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(54) **Apparatus for preventing bills or the like from being pulled out**

Vorrichtung zum Verhindern des Herausziehens von Banknoten oder ähnlichem

Dispositif pour empêcher de retirer des billets de banque ou similaires

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(56) References cited:
DE-A- 3 810 095
DE-A- 4 005 291
GB-A- 2 157 866
US-A- 4 858 744

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Description

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an apparatus for preventing a bill or the like sheet from being pulled out from a bill processing machine such as an automatic vending machine and a money exchanger. In this specification and the claims, the term "bill" is referred to a paper money and the like valuable sheet material.

The Prior Art

Generally, such a money processing machine is provided with a bill or paper money discriminating unit and a bill accumulating unit. The discriminating unit discriminates an inserted genuine bill from a counterfeit one, and the bill accumulating unit accumulates only genuine bills accepted in a bill accumulating box. Bills are conveyed by means of conveyor belts or the like device from an inlet slot along a bill passage to the bill accumulating box. During this transportation, it is judged by the bill discriminating unit whether or not the bill inserted is genuine or counterfeit. Conventionally, a shutter plate is provided to block the bill passage for the purpose of preventing a genuine bill, which has passed the discriminating unit, from being drawn back to the bill inlet slot by an illegal act.

However, in the bill processing machine according to the conventional apparatus, the shutter plate may be manually retreated by inserting an elongated thin plastic plate into the bill passage through the bill inlet slot. Thus, there is a problem in that when a bill with a tape bonded to the trailing end thereof is inserted and accepted as a genuine bill in the apparatus, the shutter plate is retreated in such a manner, and then the bill is liable to be drawn back by pulling the tape.

This problem of manipulating any bill retaining or pull out preventing means is also not solved by the following systems.

US-A-4 858 744 discloses a system according to the precharacterizing portion of claim 1. To monitor the stacking of validated bills and to prevent bulging of the bills within a stack this reference discloses a vane which is operative about a pivot which includes a tab or tongue as hang preventing means centrally positioned along the width of the note or bill path. Furthermore, a counterweight or spring and stop is provided to retain the vane and tab in a normal position. In the disclosed embodiment the stop and counter balance is used instead of spring means to urge the stiff tab in its normal vertical position against the bottom of the bill stack to prevent the same from bulging out. It is stated that the same tab also serves to prevent attempted unauthorized removal of bills from the stack as by stringing. A punch to draw the bill into the stack of bills rides over the tab such that the bill engages the tab causing the vane to actuate an optical interrupt indicating that the bill has been stacked. When the punch is withdrawn the stiff tab and the vane together return to their normal position. In case the counterweight and stop is manipulated the bill is no longer retained by the tab.

DE-A-3 810 095 also concerns a device for protecting banknote-freed machines against unauthorized manipulation. A banknote, or bill, emerges from a bill tester and enters a bill passage in which is disposed a pair of opposed transport rollers. The known device further comprises pull out preventing levers, arranged in the bill passage and abutting there against each other, for preventing a bill from being pulled out from a bill accumulating box. The pull out preventing levers each include teeth and are pivotally supported on supporting means. The teeth of each pull out preventing lever are arranged to traverse the bill passage to block a bill between the teeth of both levers, when the bill has been received in the bill accumulating box. Biasing means in form of a spring bias the pull out preventing levers against one another in the middle of the bill passage to block a bill received in the bill accumulating box from returning to the bill inlet while allowing the pull out preventing levers to be turned by a bill which passes through the bill passage for entering the bill accumulating box by separating the levers so that a small passage is created against the force of the spring.

DE-A-4 005 291 discloses spring biased pull out preventing levers comprising a flap containing a transverse wire resting on a toothed belt of a transporting means in order to prevent a bill in a stack position of being drawn out by means of a tape or the like. The possibility of manipulating the pair of levers again is not taken into consideration.

Accordingly, it is an object of the present invention to provide an apparatus for preventing bills from being pulled out, in which the bills which have been received in the bill accumulating box are prevented from being pulled out by inserting a thin plate, such a plastic plate, from a bill inlet slot along a bill passage.

This object is solved by the characterizing features of claim 1. According to the invention there are provided hang preventing means including a tongue for preventing a bill from hanging from the bill accumulating box into the bill passage. These hang preventing means are biased by first spring biasing means and pivotally supported by supporting means. Separate pull out preventing levers are also supported by said supporting means, however, separately from said hang preventing means and are spring biased by second biasing means toward the bill passage to block a bill, received in the bill accumulating box from returning to the bill inlet while allowing the pull out preventing levers to turn by a bill which passes through the bill passage for entering the bill accumulating box.

In the case where an illegal user inserts the plastic plate the lower end of the bill is brought into engagement

with hooking grooves formed by the pawls of the pull out preventing levers. In case the illegal user inserts the plastic plate further and tries to draw out the bill by retracting the pawls of the pull out preventing levers with the plastic plate, the bill is hooked at the lower edge thereof by the tongue of the hang preventing means. The bills are thus prevented from being pulled out by the tape. When the illegal user tries to draw out the type by force, the tape is cut by a V-shaped edge of the tongue according to a further development. Should the bill pass over the tongue by pulling the tape, the bill is hooked by the pull out preventing levers.

Further advantageous developments are defined in the subclaims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG.1 is a vertical sectional view of a bill processing apparatus according to the present invention;
FIG. 2 is an enlarged perspective view of the pull out preventing unit in FIG. 1;
FIG. 3 is front view, reduced in scale, of the pull out preventing unit of FIG. 2;
FIG. 4 is a plan view of the pull out preventing unit of FIG. 3;
FIG. 5 is a sectional view taken along the line V-V in FIG. 3;
FIG. 6 is a perspective view of the bill hang preventing lever of FIG. 2;
FIG. 7 is an enlarged fragmental vertical sectional view of the bill processing apparatus of FIG. 1, in which a bill with a tape is inserted;
FIG. 8 is an enlarged fragmental vertical sectional view of the bill processing apparatus of FIG. 1, illustrating a state just after the bill with the tape was received in the bill accumulating box;
FIG. 9 is an enlarged fragmental vertical sectional view of the bill processing apparatus of FIG. 1, in which a plastic plate is inserted;
FIG. 10 is an enlarged fragmental vertical sectional view of the bill processing apparatus of FIG. 1, in which the bill is being drawn back;
FIG. 11 is a block diagram of a control system of the apparatus of FIG. 1; and
FIG. 12 is a flow chart illustrating bill pull out preventing operation of the apparatus of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 is a vertical section of a bill processing system to which the present invention is applied. The bill processing system includes a housing 1, which has a bill insertion slot 2 formed through the front wall thereof. A bill is allowed to be inserted into the bill insertion slot 2 when a cover 3 is swung upwards. Within the housing 1 there are provided a horizontal bill passage 4 and a vertical bill passage 5 which communicates to the horizontal bill passage 4 in an L shape. The horizontal bill passage 4 is formed to communicate to the bill insertion slot 2. As means for discriminating counterfeit bills from genuine bills, a magnetic head 6 is arranged on the upper side of the horizontal bill passage 4. A head pinch roller 7 is arranged to oppositely face the magnetic head 6. Pulleys 8 and 9 are disposed upstream and downstream of the pinch roller 7, respectively. An endless belt 10 extends in a parallel fashion between and around the pulleys 8 and 9. The belt 10 is moved by movement of an endless belt 15 which extends around a driven pulley 14 since the pulley 9 is in contact with the belt 15. A pinch roller 11 presses the pulley 8 through the belt 10.

On one side or front side of the vertical bill passage 5, there are provided a pair of drive pulleys 12 and 12 at a horizontal distance although only one drive pulley 12 is shown. The drive pulleys 12 and 12 are rotated by the conveying motor 51. A pair of driven pulleys 14 and 14 are arranged at a lower portion of the housing 1 to correspond to the drive pulleys 12 and 12, respectively, and thereby two pairs of drive pulleys 12 and driven pulleys 14 are provided. An accumulating belt 15 extends in a parallel manner between and around each pair of the drive pulley 12 and the driven pulley 14. Adjacent to the accumulating belt 15 there is provided a bill stacker unit 16, which includes a pushing plate 17, a pair of links 19 and 20, and an eccentric cam 21. The pushing plate 17 is adapted to push backwardly a bill B which has been conveyed along the vertical bill passage 5 to a stacking position. Each of the links 19 and 20 is pivotally attached at its one end to the front surface of the pushing plate 17, and is slidably mounted at the other end to a fixed shaft 18A, 18B which passes through a slot 19A, 20A form through the link. The eccentric cam 21 is mounted on an output shaft of a stack motor unit 55 to rotate around a rotation center O. The pushing plate 17 is spring biased toward the bill stacker unit 16 by a pair of coil springs 22 and 22. On the other side of the vertical bill passage 5, there is provided an accumulating box 23 which accumulates in it bills B urged toward it by the bill stacker unit 16. A compressing plate 24 is arranged within the accumulating box 23 and is urged forwardly or to the left in FIG. 1 by a spring bar 25.

In the connected area between the horizontal bill passage 4 and the vertical bill passage 5 there is provided a shutter plate 26, which is pivotally mounted to the housing 1 through a pivot 26B. The shutter plate 26 is spring biased in the counterclockwise direction in FIG. 1, and normally closes or blocks the vertical bill passage 5 at its distal end 26A as shown. Thus, the shutter plate 26 is rotated in the clockwise direction by a bill B, which is being transported to the accumulating box 23 in a bill receiving direction, so that the shutter plate 26 is automatically retracted away from vertical bill passage 5. This causes a shutter switch 53 (FIGS. 7-10) to be turned on. On the other hand, the shutter plate 26 serves as a stop-

per to a bill B which is moving in the opposite direction or toward the bill inlet slot 2.

The accumulating box 23 is provided with a bottom plate 27. A pull out preventing unit 28 is arranged below the bottom plate 27. The pull out preventing unit 28 includes, as shown in FIG. 2, an upwardly opening channel-shaped bracket 29, a pull out preventing lever 30, a bill hang preventing lever 31, and a pivotal shaft 32 for pivotally connecting the pull out preventing lever 30 and the bill hang preventing lever 31 to the bracket 29. The bracket 29 includes a pair of attaching flanges 29a and 29a, a pair of opposing side bearing plates 29b and 29b, and a bottom plate 29c which integrally interconnects the side bearing plates 29b and 29b. The bottom plate 29c is provided in each of opposite end portions of the front edge thereof with an engaging slot 29d.

The pull out preventing lever 30 has a pair of pawls 33 and 33 which are integrally connected through a connecting plate 35. Each of the pawls 33 and 33 extends diagonally upwards to define a hook groove 34 in the upper edge thereof. The pull out preventing lever 30 is arranged so that the pawls 33 and 33 extend away from the bill insertion slot 2. The connecting plate 35 has an inverted-L shaped spring engaging portion 36 integrally formed at the upper flange thereof with the left pawl 33 in FIG. 2. A first spring 37 is fitted around the pivotal shaft 32, and one end thereof engages with the spring engaging portion 36 whereas the other end is inserted into a spring holding hole 38. The pull out preventing lever 30 is spring biased by the first spring 37 in the clockwise direction in FIG. 5 or in the direction to project the tip 33a of each pawl 33 forwardly. The tip 33a of each pawl 33 is placed at the maximum projection position when the pawl 33 is brought into engagement with the edge of the corresponding engaging groove 29d of the bottom plate 29c of the bracket 29.

As clearly shown in FIGS. 2 and 6, the bill hang preventing lever 31 is provided with a channel-shaped pivotally supported portion which includes a pair of bearing eye portions 31a and 31b and an interconnecting plate 31c interconnecting the bearing eye portions 31a and 31b. The pivotal shaft 32 passes through the bearing eye portions 31a and 31b. The interconnecting portion 31c has a tongue 39 integrally and vertically formed with a portion thereof close to the spring engaging portion 36 of the pull out preventing lever 30. The tongue 39 effectively prevents lower edges of bills received in the accumulating box 23 from suspending into the vertical bill passage 5. A second spring 40 is wound around the pivotal shaft 32, and one end thereof is inserted into a spring holding hole 41 formed through the bottom plate 29c of the bracket 29 whereas the other end is engaged with the rear edge of the interconnecting plate 31c. The bill hang preventing lever 31 is spring biased by the second spring 40 to direct the tongue 39 normally upwardly. The eye portion 31b is provided with a stopper 42 which holds the tongue 39 in the vertical position in FIG. 2 by abutting against the edge of the engaging groove 29d remote from the tongue 39.

Further as shown in FIG. 1, inlet sensors 41R and 41L are arranged just behind the bill insertion slot 2 to detect a bill inserted. The reference numeral 44 designates a stacker switch which detects whether or not the accumulating box 23 is set in position.

The bill pull out preventing apparatus is provided with a control unit 50 (FIG. 11), which includes a conventional central processing unit (CPU) and a read only memory (ROM) with a control program stored in it.

Now, referring to FIG. 12, the routine of preventing bills from being pulled out will be illustrated.

Firstly, when the stacker switch 44 is on (step S1) and the shutter switch 53 is off (step S2) after the power is turned on, according to the program of the ROM the CPU instructs the stack motor unit 55 to be energized (step S3). The CPU is placed in a standby state after the eccentric cam 21 made two revolutions (steps S4 and S5). When in the step S4 the eccentric cam 21 does not make 5 two revolutions, it is presumed that the accumulating box 23 is full up. Thus, necessary steps, such as bill receipt prohibition, are executed. In the step S4 it is judged whether or not the accumulating box 23 is full up of bills when the power is turned on. Although it is possible to push and accumulate bills in the accumulating box 23 by one revolution of the eccentric cam 21, in this embodiment the eccentric cam 21 makes two revolutions to positively place bills in the accumulating box 23. These revolutions are detected by a signal from the stack motor unit 55. When the shutter switch 53 is on in the step S2, it is liable that a bill is still left in the bill passage within the discriminating unit. In this event, the CPU controls so that the conveying motor 51 is reversed (step S25) to return the remaining bill to the bill insertion slot 2. When the bill is completely placed back to the bill insertion slot 2, the inlet sensors 41R and 41L send signals to the CPU, and then the CPU stops reversing of the motors (step S30), and thus the CPU returns to the step S3. When the bill is not returned, the check of the step S26 is repeated for about 3 seconds (steps S26 and S27). After lapse of 3 seconds, the reversing of the conveying motors is stopped (step S28). After the stopping of the motors, the CPU judges whether or not there is a jam of a bill or bills (step S29). This judgement is repeated until the jam is removed, and when the jam is removed, the CPU returns to the step S3.

When in the standby state, the shutter switch 53 is not on (step S6), the CPU goes to the step S7, where it is judged based on signals sent from the inlet sensors 41R and 41L whether or not the inlet sensors 41R and 41L are tuned on. When a bill B is inserted into the bill insertion slot 2, the inlet sensors 41R and 41L detect this and turn on, and then the conveying motors 51 is energized to introduce the inserted bill B into the bill passages 4 and 5 by the belts 10 and 15 (step S8).

When the shutter switch 53 is turned on in the step S6, it is presumed that an illegal action was taken, and the CPU enters a routine 1 and goes to the step S21. In

the step S21, the CPU energises the stack motor 55 to rotate the eccentric cam 21 to the top dead center and thereby the pushing plate 17 is raised to the top dead center position. When the shutter switch 53 is still on, the pushing plate 17 is kept urging the accumulated bills of the accumulating box 23 in the top dead center state against the compressing plate 24 which is spring biased to the left in FIG. 1 by the spring bar 25.

When the illegal action is stopped, the shutter plate 26 causes the shutter switch 53 to be turned off, and thus the CPU goes from the step S22 to the step S23. After about three seconds, in the step S24 the CPU energizes stack motor 55 to rotate the eccentric cam 21 so as to return the pushing plate 17 to the standby state with the eccentric cam 21 placed at the bottom dead center (FIG. 1). Thus, the CPU returns to the standby state in the step 5 of the routine 3.

The illegal action may be conducted by the following procedures: a genuine bill having a tape attached to its one end is inserted to the bill processing machine; the bill is stacked in the accumulating box 23 in the routine of steps S7 to S17; and then it is tried to draw back the bill by pulling the tape. More specifically, to retract the shutter plate 26 from the bill passage, a thin plastic plate or the like plate is inserted through the bill inlet slot 2 to push the shutter plate (the shutter switch 53 is turned on). In this state, it is tried to draw back the bill by pulling the tape.

According to the present invention, after the step S5, the CPU receives a signal representing that the shutter switch 53 is on or off, and when the shutter switch 53 is on, the CPU executes procedures of steps S20 to S24. The stacked genuine bill with the tape is urged by the pushing plate 17 to the top dead center position due to the rotation of the eccentric cam 21, and hence it is not possible to draw back the bill.

Returning to illustration of the normal route after the conveying motors are energized in the step S8, it is detected by the magnetic head 6 whether or not the bill is magnetized when the leading end of the bill reaches the magnetic head 6. When the bill is magnetized, according to a signal from the magnetic head 6 the CPU judges for the first stage that the bill is genuine (step S9), and then the bill is transported further to reach the shutter switch 53. The bill turns and keeps the shutter switch 53 on, during which the CPU judges whether or not the bill has a magnetic pattern of the genuine bill (step S10). When in this step an affirmative result is obtained, the bill is transported to and stopped at the stack position (steps S12 and S13) after the bill passes the shutter plate 26 causing the shutter switch 53 to be turned off.

When in the step S10 it is judged that the bill is not genuine, the conveying motors are reversed to return the bill to the bill insertion slot 2 as in the steps S25 to S30 (steps S31 to S36).

On the other hand, after the conveying motors are stopped in the step S13, the CPU energizes the stack motor unit 55 to rotate the eccentric cam 21, and thereby the bill is stacked (step S14). When the eccentric cam 21 makes two revolutions after the stack operation (steps S15 and S16), the CPU outputs a genuine bill signal (step S17), and returns to the standby state. In the case where in the step S16 it is detected that the eccentric cam 21 did not make two revolutions, the CPU judges that the accumulating box 23 is full up, and takes necessary steps such as prohibition of receiving of bills.

When in the step S9 the magnetic head 6 outputs a signal representing that the bill is not magnetized, it is likely that a nonmagnetic plastic plate or the like is inserted into the bill passage for illegally pulling out a bank. Furthermore, when the shutter switch 53 is turned on, that is, when the shutter switch 53 is turned on by a nonmagnetic insert (step S19), the CPU stops the conveying motors (step S20). Subsequently, the CPU energizes the stack motor unit 55 to rotate the eccentric cam 21, thereby urging the pushing plate 17 to the top dead center position toward the accumulating box 23 (step S21).

Until the shutter switch 53 is turned off, this state is held (step S22). When the shutter switch 53 is turned off, that is, when the insert is drawn out, a negative result is obtained in the step S22, and then after about 3 seconds (step S23), in the step S24 the CPU controls the stack motor 55 to rotate the eccentric cam to return the pushing plate 17 to the normal standby position (as shown in FIG. 1).

There is a possibility that when the accumulation box 23 is full of bills, a thin plastic plate or the like is illegally inserted from the bill insertion slot 2 into the bill passage 4. For example, the accumulating box 23 may become full up when a genuine bill having a tape attached to it is inserted. In this event, to pull out the bill the bill passage may be released by retracting the distal end 26A of the shutter plate 26 with the inserted thin plate. This causes the shutter switch 53 to turn on, and the CPU goes to the step S21, and then as already described the stack motor unit 55 is energized to rotate the eccentric cam 21, and thereby the pushing plate 17 is pushed into the accumulating box 23, and is held in this position. When the shutter switch 53 is off in the step S37, on the basis of a signal sent from the stacker switch 44 the CPU makes a judgement as to whether or not the stacker switch 44 is on or off (step S38). When the stacker switch 44 is off, the accumulating box 23 is removed and the bills stacked in it are taken out. Then, the accumulating box 23 is set in position again. After receipt of a signal representing that the stacker switch is on (step S39), the CPU returns to the standby state (step S5).

Referring to FIGS. 7 to 10, it will be described how the bill pull out preventing apparatus prevents pulling out of a bill by an illegal action such that a genuine bill B with a tape T attached to its trailing end is accepted and then it is tried to draw back the bill.

In FIG. 7, the genuine bill B with the tape T is inserted into the bill passage 4 through the bill inlet slot 2 as in the usual case, and the magnetic head 6 sends a signal representing the bill B is genuine. Subsequently, the bill

B is conveyed in the bill passage 4, pushing the projecting end 26A of the shutter plate 26 outside the bill passage 4, and then the bill B pushes the pull out preventing levers 30 to retract against the spring force of the coil spring 37, and is thus introduced into the bill passage 5 (FIG. 7). When the bill B reaches the stack position where it faces the pushing plate 17, the conveying of the bill B is stopped, and the eccentric cam 21 makes two revolutions, so that the pushing plate 17 makes two reciprocal movements. During the backward movement of the pushing plate 17, the pushing plate 17 turns the bill hang preventing lever 31 against the coil spring 40 by the lower end thereof in the counterclockwise direction as shown in FIG. 5. In this state, the pushing plate 17 pushes the bill B into the accumulating box 23 against the compressing plate 24 (FIG. 8). Although the pushing plate 17 may make a single reciprocal movement by a revolution of the eccentric cam 21, it is preferable to have the pushing plate make two reciprocal movements as in this embodiment to positively accumulate bills.

In the case where as shown in FIG. 9 it is tried to pull out the bill B by moving the projecting end 26A of the shutter plate 26 away from the bill passage with a plastic plate 43 which has been inserted through the bill inlet slot 2, the lower end of the bill B is brought into engagement with the hook grooves 34 of the pull out preventing lever 30, and thereby pulling out of the bill B is prevented.

In the case where an illegal user inserts the plastic plate 43 further and tries to draw out the bill B by retracting the pawls 33 of the pull out preventing lever 30 with the plastic plate 44, the bill B is hooked at the lower edge thereof by the tongue 39. The bills B are thus prevented from being pulled out by the tape T. When the illegal user tries to draw out the tape T by force, the tape T is cut by the V-shaped edge 39a of the tongue 39. Should the bill B pass over the tongue 39 by pulling the tape T, the bill B is hooked by the hooking grooves 34 of the pull out preventing lever 30.

Claims

1. An apparatus for preventing a bill from being pulled out, in which a bill inserted from a bill inlet is judged as to whether or not it is genuine, and only a genuine bill is passed into a bill accumulating box through a bill passage, comprising:

   pull out preventing means (28), arranged in the bill passage (5), for preventing a bill from being pulled out from the bill accumulating box (23), the pull out preventing means (28) including:
   hang preventing means (31) including a tongue (39) for preventing a bill from hanging from the bill accumulating box (23) into the bill passage (5);
   supporting means (29, 32) for pivotally supporting the hang preventing means (31); and
   first biasing means (40) for spring biasing the hang preventing means (31) to prevent a bill, received in the bill accumulating box (23), by means of the tongue (39) from hanging from the bill accumulating box, while allowing the tongue (39) to be turned by a bill which passes through the bill passage (5) for entering the bill accumulating box, characterized by further comprising pull out preventing levers (30, 30) each including a pawl (33) and being separately from said hang preventing means (31) pivotally supported by said supporting means (29, 32), the pawl (33) being arranged to traverse the bill passage (5) to block a bill, received in the bill accumulating box (23) from returning to the bill inlet (2); and
   second biasing means (37) for spring biasing the pull out preventing levers (30, 30) toward the bill passage (5) to block a bill, received in the bill accumulating box (23) from returning to the bill inlet (2) while allowing the pull out preventing levers (30, 30) to be turned by a bill which passes through the bill passage for entering the bill accumulating box.

2. An apparatus as recited in Claim 1, wherein the supporting means comprises a bracket (29) and a pivotal shaft (32) pivotally supported on the bracket; and the pull out preventing levers (30, 30) and the hang preventing means (31) are pivotally supported on the pivotal shaft (32).

3. An apparatus as recited in Claim 2, wherein the hang preventing means (31) is spring biased by the first biasing means (40) so that the tongue (39) is normally vertically placed.

4. An apparatus as recited in Claim 3, wherein the first biasing means comprises a coil spring (40) wound around the pivotal shaft (32).

5. An apparatus as recited in any of claims 2 to 4, wherein the tongue (39) comprises a V-shaped edge (39a).

Patentansprüche

1. Vorrichtung zum Verhindern des Herausziehens einer Banknote, in welcher eine von einem Banknoteneinlaß eingeführte Banknote dahingehend beurteilt wird, ob sie gültig ist, und nur eine gültige Banknote durch eine Banknotenpassage in einen Banknotensammelbehälter geführt wird, aufweisend:

   eine Herauszieh-Verhinderungseinrichtung (28), die zur Verhinderung des Herausziehens der Banknote aus dem Banknotensammelbehälter (23) in der Banknotenpassage (5) ange-

ordnet ist, wobei diese Herauszieh-Verhinderungseinrichtung (28) umfaßt:
eine Hineinhängungs-Verhinderungseinrichtung (31), die eine Zunge (39) umfaßt, zur Hinderung einer Banknote daran, aus dem Banknotensammelbehälter (23) in die Banknotenpassage (5) hineinzuhängen;
eine Halterungseinrichtung (29, 32), die die Hineinhängungs-Verhinderungseinrichtung (31) schwenkbar haltert; und
eine erste Vorbelastungseinrichtung (40), die die Hineinhängungs-Verhinderungseinrichtung (31) federbelastet, so daß diese mittels der Zunge (39) eine in dem Banknotensammelbehälter (23) aufgenommene Banknote daran hindert, aus dem Banknotensammelbehälter zu hängen, während der Zunge (39) ermöglicht ist, durch eine die Banknotenpassage (5) zum Eintritt in den Banknotensammelbehälter passierende Banknote gedreht zu werden,

dadurch gekennzeichnet, daß sie ferner aufweist

Herauszieh-Verhinderungshebel (30,30), die jeweils eine Sperrklaue (33) umfassen und separat von der Hineinhängungs-Verhinderungseinrichtung (31) schwenkbar durch die Halterungseinrichtung (29, 32) gehaltert vorgesehen sind, wobei die Sperrklaue (33) dazu ausgelegt ist, die Banknotenpassage (5) zur Blockierung einer im Banknotensammelbehälter (23) aufgenommenen Banknote im Hinblick auf eine Rückkehr zum Banknoteneinlaß (2) zu durchsetzen; und
eine zweite Vorbelastungseinrichtung (37) zur Federbelastung der Herauszieh-Verhinderungshebel (30,30) zur Banknotenpassage (5) hin zur Blockierung einer im Banknotensammelbehälter (23) aufgenommenen Banknote im Hinblick auf eine Rückkehr zum Banknoteneinlaß (2), während es den Herauszieh-Verhinderungshebeln (30,30) ermöglicht ist, durch eine die Banknotenpassage zum Eintritt in den Banknotensammelbehälter passierende Banknote gedreht zu werden.

2. Vorrichtung nach Anspruch 2, in welcher die Halterungseinrichtung einen Träger (29) und eine drehbar am Träger gehalterte Drehwelle (32) umfaßt; und die Herauszieh-Verhinderungshebel (30,30) und die Hineinhängungs-Verhinderungseinrichtung (31) schwenkbar an der Drehwelle (32) gehaltert sind.

3. Vorrichtung nach Anspruch 2, in welcher die Hineinhängungs-Verhinderungseinrichtung (31) durch die erste Vorbelastungseinrichtung (40) so federbelastet ist, daß die Zunge (39) normalerweise vertikal plaziert ist.

4. Vorrichtung nach Anspruch 3, in welcher die erste Vorbelastungseinrichtung eine Schraubenfeder (40) umfaßt, die um die Drehwelle (32) gewunden ist.

5. Vorrichtung nach einem der Ansprüche 2 bis 4, in welcher die Zunge (39) eine V-förmige Kante (39a) aufweist.

Revendications

1. Dispositif pour empêcher de retirer un billet, dans lequel un billet introduit à partir d'une entrée de billet est reconnu être authentique ou non, et dans lequel seul un billet authentique est transporté jusque dans une boîte d'emmagasinage de billets par l'intermédiaire d'un passage de billet, comprenant :

des moyens empêchant le retrait (28), disposés dans le passage de billet (5) pour empêcher un billet d'être ressorti de la boîte d'emmagasinage (23), les moyens empêchant le retrait (28) comprenant :
des moyens empêchant le débordement (31) comprenant une languette (39) destinée à empêcher un billet de déborder de la boîte d'emmagasinage de billets (23) jusque dans le passage de billet (5),
des moyens de support (29, 32) destinés à supporter avec faculté de pivotement les moyens empêchant le débordement (31), et
des premiers moyens de sollicitation (40) destinés à solliciter par ressort les moyens empêchant le débordement (31) afin d'empêcher, au moyen de la languette (39), un billet reçu dans la boîte d'emmagasinage de billets (23) de dépasser de la boîte d'emmagasinage de billets, tout en permettant à la languette (39) d'être tournée par un billet empruntant le passage de billet (5) pour pénétrer dans la boîte d'emmagasinage de billets, caractérisé par ce qu'il comprend en outre
des leviers empêchant le retrait (30, 30) comprenant chacun un doigt (33) et étant, indépendamment desdits moyens empêchant le débordement (31), supportés avec faculté de pivotement par lesdits moyens de support (29, 32), le doigt (33) étant conçu pour traverser le passage de billet (5) afin d'empêcher un billet, reçu dans la boîte d'emmagasinage de billets (23), de revenir à l'entrée de billet (2), et
des seconds moyens de sollicitation (37) pour solliciter par ressort les leviers empêchant le retrait (30, 30) en direction du passage de billet (5) afin d'empêcher un billet, reçu dans la boîte d'emmagasinage de billets (23), de revenir à

l'entrée de billet (2), tout en permettant aux leviers empêchant le retrait (30, 30) d'être tournés par un billet qui emprunte le passage de billet pour pénétrer dans la boîte d'emmagasinage de billets.

2. Dispositif selon la revendication 1, dans lequel les moyens de support comprennent un support (29) et un arbre de pivot (32) supporté avec faculté de pivotement sur le support, et dans lequel les leviers empêchant le retrait (30, 30) et les moyens empêchant le débordement (31) sont supportés avec faculté de pivotement sur l'arbre de pivot (32).

3. Dispositif selon la revendication 2, dans lequel les moyens empêchant le débordement (31) sont sollicités par ressort par les premiers moyens de sollicitation (40), de sorte que la languette (39) est normalement placée verticalement.

4. Dispositif selon la revendication 3, dans lequel les premiers moyens de sollicitation comprennent un ressort hélicoïdal (40) enroulé autour de l'arbre de pivot (32).

5. Dispositif selon l'une quelconque des revendications 2 à 4, dans lequel la languette (39) comprend une arête (39a) en forme de V.

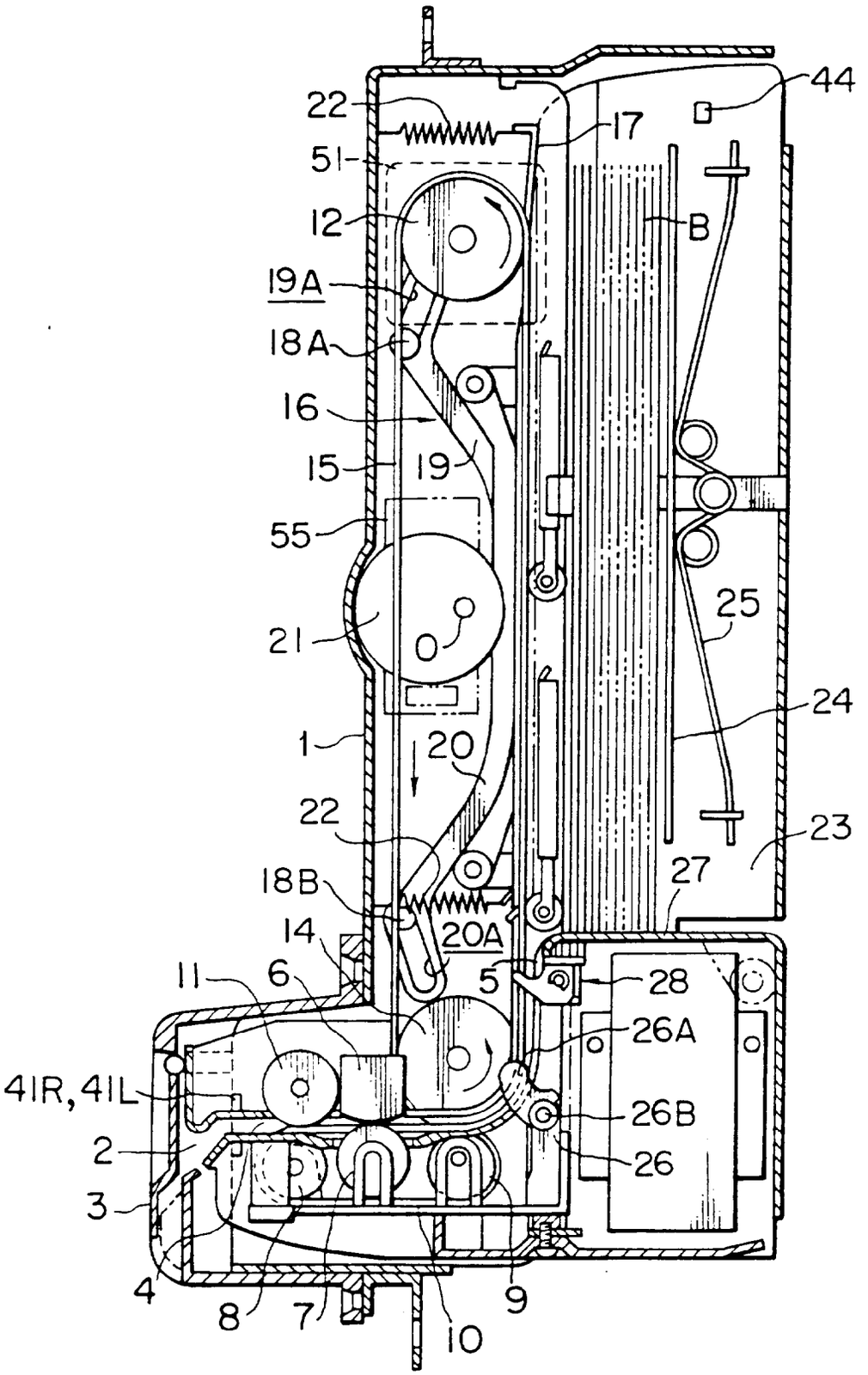

22
51
12
19A
18A
16
15
55
21
1
22
18B
14
11
6
41R, 41L
2
3
4
8
7
10
9
5
20A
20
19
17
44
B
25
24
23
27
28
26A
26B
26

FIG. 1

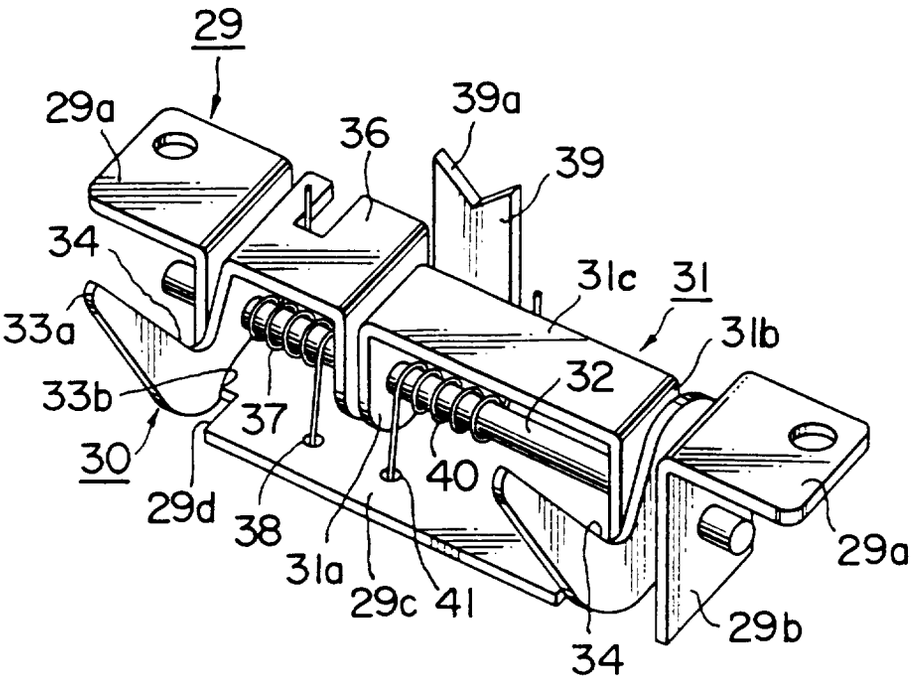

29
29a
39a
36
39
34
31c
31
33a
31b
32
33b
37
30
40
29d
38
31a
29c
41
29a
29b
34

FIG. 2

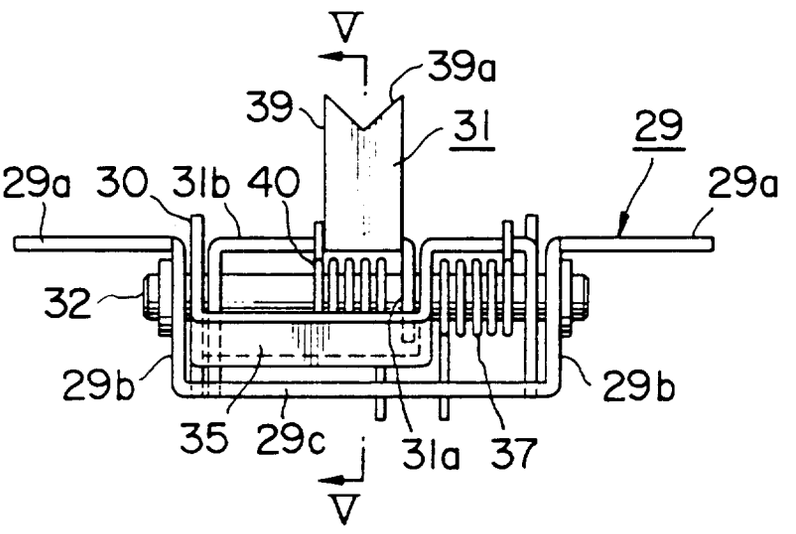

V
39a
39
31
29
29a
30
31b
40
29a
32
29b
29b
35
29c
31a
37
V

FIG. 3

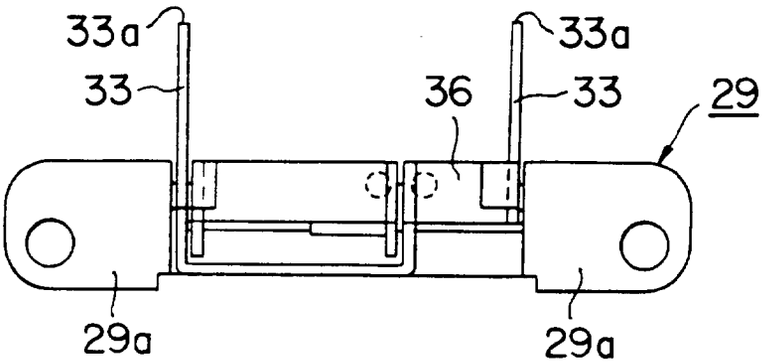


FIG. 4

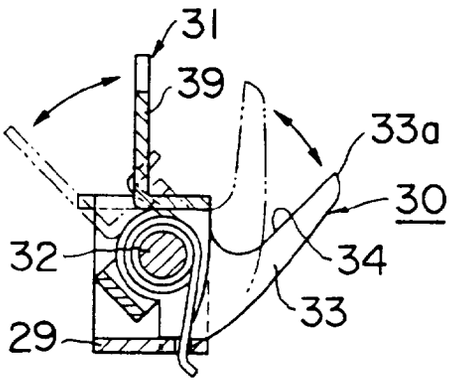


FIG. 5

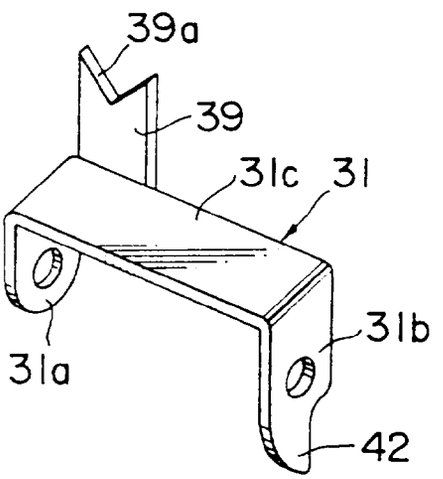


FIG. 6

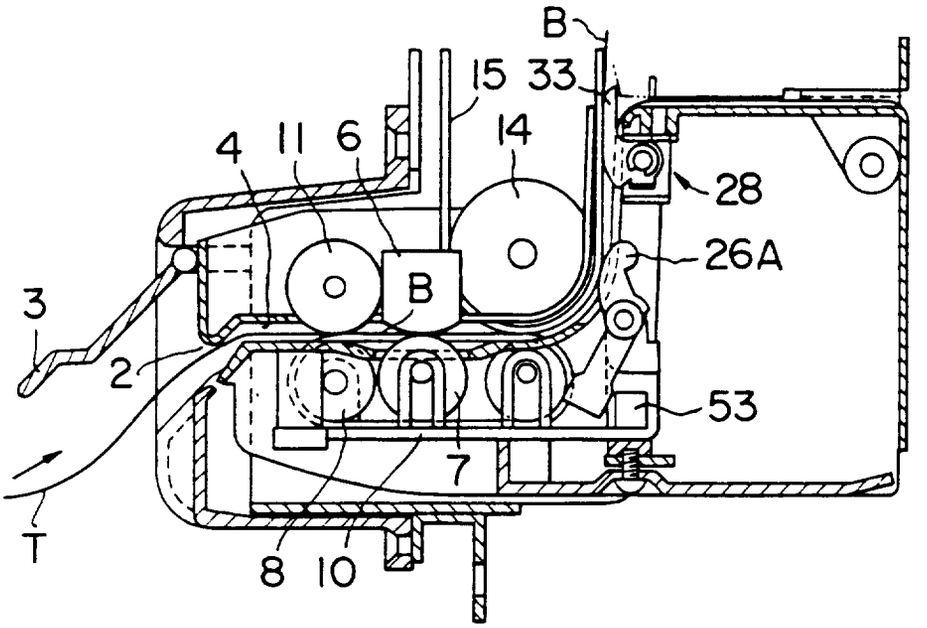

B
15
33
4
11
6
14
28
26A
3
B
2
53
7
T
8
10

FIG. 7

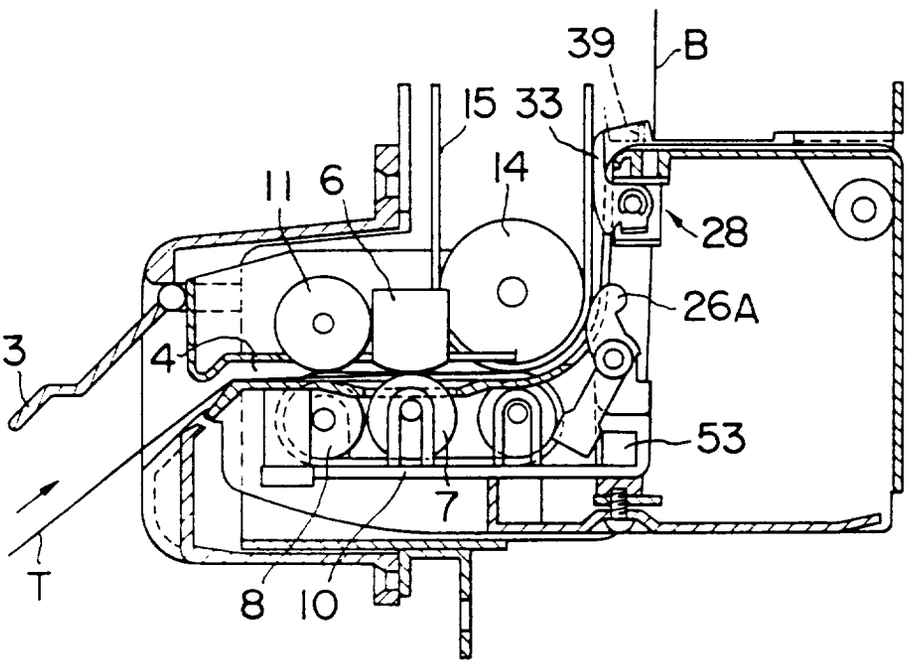

39
B
15
33
11
6
14
28
26A
3
4
53
7
T
8
10

FIG. 8

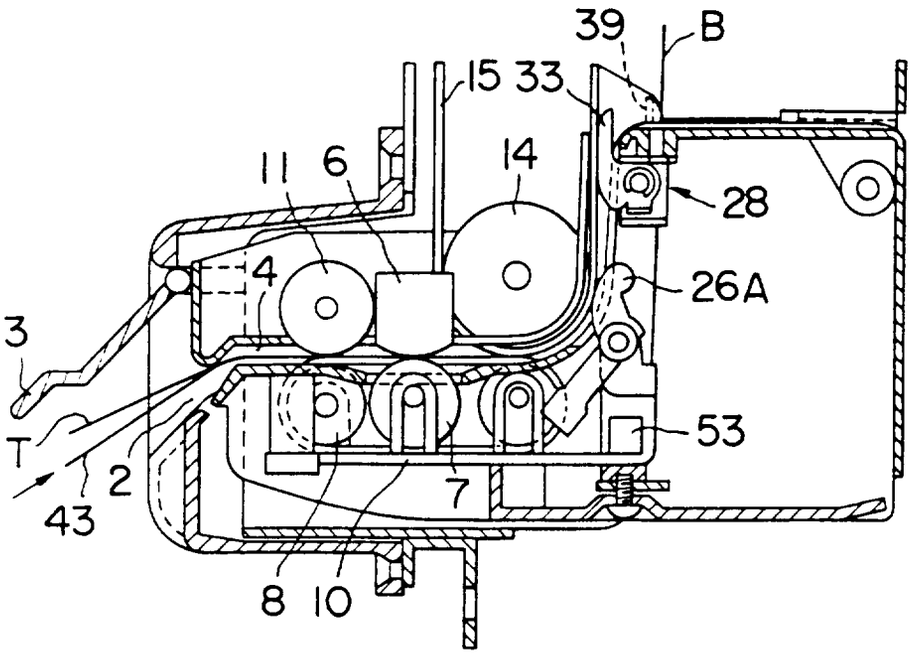

39
B
15 33
11
6
14
28
4
26A
3
53
T
2
7
43
8
10

FIG. 9

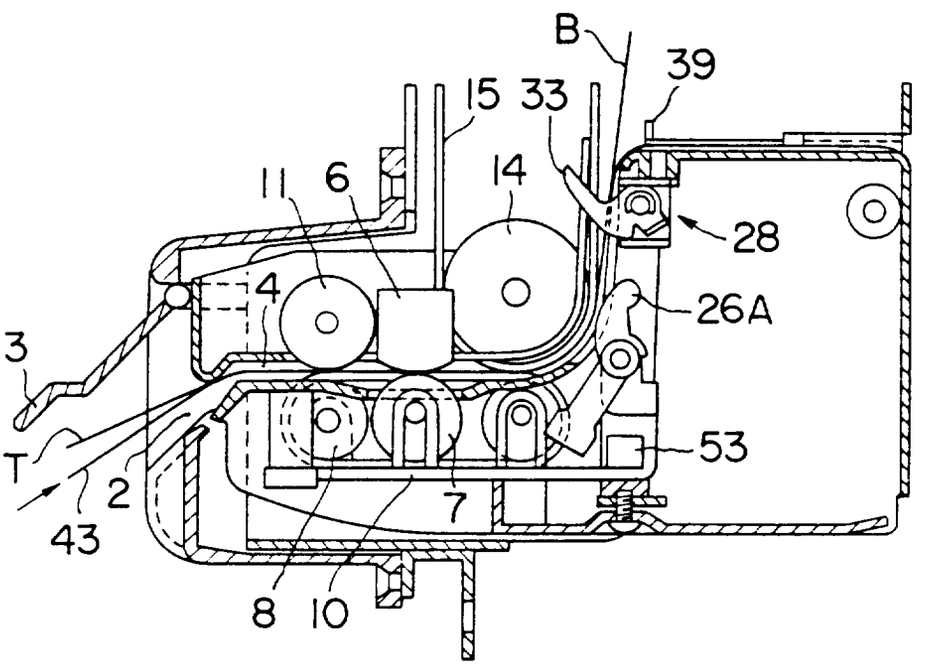

B
39
15 33
11
6
14
28
4
26A
3
53
T
2
7
43
8
10

FIG. 10

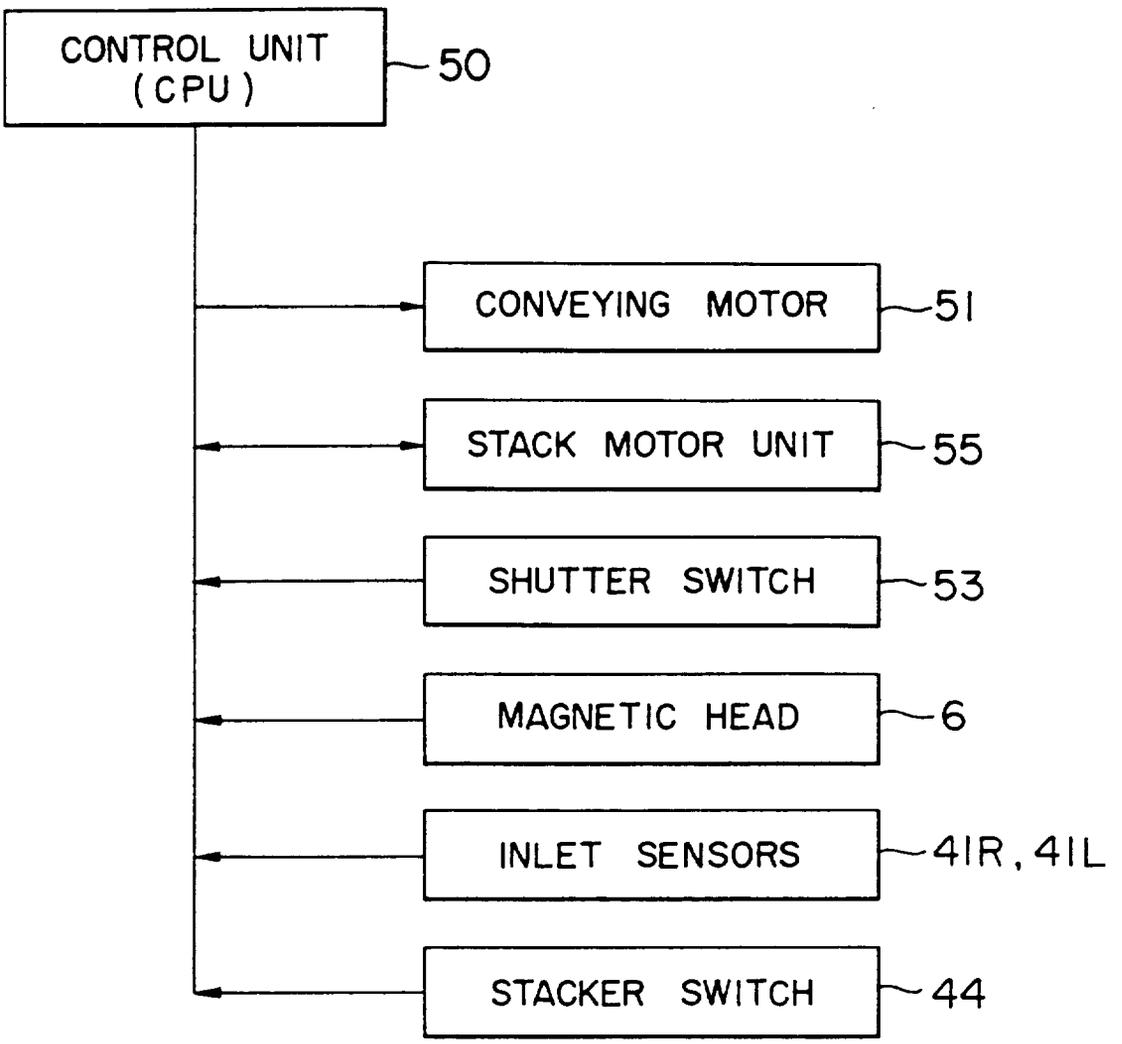

CONTROL UNIT
(CPU)
50
CONVEYING MOTOR
51
STACK MOTOR UNIT
55
SHUTTER SWITCH
53
MAGNETIC HEAD
6
INLET SENSORS
41R, 41L
STACKER SWITCH
44

FIG. 11

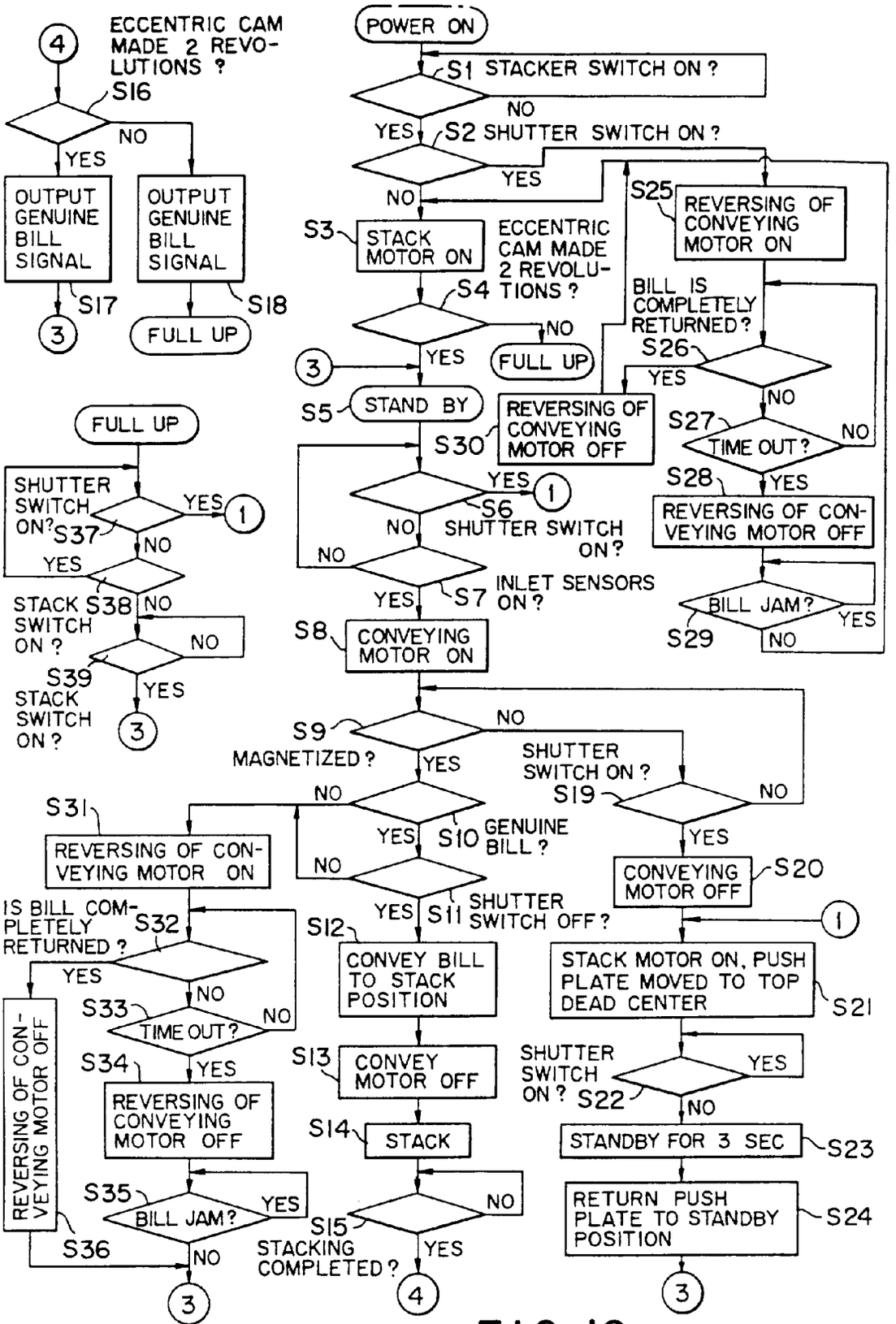

POWER ON
S1 STACKER SWITCH ON ?
NO
YES
S2 SHUTTER SWITCH ON ?
YES
NO
S3 STACK MOTOR ON
ECCENTRIC CAM MADE 2 REVOLUTIONS ?
S4
NO
FULL UP
YES
3
S5 STAND BY
S30 REVERSING OF CONVEYING MOTOR OFF
YES
1
S6 SHUTTER SWITCH ON ?
NO
NO
YES
S7 INLET SENSORS ON ?
S8 CONVEYING MOTOR ON
S25 REVERSING OF CONVEYING MOTOR ON
BILL IS COMPLETELY RETURNED ?
S26
YES
NO
S27 TIME OUT ?
NO
YES
S28 REVERSING OF CONVEYING MOTOR OFF
BILL JAM ?
YES
S29
NO
4
ECCENTRIC CAM MADE 2 REVOLUTIONS ?
S16
NO
YES
OUTPUT GENUINE BILL SIGNAL
OUTPUT GENUINE BILL SIGNAL
S17
S18
3
FULL UP
FULL UP
SHUTTER SWITCH ON ?
S37
YES
1
NO
YES
STACK SWITCH ON ?
S38
NO
NO
S39 STACK SWITCH ON ?
YES
3
S9 MAGNETIZED ?
NO
YES
SHUTTER SWITCH ON ?
S19
NO
YES
NO
YES
S10 GENUINE BILL ?
S31
REVERSING OF CONVEYING MOTOR ON
IS BILL COMPLETELY RETURNED ?
S32
YES
NO
S33 TIME OUT ?
NO
YES
S34 REVERSING OF CONVEYING MOTOR OFF
REVERSING OF CONVEYING MOTOR OFF
S35 BILL JAM ?
YES
NO
S36
3
NO
YES
S11 SHUTTER SWITCH OFF ?
S12 CONVEY BILL TO STACK POSITION
S13 CONVEY MOTOR OFF
S14 STACK
S15 STACKING COMPLETED ?
NO
YES
4
CONVEYING MOTOR OFF
S20
1
STACK MOTOR ON, PUSH PLATE MOVED TO TOP DEAD CENTER
S21
SHUTTER SWITCH ON ?
S22
YES
NO
STANDBY FOR 3 SEC
S23
RETURN PUSH PLATE TO STANDBY POSITION
S24
3

FIG. 12