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(54) **Processing financial instruments**

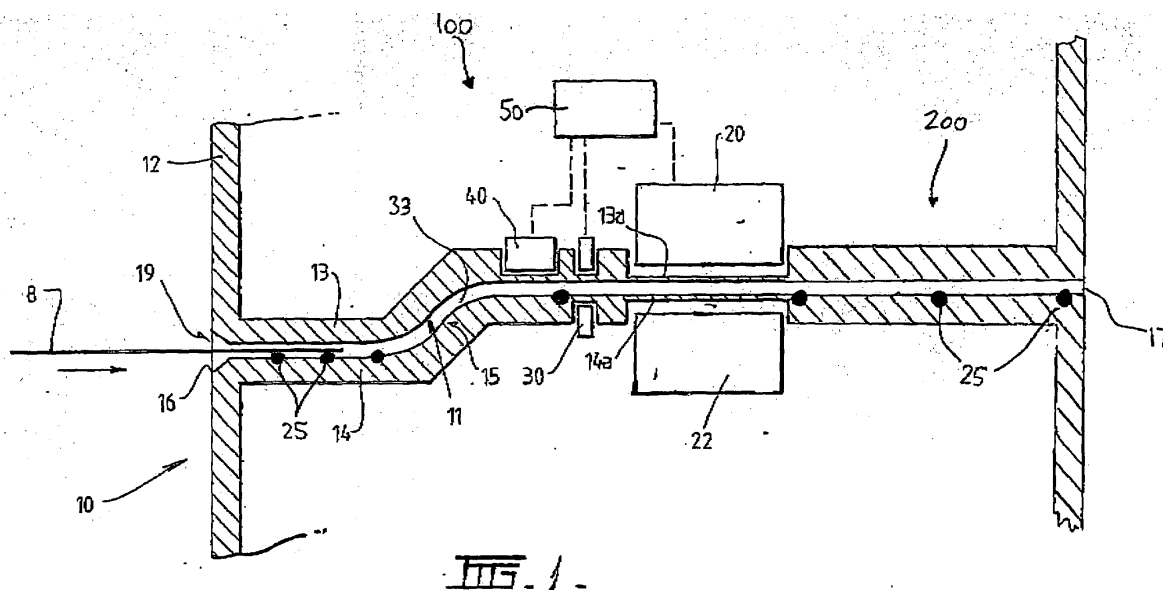
(57) Apparatus for processing financial instruments, comprising:

a receiving station for receiving a financial instrument delivered from an external source and scanning the financial instrument to identify it;

a holding station at or separate from said receiving station for securely holding the financial instrument in temporary storage; and

respective means to convey the financial instrument to the holding station and then to selectively move the temporarily stored instrument out of the holding station to either direct it to a stack or other bulk storage device or to return the instrument to the external source; and

a controller responsive to one or more import signals to effect said selective movement of a financial instrument temporarily stored at said holding station.



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Description**Field of the Invention**

[0001] This application relates to the processing of financial instruments such as banknotes and involves a function that can be usefully incorporated into a banknote Validator, especially where it is used in an AWP or similar "reward for play" game machine. The validator may be one that scans any financial instrument such as conventional banknotes, coupons, bar coded coupons or any other printed material that is visually identifiable as a source of credit.

Background Art

[0002] In an AWP (Amusement With Payout) machine or any other machine incorporating a cash payout, the player pays a stake to play a game involving a degree of skill. Players can therefore win more from the game than their original stake, and receive a payout of their winnings.

[0003] Traditionally such machines rely upon holding a float in coins within a payout hopper, in order to pay out winnings from the game. When the machines accepted only coins as payment, these coins were added to the float. Hence, statistically, the float could be relied on to last for long periods of time.

[0004] However, more recently such machines are also being fitted with banknote validators or similar coupon reading systems. This is done to offer players greater flexibility in paying their stakes. On these machines, currently all winnings are still paid in coins. If the float falls below a certain level it is no longer feasible to accept notes and be confident that the float is sufficient to cover all winnings.

[0005] Simulations of such systems show how the coin float is used up because some customers present notes instead of coins, which cannot be added to the float. At present the practice is for the machine to disable the banknote validator once the float in the coin hopper falls below a preset level. This loses the operator potential custom, as customers who only have banknotes will then not use the machine.

[0006] It is an object of the invention, at least in the application under discussion, to at least alleviate these disadvantages arising when such machines accept banknotes as stake payments.

Summary of the Invention

[0007] The invention entails a concept of securely holding a single financial instrument in temporary or intermediate storage, and selectively either employing it as a payout or transferring it to bulk storage in response to one or more input signals. In one or more embodiments, the temporarily stored financial instrument can be said to be held in escrow.

[0008] In one aspect, the invention provides an apparatus for processing financial instruments, comprising:

a receiving station for receiving a financial instrument delivered from an external source and scanning the financial instrument to identify it;

a holding station at or separate from said receiving station for securely holding the financial instrument in temporary storage; and

respective means to convey the financial instrument to the holding station and then to selectively move the temporarily stored instrument out of the holding station to either direct it to a stack or other bulk storage device or to return the instrument to the external source; and

a controller responsive to one or more import signals to effect said selective movement of a financial instrument temporarily stored at said holding station.

[0009] In another aspect of the invention, there is provided a method of processing a financial instrument, comprising:

receiving the financial instrument delivered by an external source at a note receiving station and scanning the instrument to identify it;

securely holding the financial instrument as a single instrument in temporary storage; and

selectively moving the temporarily stored financial instrument out of said temporary storage in response to one or more input signals to either direct the instrument to a stack or other bulk storage device or to return it to the external source.

[0010] The input signal(s) may include one or more of the following signals:

- a signal indicative that the external source is entitled to receive a payout equal to or greater than the value of the temporarily stored financial instrument, whereupon the temporarily stored instrument is returned to the external source.
- a signal indicative that the external source is entitled to receive a payout less than the value of the temporarily stored financial instrument, whereupon the instrument is directed to the stack or other bulk storage device.
- a signal indicative that a further financial instrument or other object has been detected at said first station whereupon the temporarily stored financial instru-

ment is directed to the stack or other bulk storage device.

[0011] Preferably, the apparatus is arranged to issue a credit signal when a single financial instrument has been received at said holding station.

[0012] Advantageously, the apparatus comprises a validator of financial instruments.

[0013] The financial instrument may be a banknote.

[0014] In a particularly useful application, the apparatus is provided in combination with a game machine on which a person comprising said external source can play a game potentially resulting in a payment to the person.

Brief Description of the Drawings

[0015] The invention will now be further described by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a cross-sectional diagram depicting the note path and principal associated components of a banknote validator fitted to a game machine and programmed with functionality to provide an embodiment of the invention; and

Figure 2 is a block flow diagram setting out the functionality of the validator illustrated in Figure 1.

Description of Embodiments of the Invention

[0016] The illustrated banknote validator 10 includes a housing 12 with close-spaced upper and lower flat walls 13, 14 and side walls 33 that define, in the conventional manner, a note path 11 from a note entry opening 16 at a presentation position 19 to an exit 17. The note path is stepped or offset in the longitudinal axis at 15 to prevent tampering with foreign objects and to reduce the effect of ambient light shining into the note path. A banknote 8 presented at note entry opening 16 is engaged by a note transport system such as a friction belt or series of rollers 25 (not all shown) which propels the note along the path 11 to exit 17.

[0017] Sensor arrays 20, 22 are positioned above and below the note path. Thinned transparent webs 13a, 14a of walls 13, 14 separate sensor arrays 20, 22 from the passing note. The validator has a transmissive trigger sensor 30 in front of the sensor head position which is used to trigger the entry of a note and actuate the aforementioned drive means 25. The longitudinal position of the note is tracked by a laser movement sensor 40, which is mounted before the transmissive trigger sensor 30.

[0018] Validator 10 is equipped with a controller 50 including logic circuits that receives inputs from the various sensors, manages note movement, and identifies notes presented to the device.

[0019] An inserted note 8 is moved past the sensors of arrays 20, 22 and each sensor records a response trace for the note as it passes. These traces are then compared in controller 100 with a bank of reference traces for valid notes. In conventional practice, a note validated in this way is propelled on to storage at exit 17, and its value may trigger an operation or may be recorded as a credit towards an operation. A note not validated is typically propelled back out the entry opening 17 by reversal of the transport system 25.

[0020] In accordance with an embodiment of the present invention, the portion of the note path 11 from entry opening 16 to the "downstream" side of sensor arrays 20, 22 constitutes a first station 100 for receiving a banknote and scanning the note to identify it. Further downstream of sensor arrays 20, 22 prior to exit 17 is a second or holding station 200 for receiving a single banknote from the first station 100 and securely holding it in temporary storage. The rollers 25 provide means to convey the banknote from first station 100 to second station 200, and then to selectively move the temporarily stored banknote out of second station 200 and either to direct it through exit 17 to a stack or bulk storage device, or to reverse the banknote and return it along note path 11 to the external source beyond entry opening 16.

[0021] In alternative embodiments, holding station 200 may be at station 100, for example at the region of sensor arrays 20, 22, or in a separate unit downstream of the sensor arrays or of exit 17. In the former case, the temporary storage might be in note path 11 between sensor arrays 20, 22.

[0022] Controller 50 is programmed to be responsive to one or more input signals to effect selective movement of a banknote temporarily stored in the second station.

[0023] Figure 2 is a block flow diagram setting out the principal operational and control steps during the course of use of a game machine fitted with a banknote validator according to the embodiment of Figure 1. A preferred embodiment of the method of the invention includes a number of significant features managed by controller 50, as follows:

1. When a note is presented to the validator 10, and the note has been scanned and recognised as genuine, controller 50 issues the appropriate credit to the host game machine and physically holds the note in an "escrow" in secure "intermediate" station 200. From here the note can be either moved to permanent storage (e.g. a stacker or cash box) or returned as part of the pay out, as so instructed by an input signal from the host controller.

2. The validator controller 50 advises the host machine controller of what note value it has, and that it is being held in "escrow" (the intermediate station).

3. If the client's winnings are greater than or equal to the value of the held note, the host controller then has the option of returning that note as part of the client's winnings, thus reducing the money removed from the coin float.

4. Alternatively, if, at the end of the game, the client's winnings are less than the value of the held note, then that note is permanently stored and the payout made in coins.

5. If the client presents a second note while a first note is already held, the validator will scan the second note while at the same time feeding the first note into permanent storage. The host controller is then told by the validator controller that the first note has been stored permanently and that a new note is now held in the intermediate station. This allows the client to maintain a level of credit with the machine, and continue playing.

6. If there is any problem with the second note, for instance if it is not a valid note or some other fraud is suspected, then that note will be returned once the first note is securely stored.

7. If power is cut to the machine while a note is temporarily held in the intermediate station the validator will endeavour to safely stack that note, either when power is restored or by use of a back-up PSU. It will advise the host controller of this when power and communication is restored. To this end, it will retain a memory of what note (if any) was last held in "escrow" when power was lost.

8. The intermediate holding station, whether it is in the location illustrated, or within station 100, or a separate unit downstream of exit 17, is preferably secure and configured so as not to allow a client to retrieve a note without consent from the host machine. This may be achieved, e.g. by detecting the presence of any device (strings, film or the like) attached to the held note for the purpose of retrieving it from the secure holding area. Also security is achieved by immediately advancing the note in the "secure holding area" to permanent storage upon detection of any object, be it a second note or any other object, presented to the validator.

[0024] An advantageous feature is for the validator controller 50 to recognise an unscheduled power-down event and have the ability to immediately drive a held note into secure storage before complete loss of power. This may involve the integration of an un-interruptable power supply and the validator. Upon recovery, a record of the held note prior to loss of power may be on hand, for advising the host machine accordingly.

[0025] The apparatus also preferably provides for oth-

er communication signals between validator and host machine which allow for constant monitoring of the position of a note as it moves from first station to secure holding station, then return as part of pay out or to permanent storage.

[0026] The disclosed apparatus gives the machine owner or operator the advantage that a given float will last longer. Hence he may attract further clients who will be able to pay using bank notes. If the operator refills the machine on a fixed schedule, then the float can be smaller, or the period between refills can be extended for a fixed float ie "hopper starvation" can be prevented.

Claims

1. Apparatus for processing financial instruments, comprising:

a receiving station for receiving a financial instrument delivered from an external source and scanning the financial instrument to identify it;

a holding station at or separate from said receiving station for securely holding the financial instrument in temporary storage; and

respective means to convey the financial instrument to the holding station and then to selectively move the temporarily stored instrument out of the holding station to either direct it to a stack or other bulk storage device or to return the instrument to the external source; and

a controller responsive to one or more import signals to effect said selective movement of a financial instrument temporarily stored at said holding station.

2. Apparatus according to claim 1 wherein said input signal(s) include a signal indicative that the external source is entitled to receive a payout equal to or greater than the value of the temporarily stored financial instrument, whereupon the temporarily stored instrument is returned to the external source.

3. Apparatus according to claim 1 or 2 wherein said input signal(s) include a signal indicative that the external source is entitled to receive a payment less than the value of the temporarily stored financial instrument, whereupon the instrument is directed to the stack or other bulk storage device.

4. Apparatus according to claim 1, 2 or 3 wherein said input signal(s) include a signal indicative that a further financial instrument or other object has been detected at said first station, whereupon the temporarily stored financial instrument is directed to the

stack or other bulk storage device.

5. Apparatus according to any preceding claim arranged to issue a credit signal when a single financial instrument has been received at said holding station. 5
6. Apparatus according to any preceding claim, comprising a validator of financial instruments. 10
7. Apparatus according to any preceding claim, wherein said financial instrument is a banknote.
8. Apparatus according to any preceding claim, in combination with a game machine on which a person comprising said external source can play a game potentially resulting in a payout to the person. 15
9. A method of processing a financial instrument, comprising: 20

receiving the financial instrument delivered by an external source at a note receiving station and scanning the instrument to identify it; 25

securely holding the financial instrument as a single instrument in temporary storage; and

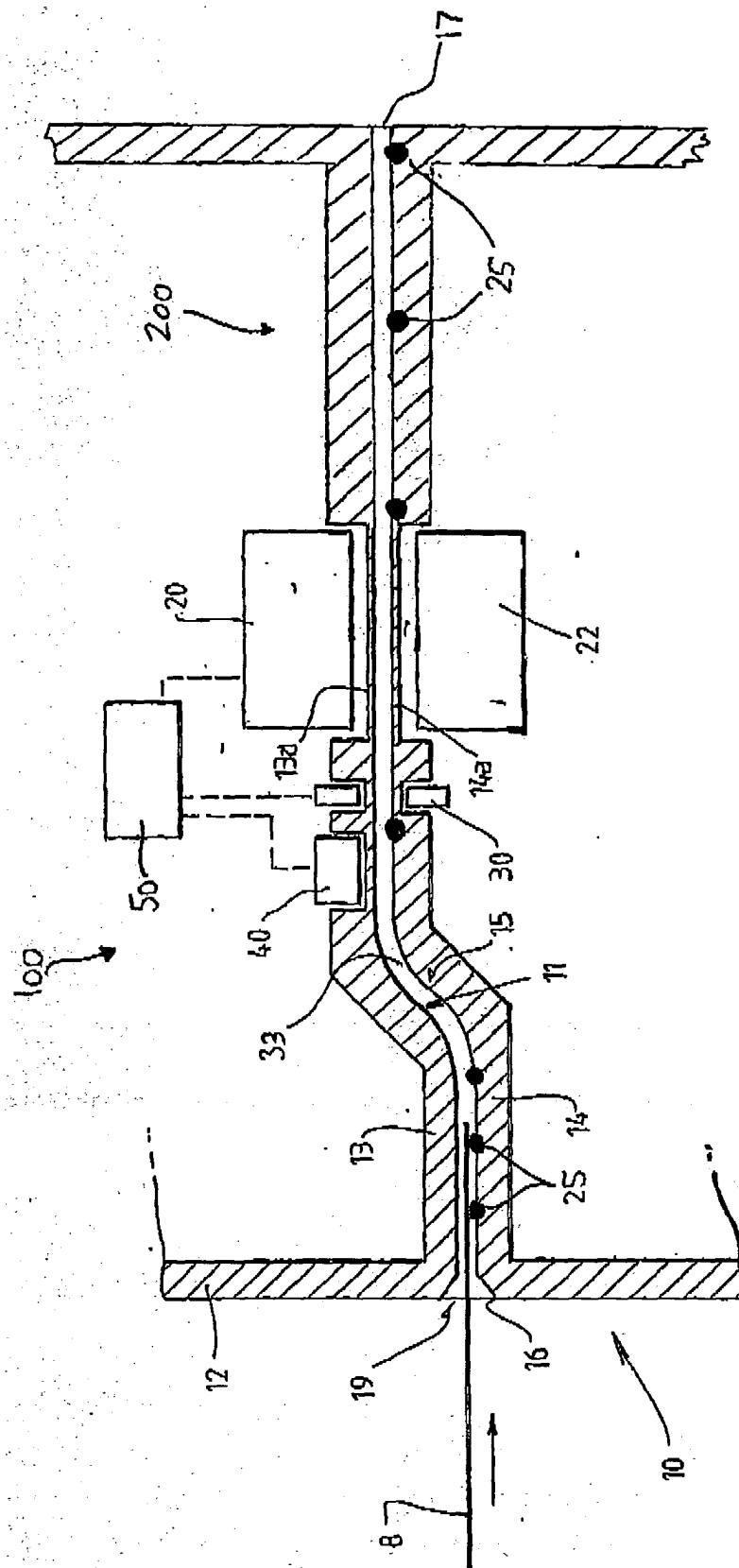
selectively moving the temporarily stored financial instrument out of said temporary storage in response to one or more input signals to either direct the instrument to a stack or other bulk storage device or to return it to the external source. 30
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10. A method according to claim 9 wherein the financial instrument is a banknote.

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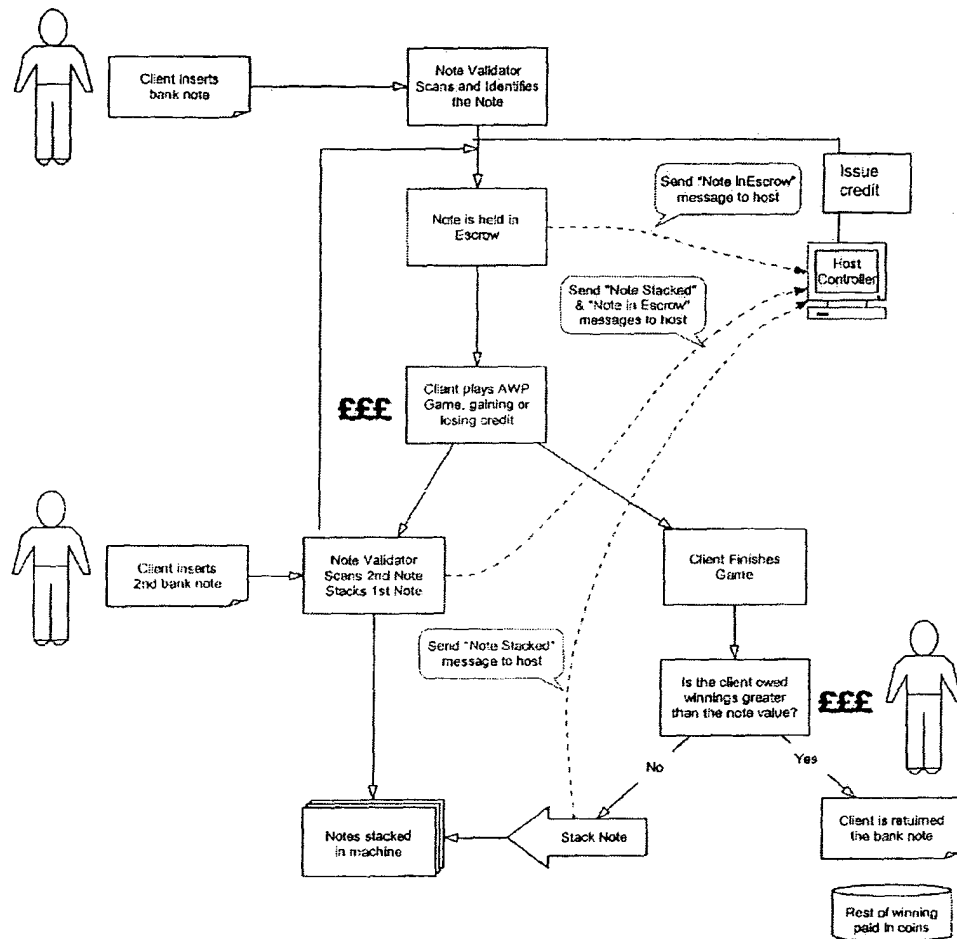


Fig 2



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EUROPEAN SEARCH REPORT

Application Number
EP 05 25 0480

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 5 400 890 A (GERLIER ET AL) 28 March 1995 (1995-03-28) * abstract; figures 1,2 * * column 1, line 38 - line 59 * -----	1-10	G07D7/00
X	US 4 011 931 A (WYCKOFF ET AL) 15 March 1977 (1977-03-15) * abstract; figures 11,12 * * column 1, line 19 - line 68 * -----	1-10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			G07D G07F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 20 May 2005	Examiner Mennerun, S
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 25 0480

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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20-05-2005

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			DE 4243626 A1 30-09-1993
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