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(54) **Apparatus for dispensing documents from a plurality of magazines of documents.**

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Apparatus for dispensing documents from a plurality of magazines of documents.

Technical Field

The present invention relates to an apparatus for dispensing documents from a plurality of magazines of documents of mutually different kinds, e.g. documents of different denominations, comprising in addition to said magazines a processing circuit for controlling the dispensement of documents from said magazines; a conveyor path controlled by signals from said processing circuit for conveying documents from said magazines to an output compartment or a further compartment; a detector means for sensing a particular characteristic, for example thickness, of each document as it passes the location of the detector means on said conveyor path and generating a corresponding sensing signal, said processing circuit including a comparison circuit for comparing a signal derived from said sensing signal with a reference signal stored in said comparison circuit and switching means incorporated in said conveyor path for switching said path to one of two part paths, of which one part path leads to said output compartment and the other leads of said further compartment. An apparatus of the aforedescribed kind is described in GB—A—2 001 038.

In apparatus of the aforementioned kind it is, of course, important that the documents are dispensed in the manner intended. When the apparatus is intended to dispense banknotes, it is important, for example, that not more than one banknote is dispensed at a time. Further, it is desirable that one and the same apparatus is able to dispense, for example, banknotes of different denomination and therewith, perhaps, of different thickness, and that a given apparatus is capable of dispensing a mixture of foreign banknotes without it being necessary to modify said apparatus to any great extent. An object of the present invention is to simplify the necessary control of the dispensement of documents from an apparatus containing magazines of documents of mutually different kind.

This object is attained by means of an apparatus according to claim 1 or the accompanying claims.

By means of the invention the dispensement of documents, such as banknotes, is controlled in a rapid and positive manner. In addition there is provided an apparatus of simple construction and reliable operation.

Brief Description of the Drawings

So that the invention will be more readily understood and further features thereof made apparent an exemplary embodiment of the invention will now be described in more detail with reference to the accompanying schematic drawing, in which

Figure 1 illustrates a banknote dispensing apparatus in accordance with the invention, and

Figure 2 illustrates a part of the apparatus illustrated in Figure 1.

Preferred Embodiment of the Invention

The apparatus illustrated in the drawing comprises a plurality of banknote magazines 11, 12 ... 14 each arranged to co-operate with an individual pickup device or feeder 18, 17 ... 15; a data processor 10 for controlling the dispensement of banknotes from said magazines; detector means 19 for checking the possible double-feed of banknotes; a collecting compartment 20; a switching means 201—202; an output compartment 21; and a return compartment 22.

The magazines 11, 12 ... 14 are intended to accommodate banknotes of different denomination, for example Swedish banknotes ranging in value from 5 Swedish crowns, 10 Swedish crowns ... to 1000 Swedish crowns. When a magazine such as the magazine 11, is inserted in the apparatus, information in the form of an identity signal, identifying the value of the notes in the magazine is automatically transmitted to the data processor 10, more specifically to a memory store 24 incorporated in the data processor, where the information of said signal is accessible provided that the magazine 11 remains in the apparatus. This information may, for example, relate to the mean thickness of a banknote in said magazine or any other particular characteristic. In a similar manner there is stored in the memory 24 information relating to the banknotes contained in the magazines 12 ... 14. It is assumed that the banknotes in the respective magazines are of the correct kind. Transmission of information to the individual addresses of respective magazines in the memory 24 is effected, for example, in binary form.

The individual feeders 15, 17, 18 cooperating with said magazines, together with the detecting means 19, the collecting compartment 20 and the switching means 201, 202, form a conveyor path for banknotes from said magazines to said output compartment 21, or, in the event of two banknotes being dispensed at the same time, to the return compartment 22.

The detecting means 19 is arranged to deliver to a control circuit 25, via a line 35, a signal (which is hereinafter referred to as the sensing signal) whose amplitude is determined by the thickness of a single document, or in an exceptional case to the thickness of several documents, during passage of said document or documents through said means. As will be understood, the detecting or sensing means 19 may be so arranged that the passage of a banknote to the value of, e.g. 5 Swedish crowns may give rise to a signal with an amplitude of 7 volts, while two banknotes of the same denomi-

nation which overlap or which are dispensed together may give rise to a signal with an amplitude of 4 volts etc.

When a banknote passes the detecting or sensing means 19, there is sent to the control circuit 25 an identity signal originating from the information which has been supplied to the memory 24 in respect of the magazine of banknotes in question, and a sensing signal originating from the sensing means 19 with information about the banknote which has just passed said means. The data processor actuates its memory store 24 in conjunction with controlling the output of a banknote from said magazine. If the banknote dispensed is of the correct denomination and has the correct thickness, the control circuit 25 handling the sensing signal and the identity signal sends a signal to a comparison circuit 23, via a line 39, which compares said signal with a given reference signal incorporated in said comparison circuit. If the value of said signal on line 39 and said given reference signal agree, a first control signal is transmitted to the switching means 201—202. The switching means are then switched to a position in which the banknote (or optionally a bundle of banknotes collected in the collecting compartment 20) is fed to the output compartment 21. On the other hand, if the compared signals do not coincide with one another, as the result of two banknotes being dispensed simultaneously for example, the first control signal transmitted by the comparison circuit will cause the switching means 201—202 to be moved to a position such that the banknote (or the bundle of banknotes) is passed to the return compartment 22. In Figure 1, the return position of the switching means 201—202 is illustrated in dash lines. As will be understood, however, the arrangement may be such that when the correct dispensing sequence takes place the amplitude of the control signal is equal to zero, and that the switching means 201—202 remain in the position shown by full lines.

The dispensement of banknotes, or documents, may be effected in a manner such that subsequent to ordering a given number of banknotes of a certain kind, e.g. by means of a keyboard not shown, the banknotes are dispensed sequentially to the output compartment 21; in this case the collecting compartment 20 is thus omitted. One variation is that the ordered banknotes are first collected in the collecting compartment 20 into a bundle, whereafter the whole bundle is fed to the output compartment 21. If, subsequent to collecting a bundle of banknotes in the compartment 20 two banknotes are dispensed instead of one, it may be advantageous not only to return the double-feed of said banknotes to the return compartment, but also the bundle of banknotes already present in the compartment 20. To this end, as illustrated in Figure 1, the circuit includes a line 36 connected to the data processor 10 and a line 37 which is connected to said line 36 and to the collecting compartment 20. The first control signal is sent from the processor 10 to the line 36 and is conducted therefrom to the compartment 20 via the line 37.

Conveniently the data processor may be arranged to control the control circuit 25 not only in dependence on from which magazine a banknote arrives but also in dependence upon any small deviation between the given value in the comparison circuit and the value of the sensing signal, provided that said deviation is small in comparison with those deviations caused by the incorrect dispensement of a banknote. In this way there is obtained a self-regulating system which eliminates any deviations within a narrow predetermined range about the correct value.

The relationship between data processor 10 and sensing means 19 can be established in different ways.

When no banknote passes the detecting means 19, said means should operate at a constant basic level so that the signal levels in the case of the dispensement of single banknotes from different magazines, and the signal levels in the possibility of two banknotes being dispensed simultaneously from the same magazine, have at least approximately the predetermined values (the set values). Should the aforementioned signal levels be displaced considerably due to aging or other mechanical/electrical phenomena, the data processor is conveniently arranged to compensate for such displacements in levels by controlling the control circuit 25. If, when dispensing the banknote from a given magazine, the sensing signal on the line 35 differs substantially from the expected value, the data processor causes the banknote to be passed to the return compartment 22, and the control circuit 25 is switched to compensate the change occurring in the detecting means 19 (or perhaps in the control circuit 25). Immediately thereon there is discharged from the same magazine a further banknote and if the expected signal level is now obtained this indicates that the first banknote or dispensing operation was in itself correct, and the change (step-up) in the control circuit 25 caused by the data processor is maintained for the subsequent dispensing operations. This implies a considerable expansion in the ability of the system to be self-regulating, thereby avoiding in many cases the provision of a special service on the apparatus.

Figure 2 illustrates one embodiment of the mutual cooperation between the detector 19, the control circuit 25, the comparison circuit 23 and the memory 24 in a more detailed manner. When inserting, for example, a magazine 11 into the apparatus a value (e.g. 8) representative of particular characteristic of the banknotes associated with said magazine is read into the memory address of that magazine. The characteristic may be read in binary code. When ordering a banknote from the magazine 11, via a keyboard for example, the aforementioned

value 8 is fed to the control circuit 25, via the line 38, as "the identity signal". When the banknote passes the detector 19, said detector transmits a sensing signal, via the line 35 to the control circuit 25, on whose output there is obtained a modified sensing signal, which should be at a predetermined signal level, and which, via the line 39 is applied to the comparison circuit 23, and there compared with a predetermined reference signal. If said signal lies within a given range around the predetermined reference signal, said signal is read as a second control signal into the memory 24, via the line 40, and the value for the magazine 11 is adjusted on its address in the memory. The adjusted value (the value 8 has been adjusted to, for example, 7 or 9) is then the basis of "the identity signal" to be transmitted on line 38. If, on the other hand, the signal lies outside said interval, this is understood as a dispensing error and a signal passes on the line 36 to the switching means 201—202. In this case the value (8) is, of course, not changed.

Claims

1. An apparatus for dispensing documents from a plurality of magazines (11—14) of documents of mutually different kinds, e.g. documents of different denominations, comprising in addition to said magazines a processing circuit (10) for controlling the dispensement of documents from said magazines; a conveyor path (15, 16, 17, 18, 19, 20, 21, 201, 202) controlled by signals from said processing circuit (10) for conveying documents from said magazines to an output compartment (21) or a further compartment (22); a detector means (19) for sensing a particular characteristic, for example thickness, of each document as it passes the location of the detector means on said conveyor path and generating a corresponding sensing signal, said processing circuit including a comparison circuit for comparing a signal derived from said sensing signal with a reference signal stored in said comparison circuit and switching means (201, 202) incorporated in said conveyor path for switching said path to one of two part paths, of which one part path leads to said output compartment and the other leads to said further compartment (22), characterized in that said processing circuit (10) is a data processor, in that signal generating means provided in association with each of said magazines are arranged for generating a respective identity signal representative of the said particular characteristic of the documents in said respective magazine, in that said data processor includes a memory (24) for storing the identity signals, in that the detector means (19) are arranged for feeding said sensing signal to a control circuit (25), which compares said sensing signal with an identity signal provided by said memory (24) to produce a modified sensing signal for delivery to said comparison circuit (23), which is arranged firstly to compare, for each document passing said detector means (19), said modified sensing signal with the reference signal stored in the comparison circuit (23) and secondly to transmit a first control signal via a first link (36) for controlling the switching means (201, 202) and a second control signal via a second link (40) for updating the value of the identity signal stored in the memory, and in that said further compartment (22) is a return compartment.

2. An apparatus according to claim 1, characterized in that said signal generating means comprises a sequential arrangement of said magazines (e.g. 11) in combination with circuits in said data processor (10) in an arrangement such that said identity signal is generated when a respective magazine (11) is inserted into said apparatus.

Patentansprüche

1. Ausgabevorrichtung von Belegen oder dgl. aus Magazinen (11—14), in denen voneinander unterschiedliche Belegsorten, z.B. Belege oder Banknoten unterschiedlicher Werteinheiten enthalten sind, bestehend neben diesen Magazinen aus einer Verarbeitungseinheit (10) zur Steuerung der Belegabgabe aus diesen Magazinen, einer Förderbahn (15, 16, 17, 18, 19, 20, 21, 201, 202), die durch Signale aus der Verarbeitungseinheit (10) gesteuert wird, so daß die Belege aus den Magazinen einem Ausgabefach (21) oder einem weiteren Fach (22) zugeführt werden, und aus einer Erfassungseinheit (19) zum Abtasten eines besonderen Merkmals, beispielshalber der Dicke jedes Belegs bei dessen Durchlaufen der Erfassungsstelle auf der Förderbahn und zum Erzeugen eines entsprechenden Abtastsignals, wobei die Verarbeitungseinheit eine Vergleichseinheit, durch die ein vom Abtastsignal abgeleitetes Signal verglichen wird mit einem in der Vergleichseinheit gespeicherten Bezugssignal, und eine Umschalteinheit (201, 202) aufweist, die derart in der Förderbahn angeordnet ist, daß auf zwei Teilbahnen umgeschaltet werden kann, von denen die eine zum Ausgabefach und die andere zum weiteren Fach (22) führt, dadurch gekennzeichnet, daß die Verarbeitungseinheit (10) eine Datenverarbeitungseinheit ist, daß jedem Magazin zugeordnete Signalgeber zum Erzeugen eines das Sondermerkmal des in dem jeweiligen Fach befindlichen Belegs darstellenden Kennsignals vorgesehen sind, daß die Datenverarbeitungseinheit einen Speicher (24) zum Speichern der Kennsignale aufweist, daß die Erfassungseinheit (19) angeordnet ist zum Zuleiten des Abtastsignals an eine Steuereinheit (25), durch die das Abtastsignal mit einem aus dem Speicher (24) stammenden Kennsignal verglichen wird, um ein modifiziertes Abtastsignal zur Abgabe an die Vergleichseinheit (23) zu erzeugen, die vorgesehen ist um für jeden die Erfassungseinheit (19) durch-

laufenden Beleg erstens das modifizierte Abtastsignal mit einem in der Vergleichseinheit (23) gespeicherten Bezugssignal zu vergleichen und um zweitens über eine erste Verbindung (36) zum Steuern der Umschalteinheit (201, 202) ein erstes Signal und über eine zweite Verbindung (40) zum Wertfortschreiben oder -ergänzen des im Speicher gespeicherten Kennsignals ein zweites Steuersignal zu übertragen, und daß das weitere Fach (22) ein Rückgabefach ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Signalgeber kombiniert mit den Schaltungen in der Datenverarbeitungseinheit (10) eine sequentielle Anordnung der Magazine (beispielshalber 11) haben und derart ausgelegt sind, daß das Kennsignal erzeugt wird, wenn ein betreffendes Magazin (11) in die Vorrichtung eingeführt wird.

Revendications

1. Un appareillage pour distribuer des documents à partir d'un certain nombre de compartiments (11—14) de documents de sortes mutuellement différentes comme, par exemple, des documents ayant des appellations différentes, comprenant en plus desdits compartiments un circuit de traitement (10) pour commander la distribution des documents à partir desdits compartiments; un réseau de transport (15, 16, 17, 18, 19, 20, 21, 201, 202) commandé par des signaux envoyés par ledit circuit de traitement (10) afin de transporter les documents desdits compartiments jusqu'à un compartiment de sortie (21) ou à un autre compartiment (22); un détecteur (19) pour déceler une caractéristique particulière comme, par exemple, l'épaisseur de chaque document pendant qu'il passe à l'emplacement du détecteur sur ledit réseau de transport et produisant un signal sensible correspondant, ledit circuit de traitement comprenant un circuit de comparaison pour comparer un signal dérivé dudit signal sensible à un signal de référence mémorisé dans ledit circuit de comparaison et des moyens de commutation (201, 202) incorporés audit réseau de transport pour commuter ledit réseau de transport sur l'un ou l'autre de deux trajets partiels, un de ces trajets partiels conduisant audit compartiment de sortie et l'autre conduisant audit autre compartiment (22), caractérisé par le fait que ledit circuit de traitement (10) est une unité de traitement de données, que les moyens de génération de signaux associés à chacun desdits compartiments sont disposés pour produire un signal d'identité respectif représentatif de ladite caractéristique particulière des documents se trouvant sans ledit compartiment respectif, par le fait que ledit traitement de données comprend une mémoire (24) pour mémoriser les signaux d'identité, par le fait que le détecteur (19) est diposé pour envoyer ledit signal sensible à un circuit de commande (25), qui compare ledit signal sensible à un signal d'identité fourni par ladite mémoire (24) pour produire un signal sensible modifié à destination dudit circuit de comparaison (23), lequel est disposé en premier lieu pour comparer, pour chaque document passant dans ledit détecteur (19), ledit signal sensible modifié au signal de référence mémorisé dans le circuit de comparaison (23) et deuxièmement pour transmettre un premier signal de commande par une première liaison (36) pour commander les moyens de commutation (202, 202) et un second signal de commande par une deuxième liaison (40) pour mettre à jour la valeur du signal d'identité mémorisé dans la mémoire et dans le fait que ledit autre compartiment (22) est un compartiment de retour.

2. Un appareillage selon la revendication 1, caractérisé par le fait que lesdits moyens de génération de signaux comprennent une disposition séquentielle desdits compartiments (par exemple 11) en combinaison avec les circuits dans ladite unité de traitement de données (10) dans une disposition telle que ledit signal d'identité est généré quand un compartiment respectif (11) est introduit dans ledit appareillage.

Fig. 1

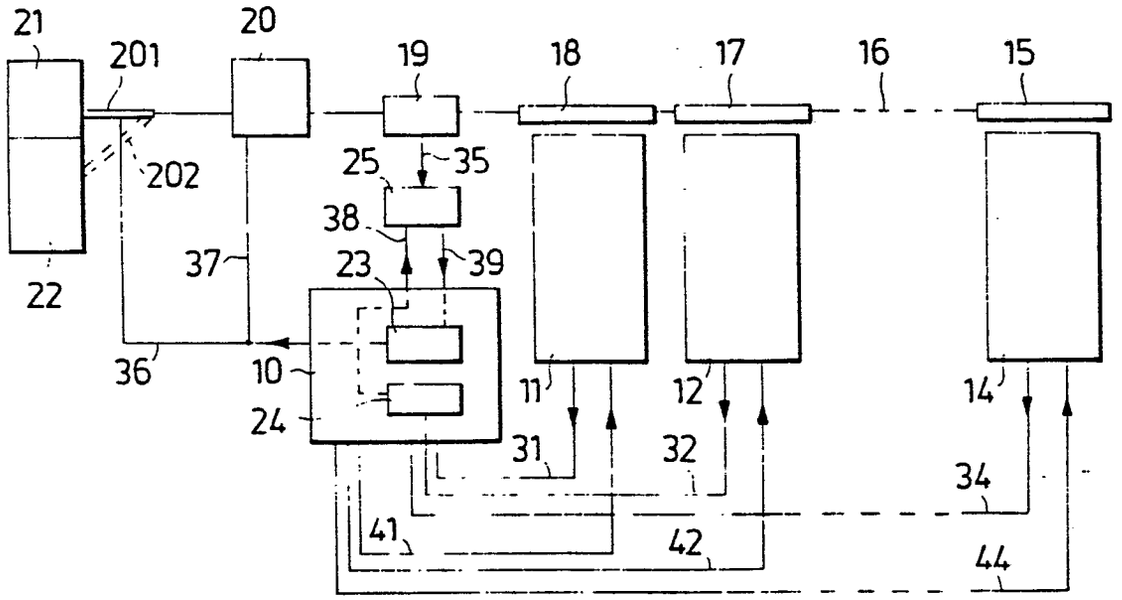
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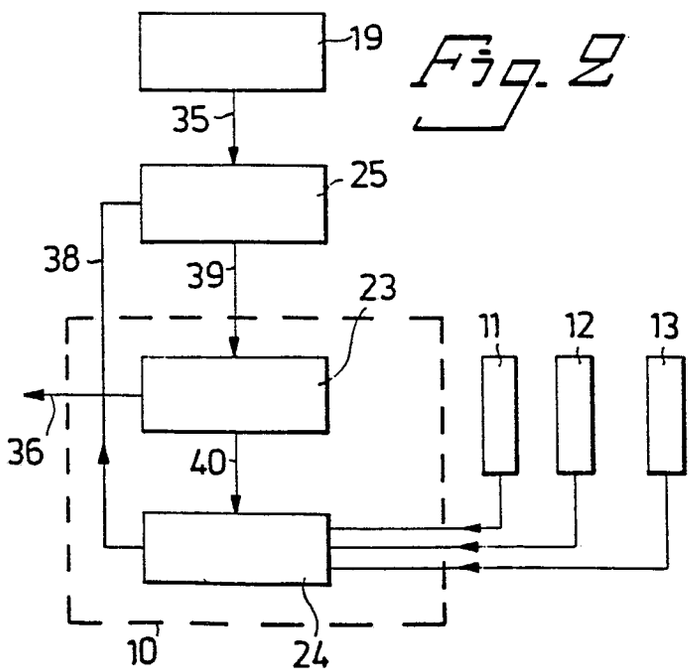
Fig. 2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