamp dispenser system will still function to accept 10-cent coins and 5-cent coins since 6-cent stamps are not delivered from the system for these coins. If the stamp dispenser unit 13 runs out of 1-cent stamps, the circuit is closed from contact 75 to all three coin solenoids 44, 45 and 46 and the coin acceptor mechanism 26 will accept no further coins and dispense no further stamps.

The stamp dispenser board 25 allows very flexible programming and this system is capable of accepting substantial amounts of money and dispensing substantial numbers of stamps therefor. Coin acceptor mechanisms are presently available which will accept a considerable number of coins as well as bills and will hold these coins and total up the sum deposited to establish a desired credit, after which a dispense signal may be given to dispense the proper number of stamps

for the total summation of money deposited and credited. The dispenser units shown in this illustration included binary counters for dispensing up to 15 stamps from each dispenser unit and for dispensing up to 45 stamps for a single coin but it should be understood that this particular selection of stamp numbers was arbitrary and that more or less stamps could be dispensed. For example, by the addition of one more flip-flop in the binary counter, up to 31 stamps may be counted and dispensed from a single dispenser. Also additional stamp dispenser units may be added to this system and the program board **25** expanded so that additional stamp denominations may be dispensed. Thus, many more combinations of coin denominations and/or stamps may be provided than are presently illustrated and such selections and variations will be obvious to those skilled in the coin-activated dispenser art.

The stamp-dispensing machine may be stocked with a variety of the same or different denomination stamps in the dispenser units **11**, **12** and **13**, and the strap connectors **29**, **32**, **33**, etc. may be rearranged in the program board **25** to dispense any desired combination of stamps from the three dispensers **11**, **12** and **13** in response to a credit signal from any of the three switches **38**, **68** and **69**. By way of example, switch **38** may be closed by a dollar bill validator or coin acceptor of the accumulator type to indicate 1-dollar credit. A suitable combination of connector pegs may then be used in the program board to dispense, in response to this credit signal, seven 8-cent stamps from dispenser **11**, five 6-cent stamps from dispenser **12**, and fourteen 1-cent stamps from dispenser **13**. This versatility permits the machine to be used in a wide variety of applications in dispensing U.S. or foreign postage stamps and trading stamps. This versatility is particularly useful with the optical stamp-counting mechanism of this invention which operates easily on stamps of different physical size.

Referring now to FIGS. **2** and **4** through **6**, there is shown one of the three novel stamp dispenser units **11** comprising a main mounting plate **81** on which first and second rolls of stamps **82** and **83** may be mounted, each roll containing 3,000 stamps. The stamps **61** from the upper or main stamp roll **82** are threaded around an idler pulley **84** and into one end of the upper level of an open-ended, elongated stamp guide **85**. The stamps pass through the stamp guide **85** and over the top portion of a drive wheel **86** which is rotatably mounted on the support plate **81**. The drive wheel **86** carries two rubber drive belts **87** which also pass over two idler pulleys **88** and **89** mounted at the front of the support plate.

A pair of elongated, rectangular-shaped support members **91** and **92** are pivotally mounted on the main support plate **81** by pivot pin **93**, the pin **93** also carrying a rotatable belt drive wheel **94**. A second belt drive wheel **95** is rotatably mounted on a shaft **96** at the opposite end of the rectangular support members **91** and **92**. a pair of rubber belts **97**, **98** are mounted on the two belt drive rollers **94**, **95**, these two belts extending between the rollers **94**, **95** and engaging the stamps **61**, which pass over the upper portion of the drive pulley **86**.

A second pair of roller support plates **99**, **101** are pivotally mounted on the shaft **96** and in turn carry and auxiliary drive roller **102** mounted on a shaft **103**. A rubber drive belt **104** extends around the two drive rollers **95**, **102** and between the pair of belts **97**, **98** and serves to drive the auxiliary roller **102** in a clockwise direction as the drive roller **95** rotates. A spring **105** coupled at one end to a pin **106** on the support member **99** and at its other end to another pin **107** on the other support member **91** serves to urge the auxiliary drive wheel **102** and belt **104** in a clockwise direction into engagement with the stamps **61** in the stamp guide **85**. A drive belt **108** encircles the drive wheel **94** between the pair of belts **97**, **98** and passes around the two idler pulleys **109**, **110** mounted at the front of the main support base **81**.

The stamps **111** from the auxiliary or backup stamp roll **83** are threaded into the bottom portion of the stamp guide **85** with the first stamp positioned directly under the stamp from the first roll **82** which is under the drive wheel **102**. Switch **73** is mounted on the support plate **81** and carries a pivotally mounted contact arm **113** which is urged into engagement with the stamps **61**.

A U-shaped pinch roller support member **114** is pivotally mounted on the main support plate **81** by means of a pivot in **115** and is coupled to the armature **116** of a pinch roller drive solenoid **22** mounted on the plate **81**, the support **114** having the rubber pinch roller **20** rotatably mounted between the legs thereof.

A knife plate **118** is mounted in a knife guide **119** at the front of the support plate **81**, the upper end of the knife plate **118** being supported at the front end **121** of a lever arm **122** which is pivotally mounted by means of a pivot pin **123** on the support plate **81**. A connector arm **124** is pivotally mounted at one end on the lever arm **122** by a pin **125** and is also mounted via slot **124'** at its other end on the shaft **126** of the pinch roller **19** and couples the pinch roller **19** to the stamp cutoff knife **118**. Tension springs **127** and **128** are mounted between the mounting shaft of the idler pulley **89** and the mounting pin **129** on the upper portion of the knife plate **118** and urges the knife plate and the lever arm **122** in a downwardly direction, also urging the pinch roller support member **114** via arm **124** in a counterclockwise direction, the stop member **130** on the U-support **114** being urged against the drive pulley **86** and serving as a brake.

An electronically operated stamp counter **67** is also secured on the main support plate **81**.

A plug-in circuit board **131** is mounted on the support plate **81** and carries the light source **59** at its lower end which directs light into the elongated cylindrical lens **60**, the lens serving to focus the light into a strip extending transverse to the strip of stamps **61** extending between the belt drives **87** and **108**. The pair of photodetectors **62**, **63** are mounted on the circuit board **131** above the stamps **61** and aligned with the beam of light passing through the perforations in the stamps as the line of perforations between stamps passes between the lens and the photodetectors. The plug-in circuit board **131** also carries the remainder of the circuit elements of the optical counter circuit **56**.

In the use of this stamp dispenser, the stamps **61** from the upper stamp roll are threaded through the upper level or channel of the stamp guide **85** and under drive wheels **102** and **95** into engagement with the drive wheel **86**. The drive wheel **86** is then manually rotated in a counterclockwise direction to feed the stamps over the top of the drive wheel **86** and under the drive belts **97**, **98**, the drive wheels **94**, **95** being driven by the belts **97**, **98**. The stamps pass under the drive wheel **94** and belt **108** toward the opening **132** in the knife plate **118**. The stamps **111** from the lower stamp reel **83** are then inserted into the lower level or channel of the stamp guide **85**. The stamps **111** remain stationary until such time as the stamps **61** from the upper roll have been completely expended. The first stamp in the strip of stamps **61** is positioned with its front edge closely spaced from the back of the knife plate **118**. The circuit board **131** is preferably positioned so that the line of perforations between the first and second stamps is located to the right of the point of interception of the light beam from the light source **59** as viewed in FIG. **2**. With the stamp dispenser in the inactivated condition, the solenoid **22** is not energized and the pinch roller bracket **114** is urged by springs **127**, **128** acting through arm **124** into a position with the brake **130** against the drive wheel **86**. The drive wheel **86** is thus held locked and the pinch roller **19** disengaged from both the drive wheel **16** and the drive wheel **86**. The lever arm **122** is also in the lowermost position and thus positions the knife plate **118** so that the opening **132** in the knife is out of alignment with the stamps **61**, thus closing off access to the stamps from outside of the stamp dispenser.

When stamps are to be dispensed from this dispenser, the drive wheel **16** is first driven in counterclockwise direction by the drive motor. The pinch roller solenoid **22** is then activated and moves its armature to the left thus rotating the U-shaped bracket **114** in a clockwise direction about the pivot pin **115**.

The brake member 130 is disengaged from the drive wheel 86 and the pinch roller 19 brought into engagement with both the motor drive wheel 16 and the stamp drive wheel 86, the stamp drive wheel 86 being driven in a counterclockwise direction to feed the stamps 61 under the drive belts 97, 98 and to the left as seen in FIG. 2. Moving in a clockwise direction, the U-shape member 114 also, through arm 124, raises the lever arm 122 and thus raises the knife plate 118 so that the opening 132 is brought into alignment with the stamps 61, thus permitting the stamps 61 to pass out through the opening 132.

As the lines of perforations between each successive pair of stamps pass between the light source 59 and the photocells 62, the stamp count pulses are generated as described above until the preselected number of stamps passes out from this particular stamp dispenser unit. When the binary counter 27 has counted the particular preset number, the solenoid 22 is deenergized and the spring-loaded U-shape member 114 is rotated in a counterclockwise direction by the springs 127, 128 to disengage the pinch roller 19 from the drive wheel 16 and stamp drive 86 and at the same time engage the brake member 130 with the stamp drive wheel 86 to prevent further stamp dispensing. The lever arm 122 also moves in a downward direction to cause the knife blade 118 to move downwardly under the urging of springs 127, 128. The two sharp knife edges 132' in the upper edge of the egress opening 132 cut the strip of stamps through the line of perforations behind the last stamp to be dispensed. The next stamp in the stamp strip 61 is in position behind the knife plate 118 for the next cycle in response to the next coin deposited.

The optical counter 56 mounted on circuit board 131 is preferably provided with an adjustable delay timer (suitably in the form of a potentiometer 131' in an RC timing circuit) to provide an adjustable time delay between the time a line of stamp perforations passes the photocells 62 and 63 and the time a pulse is delivered from the counter 56 to the counter 27. The potentiometer is adjusted so that the knife 118 falls on the last line of perforations detected by the photocells 62 and 63. In this way, the machine will operate to dispense stamps properly regardless of the length of the stamps. When the stamps to be dispensed are shorter than the distance between photocells 62 and 63 and the knife 118, the potentiometer 131' is adjusted to drop the knife 118 on the second to last line of stamp perforations detected, leaving a complete stamp between the knife and photocells.

Stamps will be dispensed form the upper roll 82 in response to successive activation by particular coins in the above-described manner until such time as the roll 82 has been depleted. As long as there are stamps 61 in the upper channel of the stamp guide 85, the drive wheel 102 will ride on top of these stamps 61. When the last of the stamps in the strip 61 passes under the auxiliary roller 102, this roller rotates downwardly in a clockwise direction about pin 96 and into engagement with the stamps 111 positioned in the lower portion of the stamp guide 85. The drive wheel 102 is urged in a downwardly direction under the tension of spring 105, the drive wheel 102 being driven in a clockwise direction by the drive belt 104 from the drive wheel 95. The drive belt 104 drives the end of the stamps 111 into engagement with the stamp drive wheel 86 and under the drive belts 97 and 98. The beginning end of the stamps 111 on the roll 83 thus follows after the tail end of the stamps 61 from the roll 82.

As long as there are stamps 61 in the upper channel or stamps 111 in the lower channel of the stamp guide 85, the switch arm 113 will ride on the stamps. When the last stamp from the roll 83 passes through the lower channel in the stamp guide 85, the lever arm 113 rotates downwardly and closes the switch 73 which operates as described above to give an "out-of-stamps" signal and to disable the coin acceptor in the system so that further coins will not be accepted to operate this particular stamp dispenser unit.

The binary counters 27, 34 and 37 are designed to operate on the trailing edge of the pulses from the optical counters 56 through 58, respectively, so that the operation of the stamp drive and the stamp-cutting knife is independent of the width of the various strips of perforations between stamps. By operating on the trailing edge of the pulse from the optical counter, the stamp dispenser unit will also be uneffected by the fact that a substantial gap may appear between the last stamp from the upper roll 82 and the first stamp from the lower auxiliary roll 83 during the switch over from the main roll of stamps to the auxiliary roll.

If someone should succeed in prying the knife plate 118 up from the outside to expose the end of the stamps through the opening 132, the arm 124 will also move upwardly. The slot 124' will permit the U-shaped member 114 to remain stationary with brake 130 against the drive pulley 86, thus preventing the stamps from being pulled from the dispenser.

Another form of dispenser unit that may be utilized in lieu of the dispenser unit shown in FIG. 2 is shown in FIG. 7; apparatus in FIG. 7 which is similar to that of the dispenser unit in FIG. 2 bears the same reference number. In this dispenser unit, an individual drive motor 135 coupled to the stamp drive wheel 86 via drive belt 136 is utilized in place of the common drive motor 14 and individual drive wheel 16. This individual drive motor 135 is energized only when the stamps from this particular dispenser unit are to be dispensed in response to the deposit of the proper coin in the coin acceptor unit. At the time the drive motor 135 is energized, a knife-actuating solenoid 136 is also energized to move the knife plate 118 to its uppermost position so as to align the opening 132 in the knife plate 118 with the stamps. After the proper number of stamps have been fed out from the dispenser unit, the drive motor 135 is deenergized and the knife solenoid also deenergized 136, the knife returning under the force of the spring 127 to cut the projecting stamps from the stamp strip.

What is claimed is:

1. A stamp-dispensing apparatus for dispensing stamps from a main stamp supply roll until all stamps are dispensed therefrom and for thereafter dispensing stamps from an auxiliary stamp supply roll comprising a main drive means for engaging said stamps from the main supply roll and moving said stamps in a stamp-dispensing direction, and auxiliary drive means arranged to drive the stamps from said auxiliary supply roll into engagement with said main drive means, means for disabling said auxiliary drive means from driving the stamps from said auxiliary drive means until such time as the stamps from the main supply roll have been depleted, and means for enabling said auxiliary drive means thereafter to drive the stamps from said auxiliary supply roll into engagement with the main stamp drive means to drive said auxiliary stamps in a stamp-dispensing direction.

2. A stamp-dispensing apparatus as claimed in claim 1 wherein said main drive means includes a main drive wheel and a flexible drive belt on said drive wheel for engaging said stamps, and wherein said auxiliary drive means comprises an auxiliary drive wheel coupled to said main drive wheel and driven from said main drive wheel, and flexible drive belt coupled to said auxiliary drive wheel for engaging the stamps from said auxiliary supply roll.

3. The stamp-dispensing apparatus of claim 1 characterized further by the inclusion of stamp guide means for guiding the stamps from said main and auxiliary rolls along adjacent main and auxiliary paths, respectively, and a friction drive member forming at least a part of said auxiliary drive means with said friction drive member mounted in engagement with stamps in said main path and movable through said main path to said auxiliary path when the supply of stamps in said main path is depleted.

4. A stamp-dispensing apparatus as claimed in claim 1 including a stamp position sensing means comprising a light source and a photodetector, said light source being arranged to direct a beam of light through the line of perforations at the junction between adjacent stamps and onto the photodetector, and means responsive to the light impinging on the photodetector for controlling said main drive means.

5. A stamp-dispensing apparatus as claimed in claim 4 wherein said main drive means comprises a main drive wheel and a flexible drive belt on said drive wheel, said flexible drive belt engaging said stamps to move said stamps in said stamp dispensing direction.

6. A stamp-dispensing apparatus as claim in claim 4 including a knife mechanism for separating the stamps at their perforated junction, and means for operating said knife means in response to the light impinging on the photodetector.

7. A stamp dispenser apparatus as claimed in claim 4 wherein said means for controlling said main drive means includes an electronic pulse-counting circuit, and means for converting the light striking said photodetector into a pulse for each line of perforations passing between the light source and the photodetector, said pulses serving to operate said pulse-counting circuit to control said main drive means.

8. Apparatus as claimed in claim 7 wherein said electronic pulse-counting circuit comprises a binary counter and circuit means coupled to said binary counter for preselecting the number of pulses that said binary counter will respond to in order to control said main drive means.

9. A stamp-dispensing apparatus as claimed in claim 8 including a knife mechanism for separating the stamps at their perforated junction, and means for operating said knife means in response to the light impinging on the photodetector.

10. A stamp-dispensing apparatus for dispensing stamps from a main stamp supply roll until all stamps are dispensed therefrom and for thereafter dispensing stamps from an auxiliary stamp roll which comprises:

A. support means for rotatably supporting a main supply roll;

B. support means for rotatably supporting an auxiliary supply roll;

C. Stationarily mounted guide means for guiding stamps from said main and auxiliary supply rolls along main and auxiliary paths, respectively, toward a discharge position with said guide means defining said main and auxiliary paths in at least one local area in positions spaced apart but adjacent to each other, and;

D. drive means adjacent to said local area for engaging stamps in said main path and moving said stamps along said main path with said drive means movably mounted for automatic movement through said main path into engagement with stamps in said auxiliary path when the supply of stamps in said main path is depleted.

11. A stamp-dispensing apparatus for dispensing stamps from a stamp supply roll comprising drive means for moving said stamps along a path in a stamp-dispensing direction, and a stamp position sensing means comprising a light source and a photodetector, said light source being arranged on one side of said path to direct a beam of light through the line of perforations between adjacent stamps in said path and onto the photodetector on the opposite side of said path, and means responsive to the light impinging on the photodetector for controlling said stamp drive means.

12. A stamp-dispensing apparatus as claimed in claim 11 wherein said drive means comprises a main drive wheel and a flexible drive belt on said drive wheel, said flexible drive belt engaging said stamps to move said stamps in said stamp dispensing direction.

13. A stamp-dispensing apparatus as claimed in claim 11 including a knife mechanism for separating the stamps at their perforated junction and means for operating said knife means in response to the light impinging on the photodetector.

14. A stamp dispenser apparatus as claimed in claim 11 wherein said means for controlling said stamp drive means includes an electronic pulse-counting circuit, means for converting the light striking said photodetector into a pulse for each line of perforations passing between the light source and the photodetector, said pulses serving to operate said pulse-counting circuit to control said stamp drive means.

15. Apparatus as claimed in claim 14 wherein said electronic pulse-counting circuit comprises a binary counter and circuit means coupled to said binary counter for preselecting the number of pulses that said binary counter will respond to in order to control said stamp drive means.

16. A stamp dispenser apparatus as claimed in claim 14 including a knife mechanism for separating the stamps at their perforated junction, and means for operating said knife means in response to the light impinging on the photodetector.

17. A stamp-dispensing apparatus comprising a plurality of separate stamp-dispensing units, each stamp-dispensing unit including a stamp drive means for driving the stamps from a stamp supply roll on the associated stamp-dispensing unit in a stamp dispensing direction, a main drive motor, a drive wheel for each of said separate stamp-dispensing units, and means for engaging the drive wheel of each of said dispensing units between said drive motor and the stamp drive means for that dispenser unit to dispense stamps from each particular stamp-dispensing unit, and including a stamp position sensing means comprising a light source and a photodetector, said light source being arranged to direct a beam of light through the line of perforations at the junction between adjacent stamps and onto the photodetector, and means responsive to the light impinging on the photodetector for controlling said drive means engaging means.

18. Stamp-dispensing apparatus for dispensing stamps from a plurality of stamp rolls plurality response to a plurality of different monetary credit signals which comprises:

A. money acceptor means having a plurality of different-output terminals for conducting a plurality of different-output electrical signals indicative of different monetary credits;

B. a plurality of stamp-dispensing units with each of said units having:

1. means for supporting a roll of stamps to be dispensed;
2. drive means for conveying stamps along a path from said roll to a discharge position;
3. pulse-generating means for generating an output pulse for each stamp moved along said path, and;
4. a counter having a zero condition and connected to said pulse-generating means to move one step closer to said zero condition responsive to each pulse received from said pulse generating means with said counter connected to said drive means for operating said drive means when said counter is not in said zero condition, and;

C. an adjustable encoder interconnecting said money acceptor means and all of said dispensing units with said encoder having:

1. a plurality of input terminals connected to said output terminals of said acceptor means;
2. a plurality of output terminals connected to the counter of each of said dispensing units for delivering a respective plurality of different electrical signals to said counter to preset said counter to different numbers of steps away from the zero condition thereof, and;
3. manually adjustable switch means for connecting every one of said input terminals to every one of said output terminals.

19. A stamp-dispensing apparatus for dispensing stamps from a stamp supply roll comprising a drive means for moving said stamps in a stamp-dispensing direction, means for initiating operation of said stamp drive means in response to a signal from a coin acceptor apparatus, electronic pulse-generating means for generating one pulse for each stamp dispensed by the drive means, and an electronic pulse counter circuit adapted to receive said pulses and to operate after a predetermined number of pulses have been received for disabling said stamps drive means.

20. A stamp-dispensing apparatus as claimed in claim 19 including a knife means for cutting the dispensed stamps off from the supply roll at the perforated junction between the last-dispensed stamp and the next stamp in the roll, and means responsive to operation of said electronic pulse counter circuit for operating said knife means to cut said dispensed stamps off from the supply roll.

21. A stamp-dispensing apparatus as claimed in claim 19 wherein said electronic pulse counter circuit comprises a binary counter.

22. A stamp-dispensing apparatus as claimed in claim 20 including a program board having a plurality of electrical jack pairs, each pair adapted to set a separate pulse count in the binary counter, the total pulse count being set by the strapping of a selected one or more of said jack pairs.

23. A stamp-dispensing apparatus comprising a plurality of separate stamp-dispensing units, each stamp-dispensing unit including a stamp drive means for driving the stamps from the associated stamp-dispensing unit in a stamp-dispensing direction, a binary counter circuit associated with each dispenser unit and set to count a predetermined number of input pulses, coin acceptor means for energizing said binary counters, an electrical pulse-generating means for generating a pulse for each stamp dispensed form each stamp dispenser unit, said binary counters each operating upon receipt of said predetermined number of pulses from the associated pulse-generating circuits for operating to terminate the associated stamp drive means, and a program board comprising a plurality of sets of jack pairs, each set associated with one particular monetary coin of a plurality of monetary values, certain ones of the jack pairs in each set being associated with certain ones of the binary counters in each separate stamp dispensing unit, the electrical strapping of the jack pairs associated with each particular coin set and associated with each particular stamp-dispensing binary counter determining whether or not the particular stamp dispenser drive means is made operative upon receipt of that particular coin by the coin acceptor, the particular strapping of one or more of the jack pairs in a set determining the number of pulse counts to be accepted by the binary counter and thus the number of stamps to be dispensed from the particular associated stamp dispenser unit.

24. A detector assembly for detecting the lines of perforations in a strip of stamps which comprises a printed circuit board having an aperture therein adapted to receive a strip of stamps moving in a direction generally perpendicular to said board, a photodetector mounted on said printed circuit board on one side of said aperture for detecting light which passes across said aperture generally parallel to said circuit board, a light source mounted on said circuit board on the opposite side of said aperture from said photodetector, and a cylindrical transparent lens mounted on said circuit board between said light source and said photodetector with the axis of said lens generally perpendicular to the line extending between said light source and said photodetector.

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