

EXHIBIT S

① 日本国特許庁 (J P) ② 特許出願公告
 ③ 特許公報 (B 2) 昭 61 - 41439

④ Int. Cl. 識別記号 庁内整理番号 ⑤ 公告 昭和61年(1986)9月16日
 G 06 M 7/06 7023-2F
 B 65 H 3/00 7456-3F
 発明の数 1 (全9頁)

⑥ 発明の名称 紙幣識別計数機
 ⑦ 特 願 昭52-136683 ⑧ 公 開 昭54-71674
 ⑨ 出 願 昭52(1977)11月18日 ⑩ 昭54(1979)6月8日
 ⑪ 発 明 者 畑 中 秋 弘 姫路市下手野35番地 グローリー工業株式会社内
 ⑫ 発 明 者 堂 野 修 吾 姫路市下手野35番地 グローリー工業株式会社内
 ⑬ 出 願 人 グローリー工業株式会 社 姫路市下手野35番地
 ⑭ 代 理 人 弁理士 佐藤 一雄 外1名
 審 査 官 下 村 周 三
 ⑮ 参 考 文 献 特 公 昭55-37983 (J P, B 1)

⑯ 特許請求の範囲

1 計数すべき紙幣を一括して載せられる載置台と、
 この載置された紙幣を順次1枚ずつ取出して搬送する紙幣送出手段と、
 この搬送される紙幣の金種を識別する識別装置と、
 この識別装置から出力される複数金種の金種信号に基づき当該搬送紙幣の金種別枚数並びに合計金額を算出する計数演算装置と、
 この計数演算装置の計数内容を表示する表示装置と、
 上記識別装置にて金種が識別された紙幣について一括集積する堆積台と、
 を具備した事の特徴とする紙幣識別計数機。

発明の詳細な説明

(産業上の利用分野)

本発明は銀行等の金融機関に於いて使用され、載置台に載せられた入金等の紙幣を1枚ずつ取出して計数等の所要の処理を行なう紙幣識別計数機 20 に関する。

(従来技術およびその問題点)

銀行等の金融機関に於いて使用されている紙幣計数機においては、載置台に多数枚堆積された紙幣から取出機構により1枚ずつ取出して搬送し、25 この紙幣の枚数を計数し、その計数枚数を表示さ

せたり、又、所定枚数取出し後に自動的に送出手を停止させたりする機能等を備えている。

しかしながら、例えば、銀行の窓口係が客から受取った紙幣の入金額を知りたい時には、計数機 5 で金種別に手で区分して金種別に計数し、この計数値をみて金額に換算しなければならず、計算ミスが生じる確率が高くなり窓口係自身の信頼度も低くなる問題があつた。

又、窓口紙幣分類計数機を設置して使用すれば、金種別に分類集積すると共に金種別枚数の表示により窓口係が枚数を知り得ることができ 10 るが、紙幣は金種別に分離されてしまい、窓口係が逐一分類されてしまった紙幣を再び集めなければならない煩雑であつた。又、金額もそれぞれ表示を見て算出しなければならず、客が差出した入金紙幣と入金伝票との照合に手間取ることもあつた。

よつて本発明は一括して載置台に載置された紙幣を1枚ずつ取出して紙幣の金種を識別し、自動的に合計金額を算出して表示すると共に再び一括集積して計数後の紙幣を取出しやすくする紙幣識別計数機を提供することを目的とする。

(問題点を解決するための手段)

本発明にかかる紙幣識別計数機においては、計数すべき紙幣を一括して載せられる載置台と、この載置された紙幣を順次1枚ずつ取出して搬送す

る紙幣送出手段と、この搬送される紙幣の金種を識別する識別装置と、この識別装置から出力される複数金種の金種信号に基づき当該搬送紙幣の金種別枚数並びに合計金額を算出する計数演算装置と、この計数演算装置の計数内容を表示する表示装置と、上記識別装置にて金種が識別された紙幣について一括集積する堆積台と、を具備した事を特徴としている。

(作用)

本発明の装置では載置台に載せられた紙幣束から紙幣を順次1枚ずつ取出して搬送すると共に搬送される紙幣の金種を判別して金種信号を出力し、この金種信号に基づいて金種別に計数すると共に合計金額を算出し、表示装置にて金種別枚数及び合計金額を表示させ金種が識別された紙幣を堆積台上に一括集積させるようにしている。これにより、特に窓口業務での能率と正確さの向上が図られる。

(実施例)

以下この発明を図面に示す実施例により説明する。

第1図において、計数機本体1の上部一側に紙幣載置台2が設けられ、この載置台2の各側方には紙幣送出手段として搬送ベルト3、3が設けられている。

上記搬送ベルト3、3は、第2図に示すようにそれぞれプーリー4、5間に巻回されており、このベルト3、3の外表面には紙幣Pとの摩擦力を増すため凹凸が形成されている。前記一方のプーリー5にはモータMからベルト5により矢印方向への駆動が与えられるようになっており、また前記載置台2の内端部に対応する位置には偏心プーリー7が設けられ、この偏心プーリー7の最大半径部分7aが上部走行側ベルトの裏面に接したときこのベルトの外表面が前記載置台2の上面よりやや上方に突出し、同最小半径部分7bが接したとき前記ベルトの外表面が載置台2の上面よりも下位に下るように形成されていて、搬送ベルト3、3の上下動により載置台2上の紙幣P群の最下位のものから1枚ずつ間歇的に送出するようになされている。

前記搬送ベルト3、3の中間部上面には、このベルトとは反対方向に周面が回動される逆転ローラ8が、軸9に固定のアーム10の先端に支持さ

れた軸11により搬送ベルト3、3の上面との間に少くとも紙幣1枚が通れる間隙をおいて配設され、この逆転ローラ8と対応するベルト3、3の内面側にはこのベルト3、3の位置を規制する案内プーリー41が配設されている。

前記逆転ローラ8の紙幣送入側には、上方部が計数機本体1側の部材12に軸13により枢支された押え部材14が揺動可能に設けられ、その下端部14aにはベルト3、3および逆転ローラ8の周面を避ける位置に杆15、15が垂設され、前記逆転ローラ8側に向け所要角度屈曲され、この杆部15、15の間隙でそれぞれ逆転ローラ8および搬送ベルト3、3を跨ぐようになっており、常時はばね16により下端部14aが逆転ローラ8とは反対方向に偏倚されている。

前記搬送ベルト3、3の駆動側のプーリー軸17には大径のローラ18が取付けられ、このローラ18の後半部には円弧状のガイド板19がローラ18の周面との間に少許の間隙をおいて添設されている。このガイド板19の下端には紙幣Pの先端をガイドするシユート20が連設され、このシユート20の下端は水平方向に設けられた搬出ベルト21の上面に臨ませてある。この搬出ベルト21の上面に臨ませてある。この搬出ベルト21の末端は計数機本体1の取出口22に臨み、この取出口22に設けられた紙幣堆積台23上に紙幣Pを放出するように構成されている。この堆積台23の上方には、基端が計数機本体1側に固定されたばね性を有する押え板24が設けられ、堆積台23上に放出された紙幣Pが飛散しないようになされている。

前記搬送ベルト3、3間には、その前部が前記載置台2の内部近傍に延び、後部が後部側のプーリー5の近傍に延びる押上げ板25が前記逆転ローラ8よりやや後方位置において軸26により揺動自在に枢支され、この押上げ板25の上面はその前部側25aが上昇したとき偏心プーリー7により押上げられた搬送ベルト3、3の上面よりもやや高位に位置され、同下降時にはその軸26より前部側25aの上面が前記状態にあるベルト3、3の上面よりもやや低位に位置されるようになってい

る。前記軸26にはアーム27が固着され、このアーム27の先端と、軸28により枢支されたア

5

6

ム29の先端とがリンク30で連結され、前記軸28には前記押え部材14の背面に設けられた突起31に係合して押え部材14の下端部14aを逆転ローラ8の前側に突出した位置(第2図示状態)と逆転ローラ8の前側周面より後退した位置、すなわち逆転ローラ8の周面の一部が押え部材14の杆部15間より突出される位置とに変位させる作動レバー32が固着されている。前記軸26の端部にはレバー33が固着され、このレバー33の先端にソレノイド34のプランジャ35が連結されていて、ソレノイド34が励磁されたとき押上げ板25の先部側25aが上昇するとともに押え部材14を逆転ローラ8側に引寄せられるようになっている。

押圧装置は第2図に示すように、前記軸9に所定角度鈍角に屈曲された左右一対の支持アーム36、36の屈曲部分が挿通支持され、この支持アーム36、36の先端側には押圧ローラ37、37………が軸47により支持され、支持アーム36、36の他端側にはウエイト38が支持されている。前記押圧ローラ37、37………側は前記ウエイト38側よりもレバー比あるいは重量自体により押圧ローラ37、37………側の方が重く形成されており、このとき押圧ローラ37、37………の中心と軸9の中心とを結ぶ線に対し、軸9とウエイト38の中心とを結ぶ線は所要の角度を有している。また前記支持アーム36の後部側上面には、前記逆転ローラ8の軸11を支持するアーム10に固定のストッパ39が当接自在に配設され、押圧ローラ37と逆転ローラ8との位置関係が定められるようになっている。さらに前記押上げ板25の前部側25aの側部には、前記逆転ローラ8と同軸上のローラ部材40の周面に当接自在なころ42が取付けられており、押上げ板25の前部側25aが上昇させられたとき逆転ローラ8も共に押し上げられて、押上げ板25の上面と逆転ローラ8の周面との間隙を一定に保つようになっている。送出停止時に押上げ板25上に残存する紙幣Pを載置台2方向に確実に逆送されるようになされている。

図中43は前記大径のローラ18の周面に当接された計数ローラで、紙幣Pが両ローラ18、43間を通過する際に上方に変位する計数ローラ43の動きをレバー44に取出して増巾し、そのレ

バー44によつて計数スイッチ45を開閉して通過枚数をカウントするものであり、46は堆積台23に過剰に紙幣Pが堆積された場合、あるいは送出途上で紙幣Pがジャミングした場合に作動される非常停止用スイッチである。

また、計数機1の前面パネルには計数処理した紙幣の金額、枚数を表示する表示装置101、全てのデータをクリアするクリアキー102、計数紙幣の金額を指定するための金額指定キー103、計数紙幣の枚数を設定するための枚数設定装置(ダイヤスイッチ)104、計数する紙幣の種類(普通紙、単金種、複合金種)を選択する計数種類選択ボタン105、計数機の作動モード(計数モード、加算モード、バツチモード)を選択する作動モード選択ボタン106、後述するメインメモリのデータ表示を指示するトータルキー107、後述する1次メモリのデータ表示を指示するサブトータルキー108、全ての動作を停止させるためのストップボタン109、電源スイッチ110が設けられている。

しかして、上述の如き計数機は第3図に示す制御回路によつて制御される。すなわち、第3図において、111は搬送される紙幣の金額を識別するための、搬送路に設けられたパターン検知装置であり、第4図に示す如く投光器111Bの光電装置と、その間に配設された長形状の透過光スリット111Cを有する走査スリット板111Dとで構成されている。また、112はパターン検知装置111からのパターン検知信号を入力して当該紙幣の金額を識別するための識別装置、113は金額指定キー103で指定された金額データを記憶する金額記憶装置、114は識別装置112の識別金額と金額記憶装置113の記憶金額とを照合して照合信号を出力する金額照合装置である。さらに、121は紙幣の搬送を行なう搬送駆動部120を駆動制御するための搬送制御装置であり、載置台2に載置された紙幣を検知する第1収容紙幣検知装置122からの検知信号をスタート指令として搬送駆動部120を駆動し、載置台2に載せられた紙幣を順次1枚ずつ取出して紙幣堆積台23上に搬送すると共に、金額照合装置114からの照合信号RFを入力してそれが不一致を示すものであれば搬送駆動部120を停止する。尚、異金額紙幣排除装置123を設けて、金

種照合装置114からの照合信号RFを入力してそれが不一致を示すものであれば、当該検出紙幣を紙幣堆積台23に搬送させないで別途設けられている排除口へ排除させるようにしてもよい。また、ストップボタン109からストップ信号が入力された場合には、搬送駆動中であつても搬送駆動部120を停止させる。

一方、124は第1収容紙幣検知装置122で載置台2に載せられた紙幣が検知されており、かつ後述するタイマー回路125から計数紙幣無し信号NEが出力された時に搬送通路内での紙幣の詰り等の事故として事故検知信号TDを出力し、搬送制御装置121を介して搬送駆動部120を停止させるための事故検知装置、126は搬送駆動部120によつて搬送される紙幣を光电装置等で検知する搬送紙幣検知装置であり、タイマー回路125は搬送紙幣検知装置126からの搬送紙幣検知信号TNを入力して所定時間以上にわたつてこの検知信号TNが入力されなければ、搬送制御部120からの制御信号を入力して計数紙幣無し信号を出力する。

また、モード選択装置127は計数処理するモードを選択するものであり、載置台2に載せられた紙幣が無くなるまで計数し、計数終了検知装置128からの計数終了信号CFにより搬送制御装置121を介して搬送駆動部120を自動的に停止させる。なお、第2収容紙幣検知装置129は紙幣堆積台23上に搬送された紙幣を検知するためのものである。

しかして、計数演算装置200は加算ゲート201、レジスタ202A~202Dで成る1次メモリ202、メインメモリ203、演算制御装置204で構成されており、金種記憶装置113からの金種信号と搬送紙幣検知装置126からの紙幣検知信号とに基づいて金種別に枚数を計数すると共に、計数終了信号CFによりその回の計数結果をメインメモリ203に加算する。また、1次メモリ202及びメインメモリ203のデータと、これらを金額に変換したデータとを表示装置101で表示させるようにする。1次メモリ202は「万円」「五千円」「千円」「五百円」の金種別のレジスタ202A~202Dで構成されており、金種別の計数枚数を記憶し、混合金種の計数時は金種指定キー103及びサブトータルキー108と

の併用、つまりフアンクションキーの操作により演算制御装置204を介して表示装置101で表示される。また、メインメモリ203は1次メモリ202と同様に「万円」「五千円」「千円」「五百円」の4金種のメモリ部を有すると共に、トータル金額をも記憶するようになっており、金種指定キー103及びトータルキー107の併用、つまりフアンクションキーの操作によりその記憶データを表示装置101に表示する。さらに、演算制御装置204は、単金種計数及び普通紙計数の場合には加算ゲート201を経て1次メモリ202に金種別に計数記憶してそのデータを逐次金額に変換し、枚数データと共に表示装置101へ転送して表示する。そして、混合金種計数の場合には1次メモリ202に計数記憶されている金種の各データを金種指定キー103及びサブトータルキー108の操作により金額データに変換し、枚数データと共に表示装置101へ転送して表示する。また、演算制御装置204はサブトータルキー108の指示により1次メモリ202のデータをメインメモリ203の当該金種部に加算し、メインメモリ203に金種別に記憶されているデータをトータルキー107及び金種指定キー103の指示により金額データに変換し、枚数データと共に表示装置101に転送して表示する。しかして、バッチモードの場合、枚数設定装置104の操作に基づき当該金種の1次メモリ202内のデータを常時チェックし、計数一致時に一致信号CNを出力する。

なおトータルキー107はメインメモリ203のデータ表示を指示する場合に、金種指定キー103に先立つて操作することによりメインメモリ表示命令を演算制御装置204に与え、サブトータルキー108は1次メモリ202のデータ表示を指示しかつ1次メモリ202のデータをメインメモリ203へ加算指示する場合に、金種指定キー103に先立つて操作することにより当該演算命令を演算制御装置204に与える。また、表示装置101は枚数表示部101Aと金額表示部101Bとに分かれており、単金種(又は普通紙)の場合には当該金種の計数中、常時その計数枚数を表示し、混合金種(又はトータル脱出時の場合には所定の操作に基づき当該金種データを表示するようになっており、さらに、モード選択装置1

27は計数種類選択ボタン105及び作動モード選択ボタン106からの各信号を入力して計数処理を行なうモード信号MSを出力するもので、パッチモードが選択された時、並びに「計数」「加算」モードでの「普通紙」選択時には識別装置112、金種指定キー103、金種記憶装置113を不動作とし、搬送紙幣検知装置126から出力される紙幣検知信号を「万」の金種別レジスタ202Aにて枚数を計数させる。

一方、作動モード選択ボタン106は計数するモードを選択するものであり、

- (1) 搬置台2に載せられた紙幣が無くなるまで計数し、計数終了検知装置126からの計数終了信号CFにより自動的に搬送駆動部120を停止させ、「普通紙」計数の時は枚数のみを、「単金種」及び「複合金種」の時には枚数及び金額表示を行なわせる計数モードと、
- (2) 搬置台2に載せられた紙幣を順次計数して、計数中は金種別のレジスタ202A~202Dの内容を表示し、計数終了信号CFが出力された時にはレジスタ202A~202Dの内容を金種別に合計して表示し、「普通紙」計数の場合は枚数表示を、「単金種」及び「複合金種」の場合は枚数、金額を表示させる加算モードと、
- (3) 枚数設定装置104で設定された枚数に一致すれば堆積台23にて収容紙幣検知装置129が紙幣を検知しておけば、計数終了検知装置126にて一致信号CNを入力して堆積台23に収容されている紙幣を取出せば再び搬送駆動部120が動作し、設定枚数未滿で計数紙幣無し信号NEが出力されて搬送駆動部120が停止すれば、再び搬置台2に紙幣を追加補充すると搬送駆動部120が再び動作し、所定枚数を計数し、その枚数を表示するパッチモードと、

を含んでいる。

このような構成において、今、単金種の紙幣を加算モードで計数する場合を例に挙げて説明する。

まず、計数種類選択ボタン105の「単金種」と、作動モード選択ボタン106の「加算モード」を選択する。そして、金種指定キー103の指定ボタンにより計数すべき紙幣の金種を指定すると、金種指定キー103から指定金種信号が

出力される。ここでは「万」の金種を指定したとする。

そして、次に計数すべき紙幣束を搬置台2に載せると収容紙幣検知手段122にて紙幣が検知され、この検知信号がスタート指令として搬送制御装置121に入力される。

かくして、搬送制御装置121は、搬送駆動部120を駆動させるための制御信号を出力し、搬置台2に載せられた紙幣束は順次1枚ずつベルト3により送出されて搬送される。

ところで、パターン検知装置111は搬送紙幣検知装置126と搬置台2との間に設けられているため、先ず、パターン検知装置11にて、搬送される紙幣のパターンが検知され、パターン検知信号が出力されてこれを入力する識別装置112は「万」の金種を示す識別信号を出力する。そして、金種照合装置114はこの識別信号と金種指定キー103からの金種信号とを入力し照合し、「一致」又は「不一致」の照合信号RFを出力する。そして、「不一致」であれば搬送制御装置121は搬送駆動部120を停止させる。なお、搬送駆動部120を停止させずに異金種排除装置123を作動させて、異金種の紙幣を堆積台23に搬送させずに排除させるようにしても良い。

そして、搬送されている紙幣はパターン検知装置111が設けられている位置から搬送紙幣検知装置126が設けられている位置に搬送されると、この搬送紙幣検知装置126は紙幣の通過により1パルスの搬送紙幣検知信号TNを出力する。この搬送紙幣検知信号TNは計数演算装置200の加算ゲート201に入力され、「一致」の照合信号RFを入力条件として金種記憶装置113から出力された金種信号に対応する「万」のレジスタ202Aに入力され計数される。そして、表示装置101の枚数表示部101Aにて計数した枚数を表示する。また、「万」のレジスタ202Aの内容を演算制御装置204にて金額に変換し、これを表示装置101の金額表示部101Bに表示する。かくして、順次1枚ずつ送出搬送される紙幣は1枚ずつ識別されると共に計数処理される。そして、搬置台2に搬置された紙幣が無くなれば、収容紙幣検知装置122は紙幣を検知せずその検知信号を出力しない。また、搬送紙幣検知装置126も紙幣を検知しなくなるため、タイ

マー回路125は搬送紙幣検知信号TNが出力されなくなつてから所定時間以上経過すれば計数紙幣無し信号を出力し、計数終了検知装置128は計数終了信号CFを出力して1次メモリ202のデータをメインメモリ203に転送して搬送駆動部120を停止させる。そして、載置台2に再び紙幣を載置すれば上述と同様の計数処理動作を繰返すことになる。

次に、計数種類選択ボタン105の「複合金種」、及び作動モード選択ボタン106の「計数モード」を選択した場合について述べると、

載置台2に複数金種混合の紙幣束が載せられると搬送駆動部120が作動し、紙幣が順次1枚ずつ送出搬送され、パターン検知装置111は搬送される紙幣の金種を判別するためのパターン検知信号を出力する。そして、識別装置112は金種を示す識別信号を出力するが、この時金種照合装置114はモード選択装置127よりモード信号MSを入力して動作しないようになっている。よつて、加算ゲート201は金種信号に応じて搬送紙幣検知装置126からの搬送紙幣検知信号TNを金種別に1次メモリ202のレジスタ202A~202Dに入力して計数する。そして、表示装置101の枚数表示部101A並びに金額表示部101Bにて金種別に枚数及び金額を表示する。なお、この表示装置は1つの表示手段だけを設けて別途金種別表示キーのキー操作により金種別に順次表示させてもよく、金種別のレジスタに対応して表示手段を設けても良い。

金額表示についても同様である。

次に、「加算モード」を選択した場合には、載置台2に載せられた複数金種混合の紙幣が無くなり、計数終了検知装置128にて計数終了信号CFが出力されると、計数演算制御装置204は金種別に設けられたレジスタ202A~202Dの内容を加算し、メインメモリ203内のトータル計数回路の内容を、つまり枚数及び金額を表示装置101にて表示する。そして、次に載置台2に紙幣束が載せられると自動的に搬送駆動部120が動作を開始し、加算ゲート201を経てレジスタ202A~202Dにて計数し、表示装置101にて表示し、計数終了すれば再び金種別にトータル枚数及び金額を表示する。なお、「複合金種」または「単金種」を選択した時、金種指定キ

ー103にて計数すべき金種を指定しておき、識別装置112からの識別信号を金種照合装置114にて照合して、指定された金種以外の紙幣であれば異金種紙幣排除装置123により別途設けられている排除口へ排除し、指定された金種のみの紙幣を堆積部23に搬送させて金種別に計数させても良い。

また、「普通紙」又は「パツチモード」の選択時には金種の識別は行なわれず、金種指定キー103もロックされる。

なお、上述の実施例では金種指定キー103の指定金種を金種記憶装置113が記憶し、この記憶金種を金種照合装置114で照合するようになっているが、識別装置112で最初に識別された金種を金種記憶装置113に記憶させ、これを金種照合装置114に入力させるようにしても良い。
(発明の効果)

本発明に係る紙幣識別計数機では紙幣の枚数を計数するとともに金額合計も算出して表示するため、オペレータは換算の手間がいらず、業務効率の向上を図ることができると共に正確さを向上させることができ複数金種が混在している場合は特に便利である。

又、計数された紙幣は再び一括して集積されるので、係員にとって一括して取出すことができ、入金紙幣の計数確認が早くできることから能率が向上する。

図面の簡単な説明

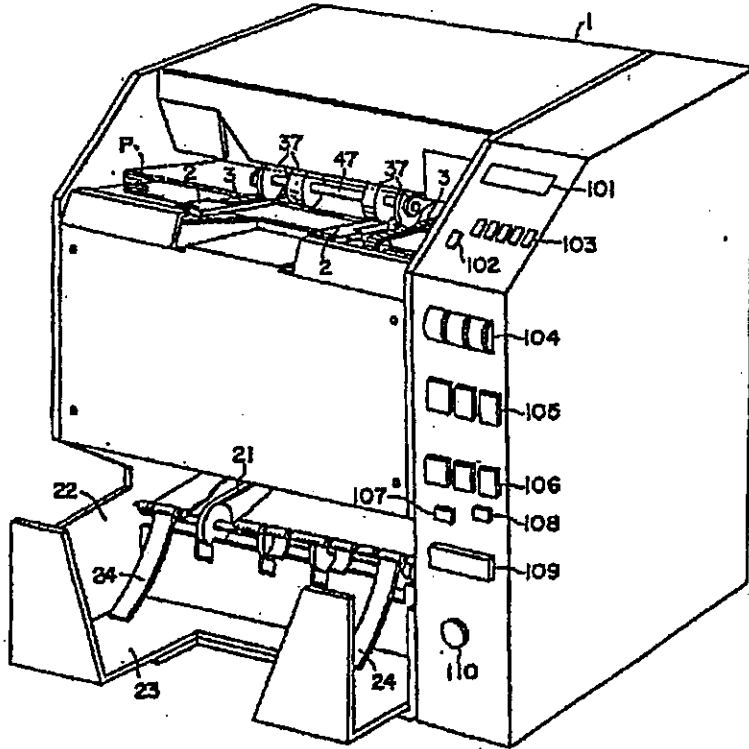
第1図はこの発明による紙幣計数機の外観図、第2図はその内部機構を示す図、第3図はその制御回路のブロック図、第4図はパターン検知装置の機構を示す図である。

101……表示装置、102……クリヤーキー、103……金種指定キー、104……枚数設定装置、105……計数種類選択ボタン、106……作動モード選択ボタン、107……トータルキー、108……サブトータルキー、109……ストップボタン、110……電源スイッチ、111……パターン検知装置、112……識別装置、113……金種記憶装置、114……金種照合装置、120……搬送駆動部、121……搬送制御装置、122、129……収容紙幣検知装置、123……異金種紙幣排除装置、124……事故検知装置、125……タイマー回路、128……排

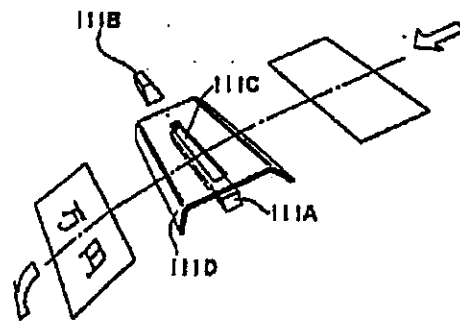
送紙精検知装置、127……モード選択装置、128……計数終了検知装置、200……計数演算装置、201……加算ゲート、202……1次メ

モリ、203……メインメモリ、204……演算制御装置。

第 1 図

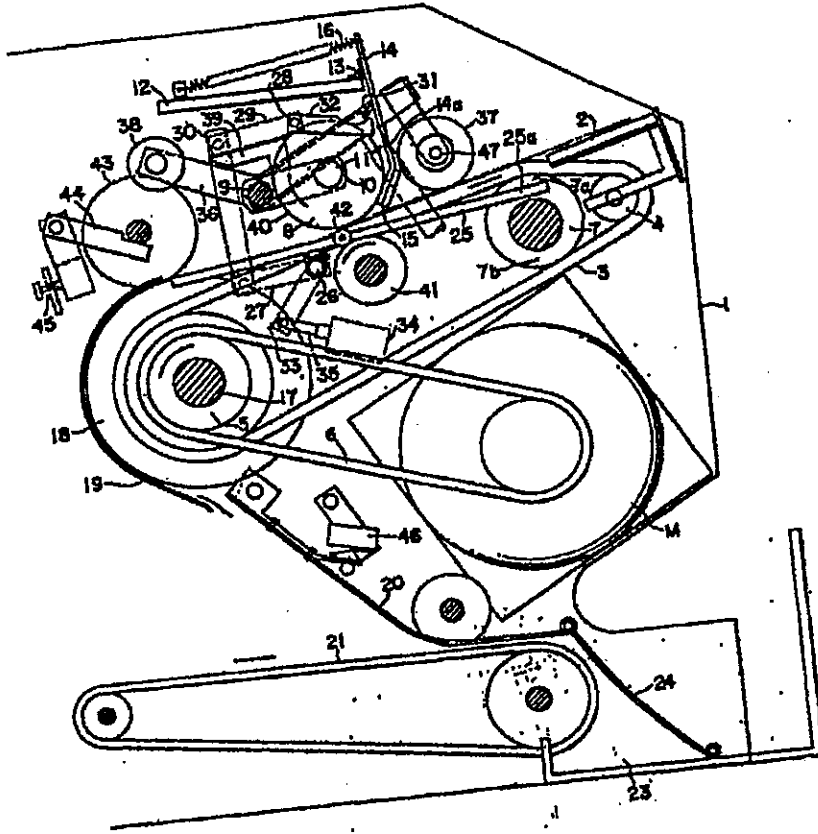


第 二 図

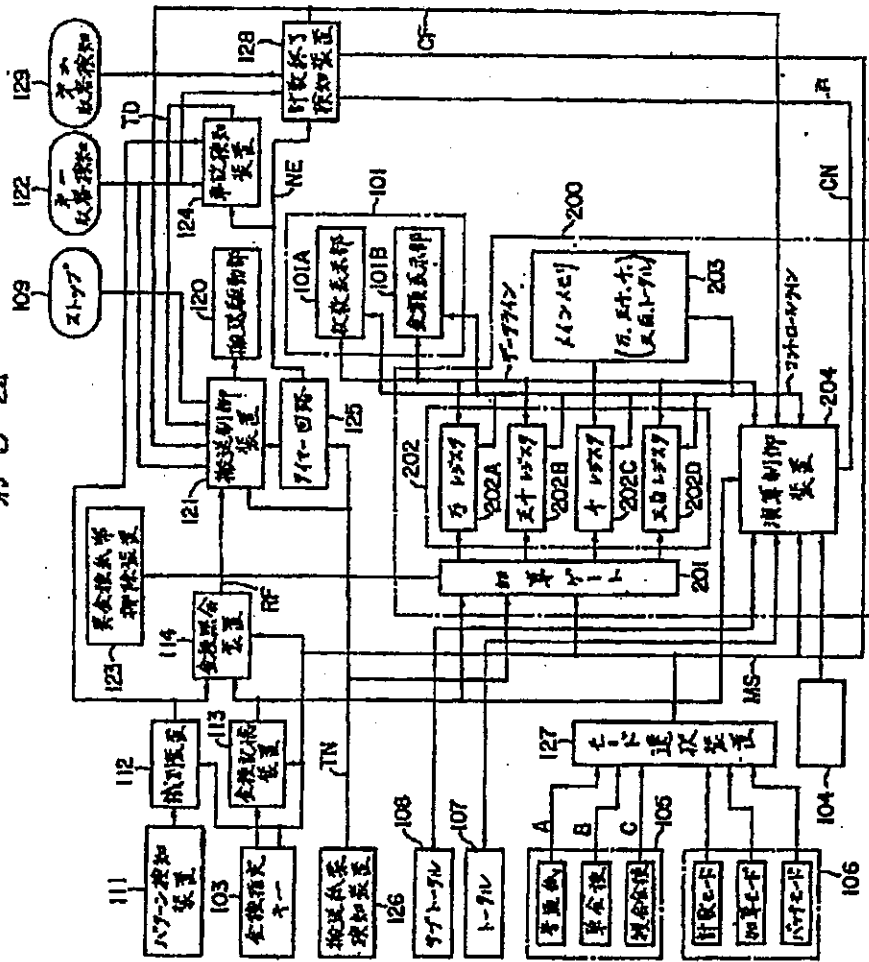


(8)

第 2 図



第 3 図





**Japanese-English
Technology
Services**

Dr. Warren Smith

27 Sandy Brook Dr.
Durham, NH 03824
1.603.674.2227

warren.smith@comcast.net

Serving the Global Technical and Legal Communities Since 1984

July 27, 2005

CERTIFICATION OF TRANSLATION

I, Dr. Warren Smith of JETS: Japanese-English Technology Services, 27 Sandy Brook Drive, Durham, NH 03824 hereby declare and certify:

I am well acquainted with and knowledgeable regarding both the Japanese and English languages;

I am the translator of the attached English translation of Japanese Examined Patent Application Publication S61-41439, sent in the same e-mail with this certification on July 27, 2005 to Manuel Nelson (MCNelson@Hblaw.com). Note that this is a re-edited version of an earlier translation of this document, re-edited to correct an omission in the previously submitted translation, and to correct some other minor inaccuracies in the earlier translation, thereby providing a translation that is more accurate and more complete than the previously submitted translation.

To the best of my knowledge and belief, the attached English translation is a true, correct, accurate and complete translation.

I further declare and certify that all statements made herein of my own knowledge are true and that all statements-made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under 18.U.S.C. § 1001.

Pursuant to 28 U.S.C. § 1746, I declare and certify under penalty of perjury that the foregoing is true and correct.

Date: July 27, 2005

Dr. Warren W. Smith
JETS: Japanese-English Technology Services
Durham, NH 03824
Warren.Smith@comcast.net
603-674-2227

EXH. S0010

(19) Japan Patent Office (JP)

(11) Japanese Examined Patent
Application Publication Number

(12) Japanese Laid-Open Patent
Application Publication (B2)

S61-41439

(51) Int. Cl.⁴

G 06 M 706
// B 65 H 300

Identification codes

JPO file numbers

7023-2F
7456-3F

(24)(44) Publication date: 9/16/1986

Number of inventions: 1 (Total of 9 pages)

(54) Title of the invention PAPER CURRENCY DISCRIMINATOR COUNTER MACHINE
(21) Japanese Patent Application S 52-138683
(22) Date of Application 11/18/1977
(65) Unexamined Patent Application S 54-71674
Publication Number
(43) Date of Publication of 6/8/1979
Unexamined Patent Application
(72) Inventor HATANAKA, Yoshihiro Glory Kogyo, KK
35 Shimoteno, Himeji
(72) Inventor DONO, Shugo Glory Kogyo, KK
35 Shimoteno, Himeji
(71) Applicant Glory Kogyo, KK 35 Shimoteno, Himeji
(74) Agent Patent attorney SATO, Kazuo and 1 other
Examiner SHIMOMURA, Shuzo
(56) References Japanese Examined Patent Application Publication S 55-37983 (JP, B1)

(57) Scope of Patent Claims

1. A paper currency discriminator counter machine, comprising,
a placement platform upon which the currency to be counted can be placed in a stack;
a currency feeder means that removes and transports, sequentially and one sheet at a time, the currency that has been placed;
a discriminator device that discriminates the denomination of the currency that is transported;
a counter and calculator device that calculates the count of currency notes by denomination, and calculates the total value, of said transported currency based on the denomination signals for multiple denominations, outputted from the discriminator device;
a display device that displays the details of the calculations by the counter and calculation device; and
a stacker platform that accumulates together the bills for which the denominations have been discriminated by said discriminator device.

Detailed Description of the Invention

(Area of Use in Industry)

The present invention relates to currency discriminator/counter devices that perform specific processes, such as counting, by feeding currency one note at a time, such as deposited money, placed on the placement platform, used in financial institutions such as banks.

(Prior Art and Problems Therewith)

Currency counters used in financial institutions, such as banks, are equipped with functions for

removing and transporting, one note at a time, a large number of notes stacked on the placement platform, to count the number of the currency notes, to display the number of notes counted, and to automatically stop feeding after a specific number of currency notes have been dispensed.

However, when a bank teller wishes to know, for example, the value of a deposit of currency received from a customer, it has been necessary to manually sort into denominations and then use a counting machine to count for each denomination, and then calculate the value after viewing the counts [for each denomination], with the problem that this increases the probability of calculation errors, also reducing the reliability of the teller himself or herself.

Moreover, if a currency type counter, positioned at the teller window, were used, then not only would the currency be stacked in types by denomination, but also the teller would know the currency count by the display of the count for each denomination; however, when the currency is separated by denomination, the teller must then again gather together the currency, once it has been separated, increasing the complexity [of the operations]. Furthermore, [the teller] must view the denominations and the displays for each, and take the time to compare to the deposited money and deposit slip provided by the customer.

Consequently, the object of the present invention is to provide a paper currency discriminator counter machine device that feeds, one note at a time, currency stacked on a placement platform to discriminate the denominations to not only calculate and display the total value automatically, but that also makes it easy to again gather together the currency to remove the currency after counting.

(Means By Which to Solve the Problem)

A paper currency discriminator counter machine, comprising, a placement platform upon which the currency to be counted can be placed in a stack; a currency feeder means that removes and transports, sequentially and one sheet at a time, the currency that has been placed; a discriminator device that discriminates the denomination of the currency that is transported; a counter and calculator device that calculates the count of currency notes by denomination, and calculates the total value, of said transported currency based on the denomination signals for multiple denominations, outputted from the discriminator device; a display device that displays the details of the calculations by the counter and calculation device; and a stacker platform that accumulates together the bills for which the denominations have been discriminated by said discriminator device.

(Operation)

The device according to the present invention removes and transports, sequentially and one note at a time, currency from a currency bundle placed on a placement platform, and, at the same time, discriminates the denomination of the currency that is being fed and outputs denomination signals, where, based on the denomination signals, a count is kept for each denomination and the total value is calculated to display, on a display device, the count for each denomination and the total value, and to stack together, on a stacker platform, the currency for which the denominations have been discriminated. Doing so makes it possible to improve the capability and accuracy, particularly in teller work.

(Examples of Embodiment)

An example embodiment according to the present invention will be explained below, in reference to the drawings.

In Fig. 1, a paper currency placement platform 2 is equipped on one side of the top of the counter machine main unit 1 conveyor belts 3 and 3 are provided as a paper currency conveyer means in the directions of each of the sides of this paper currency placement platform 2.

As shown in Fig. 2, the aforementioned conveyor belts 3 and 3 are wrapped between the respective pulleys 4 and 5, where indentations and protrusions are fabricated on the outer surface of these belts 3 and 3 in order to increase the frictional force with the paper currency P. One of the aforementioned pulleys 5 is

[configured] so as to apply a driving [force] in the direction of the arrow from the motor M via a belt 6, and an eccentric pulley 7 is positioned at a point corresponding to the inner edge part of the aforementioned placement platform 2, where, when the maximum radius part 7a of this eccentric pulley 7 is in contact with the back surface of the top travel-side belt, the outer surface of this belt protrudes somewhat in the upper direction beyond the top surface of the aforementioned placement platform 2, and when the minimum radius part 7b thereof is in contact, the outer surface part of said belt falls to a position below the top surface of the placement platform 2, so that the vertical motion of the conveyer belts 3 and 3 causes intermittent feeding, one sheet at a time, from the bottom most position of the stack of paper currency P on top of the placement platform 2.

A reverse-rotation roller 8, the outer surface of which rotating in the opposite direction from these belts, is disposed on the top surface of the middle part of the aforementioned conveyer belts 3 and 3 with a spacing with the top surface of the conveyer belts 3 and 3 through which at least one paper currency sheet can pass, [positioned] by an axle 11 that is supported on the tip end of an arm 10 which is affixed to an axle 9, where a guide pulley 41 that constrains the position of these belts 3 and 3 is disposed on the inner surface side of these belts 3 and 3 corresponding to this reverse-rotation roller 8.

At the paper currency in-feed side of said reverse-rotation roller 8 is equipped swivalably a retainer member 14, the top part thereof supported by an axle 13 on a member 12 on the counter machine main unit 1 side, where rods 15 and 15 are equipped vertically on the bottom edge part 14a thereof in a position that avoids the belts 3 and 3 and the peripheral surface of the reverse rotation roller 8, where [said retainer member 14] is bent at a specific angle towards said reverse-rotating roller 8 so as to follow along the reverse-rotating roller 8 and the feed belts 3 and 3 in the gap between the rods 15 and 15, where the bottom part 14a is usually biased in the direction opposite that of the reverse-rotation roller 8 by the spring 16.

A large diameter roller 18 is attached to the pulley axle 17 of the drive side of said conveyer belts 3 and 3, where an arc-shaped guide plate 19 is equipped with a small-tolerance gap from the peripheral surface of the roller 18. A chute 20 that guides the leading edge of the paper currency P is equipped continuous with the bottom edge of this guide plate 19. The bottom edge of this chute 20 faces the top surface of a feed belt 21 that is equipped in the horizontal direction. The end of this feed belt 21 faces the removal aperture 22 of the counter machine main unit 1, and is structured so as to eject the paper currency P over the paper currency stacking platform 23 equipped in this removal aperture 22. Above this stacking platform is equipped a retainer plate 24 that has spring properties, the base of which being secured to the counter main unit 1 side, [configured] so that the paper currency P ejected over the stacking platform will not become scattered.

Between said conveyer belts 3 and 3, a lift plate 25, the front edge of which extending to the vicinity of the inside of said stacking platform 2 and the back edge of which extending to the vicinity of the pulley 5 on the back side, is supported swivalably by an axle 26 in a position that is somewhat further back from that of said reverse rotation roller 8, where the top surface of this lift plate 25 is positioned somewhat higher than the top surface of the conveyer belts 3 and 3 that are pushed up by the eccentric pulley 7, when the front part side 25a thereof is pushed up, and when the same [(i.e., the front part side 25a)] is down, the top surface of the front part side 25a is positioned by the axle 26 to be somewhat lower than the top surface of the belts 3 and 3, which are in the state described above.

An arm 27 is secured to said axle 26, where the tip of this arm 27 is linked by a link 30 to the top of the arm 29 that pivots on the axle 28, where an operating lever 32, which is linked to a protrusion 31 equipped on the back surface of the aforementioned retainer member 14 and which displaces the bottom edge part 14a of the retainer member 14 to a position that is withdrawn back from the front peripheral surface of the reverse rotation roller 8 and the position that protrudes to the front side of the reverse rotation roller 8 (the state shown in Fig. 2), or in other words, to a position wherein a part of the peripheral surface of the reverse rotation roller 8 protrudes from between the rod parts 15 of the retainer member 14, is affixed to said axle 28. A lever 33 is affixed to the top part of said axle 26, where the plunger 35 of a solenoid 34 is linked to the tip of this lever 33 so that when the solenoid 34 is activated, the retainer member 14 is pulled towards the reverse rotation roller 8 when the tip part side 25a of the lift plate 25 moves in the upward direction.

As is shown in Fig. 2, in a press device the bend parts of a pair of left and right support arms 36 and 36, which are bent to the required obtuse angle, are supported on the aforementioned axle 9, which is inserted therein, where, at the tip side of said support arms 36 and 36, press rollers 37, 37, . . . are supported by an axle 47, and a weight 38 is supported on the other end of the support arms 36 and 36. When it comes to the aforementioned press roller 37, 37, . . . side, the press roller 37, 37, . . . side is formed so as to be heavier than the aforementioned weight 38 side, due to the lever ratio or due to the mass itself, and at this time, there is a specific angle between the line joining the center of the press rollers 37, 37, . . . to the center of the axle 9, and the line joining the axle 9 to the center of the weight 38. Furthermore, at the top surface of the back part of the aforementioned support arm 36 is disposed, so as to be able to contact freely, a stopper 39, which is affixed to an arm 10 that supports the axle 11 of the aforementioned reverse rotation roller 8, so as to establish the relative positioning between the press roller 37 and the reverse rotation roller 8. Furthermore, on the side part of the front side 25a of the aforementioned lift plate 25 is attached at roller 42, which can contact freely the peripheral surface of the roller member 40, which is coaxial with the aforementioned reverse rotation roller 8, so that when the front side 25a of the lift plate 25 is moved upwards, the reverse rotation roller 8 also moves upwards so that a constant gap is maintained between the top surface of the lift plate 25 and the peripheral surface of the reverse rotation roller 8, so that when the conveying is stopped, any paper currency P remaining on the lift plate 25 will reliably be sent back in the direction of the placement platform 2.

In the figure, 43 is a counter roller that contacts the peripheral surface of the aforementioned large diameter roller 18, and when the paper currency P passes between these rollers 18 and 43, the movement of the counter roller 43 in its upward displacement is picked up and amplified by the lever 44, where the counter switch 45 is opened and closed by the lever 44 to count the number of sheets that pass, where 46 is an emergency stop switch that operates when too much paper currency P is stacked on the stacking platform 23, or when the paper currency P jams during conveying.

Additionally, the front panel of the counter machine 1 is equipped with a display device 101 that displays the value and the number of paper currency notes that have been counted, a clear key 102 that clears all data, a denomination specification keys 103 for specifying the denominations of the paper currency, a note count setting device (a digital switch) 104 for setting the number of notes of the paper currency to be counted, count type selection buttons 105 for selecting the types of paper currency to be counted (plain paper, single denominations or mixed denominations, operating mode selection buttons 106 for selecting the operating modes for the counter machine (counting mode, adding mode, or batching mode) a total key 107 for providing an instruction to display the data from the main memory, described below, a subtotal key 108 for providing an instruction to display the data from the temporary memory, described below, a stop button 109 for stopping all operations, and a power switch 110.

The counting machine, as described above, is controlled by the control circuit shown in Fig. 3. In Fig. 3, 111 is a pattern detection device that is equipped in the conveyer path for discriminating the denomination of the paper currency being conveyed, comprising the photoelectrical devices of a [phototransmitter 111a and] a photoreceiver 111b, with a scan slit plate 111d with an elongated phototransparent slit 111c disposed therebetween, as shown in Fig. 4. Furthermore, 112 is a discriminator unit that discriminates the denomination of the paper currency by inputting a pattern detection signal from the pattern detection device 111. 113 is a denomination memory device that stores in memory the denomination data specified by the denomination specification key 103. 114 is a denomination comparison device that outputs a comparison signal after comparing the discriminated denomination [from] the discriminator unit 112 to the stored denomination [from] the denomination memory device 113. 121 is a conveyer control device for controlling the driving of the conveyer drive unit 120 for conveying the paper currency, where the conveyer drive unit 120 is driven, using as the start command a detection signal from a first receptacle paper currency detector device 122 that detects paper currency placed on the placement platform 2, where the paper currency placed on the placement platform 2 is taken up a single note at a time and conveyed onto the paper currency stacking platform 23, at which time the comparison signal RF from the denomination comparison device 114 is inputted, and if the signal indicates a mismatch, the conveyer drive unit 120 is stopped. Note that an dissimilar paper currency rejector device 123 may be provided and a comparison signal RH [SIC - "RF"] may be inputted from the denomination comparison device 114 so that if there is a mismatch the applicable paper currency can be rejected to a rejection aperture, equipped

separately, rather than being conveyed to the paper currency stacking platform 23. Moreover, the conveyer drive unit 120 is stopped, even if conveyer drive is in process, if a stop signal is inputted from the stop button 109.

On the other hand, 124 is a fault detector device for stopping the conveyer drive unit 120, via the conveyer control device 121, by outputting a fault detection signal TD, [assuming] a fault such as a jam of paper currency within the conveyer path, when a "no paper currency counted" signal NE is outputted from a timer circuit 125, described below, when paper currency placed on the placement platform 2 is detected by the first receptacle paper currency detector device 122. 126 is a conveyed paper currency detector device for detecting, using a photoelectric device, or the like, paper currency conveyed by the conveyer drive unit 120. The timer circuit 125 outputs the "no paper currency counted" signal after inputting a control signal from the conveyer control unit 120 if the detection signal TN is not inputted within a specific period of time after a conveyed paper currency detection signal TN has been inputted from the conveyed paper currency detector device 126.

The mode select device 127 is for selecting the mode for the count processing, where counting continues until there is no more of the currency that had been placed on the placement platform 2, at which time the conveyer drive unit 120 is stopped automatically the conveyer control device 121 based on the counting complete signal CF from a counting complete detector device 128. Note that the second receptacle paper currency detector device 129 detects paper currency that has been conveyed onto the paper currency stacking platform 23.

Thereafter, the count calculation device 200 comprises an adder gate 201, a temporary memory 202 comprising registers 202a through 202d, a main memory 203, and a calculation control device 204, where, based on the paper currency detection signal from the conveyed paper currency detector device 126, and on the denomination signal from the denomination memory device 113, not only are the number of notes counted for each denomination, but the count results for the run are added to the main memory 203 [when there is] a counting complete signal CF. Moreover, the data from the temporary memory 202 and the from the main memory 203, and the data wherein said data has been converted into a monetary value, can be displayed on the display device 101. The temporary memory 202 comprises registers 202a through 202d for each of the denominations of "10,000 yen," "5,000 yen," "1,000 yen," and "500 yen," where the number of notes of each denomination is stored, and when counting mixed denominations, the use of the denomination specification keys 103 together with the subtotal key 108, or in other words, the operation of the function keys, will display [the individual totals] on the display device 101 through the calculation control device 204. Furthermore, not only does the main memory 203 have memory parts for the same four denominations of "10,000 yen," "5,000 yen," "1,000 yen," and "500 yen," as with the temporary memory, but also stores the total value, where the use of the denomination specification keys 103 and the total key 107, or in other words, the operation of the function keys, displays the aforementioned data on the display device 101. Moreover, the calculation control device 204 converts into individual monetary values the data for the stored counts for each of the denominations in the temporary memory 202 through the adder gate 201 when [the operating mode] is the single denomination count [mode] or the plain paper [mode] and sends the monetary values together with the note count data to the display device 101, to be displayed. Moreover, when in mixed denomination count [mode], operating the denomination specification keys 103 and the subtotal key 108 causes the data for each of the denominations, counted and stored in the temporary memory 202, to be converted to monetary values and sent together with the note count data to the display device 101, to be displayed. When there is an instruction from the subtotal key 108, the calculation control device 204 adds the data from the temporary memory 202 to the appropriate denomination parts of the main memory 203, so that when there are instructions from the total key 107 and the denomination specification keys 103, the data that is stored for each denomination in the main memory 203 is converted into individual value data, and sent along with the note count data to the display device 101, to be displayed. Thereafter, when in batching mode, the data within the temporary memory 202 for each of the denominations is constantly checked based on the operation of the note count setting device 104 to output a match signal CN when the number of notes is matched.

Note that when the display of the data from the main memory 203 is specified, operating the total key 107 before operating the denomination specification keys 103 causes a main memory display command to

be applied to the calculation control device 204, and when the display of the data from the temporary memory 202 is specified, or when the addition of the data from the temporary memory 202 to the main memory 203 is specified, operating the subtotal key 108 in advance of operating the denomination specification key 103 causes the applicable calculation command to be applied to the calculation control device 204. Moreover, the display device 101 is divided into a note count display unit 101a and a denomination display unit 101b, where, for single-denomination (or plain paper) [mode], normally the number of counted notes will be displayed while counting the applicable denomination, but while in mixed-denomination [mode] or for a total readout, the applicable denomination data will be displayed, based on the specific operation. Furthermore, the mode select device 127 inputs the various signals from the count type selection buttons 105 and the operating mode select buttons 106, and outputs a mode signal MS for the mode in which the counting process is to be performed, where, when the batching mode is selected, and when "plain paper" is selected in either "count" or "add" mode, the discriminator unit 112, the denomination specification keys 103, and the denomination memory device 113 are disabled, and the paper currency detector signal that is outputted from the conveyed paper currency detector device 126 will count the number of notes using the "10,000 yen" denomination register 202A.

On the other hand, the operating mode select button 106 selects the mode in which the counting is done, including the following [modes]"

- (1) A counting mode wherein counting proceeds until all of the paper currency notes placed on the placement platform 2 are gone, [at which time] the conveyer drive unit 120 is stopped automatically by the counting complete signal CF from the counting complete detector device 128, where only the number of notes is displayed for counting "Plain Paper," or for "Single Denomination" or "Mixed Denominations," the number of notes and monetary value will be displayed.
- (2) An adder mode wherein the paper currency placed on the placement platform 2 is counted sequentially, the contents of the registers 202a through 202d for each denomination are displayed during counting, and when the counting complete signal CF has been outputted, totals are displayed for the contents of the registers 202a through 202d for each denomination, where only the number of notes is displayed for the "Plain Paper" counting [mode], and the number of notes and the monetary value are displayed for "Single Denomination" or "Mixed Denominations" [modes].
- (3) A batching mode wherein, once the number of notes set in the note count setting device 104 has been matched, then if paper currency is detected by the receptacle paper currency detector device 129 on the stacker platform 23, then the match signal CN is inputted by the counting complete detector device 128, and if the paper currency stored on the stacker platform 23 is removed, then the conveyer drive unit 120 will begin to operate again, and if the "no paper currency counted" signal NE is outputted to stop the conveyer drive unit 120 prior to reaching the set number of notes, then when additional paper currency notes are placed on the placement platform 2, the conveyer drive unit 120 will begin to operate again, counting the specific number of notes, where the number of notes is displayed.

An example will be explained for the case wherein single-denomination paper currency is counted in adder mode using this type of structure.

Firstly, "Single Denomination" is selected for the count type selection button 105 and "adder mode" is selected for the operating mode selection button 106. After this, when the specified button of the denomination specification keys 103 specifies the denomination of the paper currency to be counted, the specified denomination signal is outputted from the denomination specification keys 103. Here it is assumed that the "10,000 yen" denomination has been specified.

After this, when a stack of paper currency to be counted is then placed on the placement platform 2, the paper currency is detected by the receptacle paper currency detector means [SIC] 122, and this detector signal is inputted into the conveyer control device 121 as the start instruction.

In this way, the conveyer control device 121 outputs a control signal for driving the conveyer drive unit 120, and the stack of paper currency placed on the placement platform 2 is fed by the belt 3, one note at a time, for conveying.

The pattern detector device 111 is equipped between the conveyed paper currency detector device 126 and the placement platform 2, and thus the pattern of the paper currency being conveyed is detected by the pattern detector device 111 to output a pattern detection signal, and the discriminator unit 112, which input this signal, outputs a discrimination signal indicating that the denomination is "10,000 yen." The denomination comparator device 114 compares this discrimination signal to the denomination signal from the denomination specification keys 113, and outputs a comparison signal RF [indicating] either "match" or "mismatch." If "mismatch," then the conveyer control device 121 stops the conveyer drive unit 120. Note that, instead, a dissimilar denomination rejection device 123 can be actuated without stopping the conveyer drive unit 120 to reject the paper currency of the dissimilar denomination without sending said paper currency to the stacker platform 23.

Moreover, when the paper currency that is being conveyed is conveyed from the position wherein the pattern detector device 111 is equipped to the position wherein the conveyed paper currency detector device 126 is equipped, this conveyed paper currency detector device 126 outputs a single-pulse conveyed paper currency detection signal TN when the paper currency goes by. This conveyed paper currency detector signal TN is inputted into an adder gate 201 of a calculation device 200, and, conditional upon the input of a "match" comparison signal RF, is inputted into, and counted by, the register 202A for the "10,000 yen" [denomination] corresponding to the denomination signal that is inputted from the denomination memory device 113. The number of notes counted is displayed on the note count display unit 101a of the display unit 101. The contents of the "10,000 yen" register 202a are converted into a monetary value by the calculation control unit 204, where this [monetary value] is displayed on the monetary value display unit 101b of the display unit 101. Given this, the paper currency that is fed and conveyed one note at a time is discriminated one note at a time, counted, and processed. When the paper currency on the placement platform 2 has been depleted, the receptacle paper currency detector device 122 no longer detects the paper currency and outputs such a detection signal. Moreover, if more than the specified amount of time elapses after the conveyed paper currency detection signal TN ceases to be outputted because the conveyed paper currency detector device 126 also does not detect paper currency, then the timer circuit 125 will output a "no paper currency counted" signal, and the counting complete detector device 128 will output the counting complete signal CF, the data from the temporary memory 202 will be sent to the main memory 203, and the conveyer drive unit 120 will be stopped. At this time, if more paper currency is placed on the placement platform 2, the counting process operations described above will be repeated.

Next will be described the case wherein "Mixed Denominations" is selected for the count type selection buttons 105 and "counting mode" is selected for the operating mode selection buttons 106.

When a stack of paper currency "notes" of multiple mixed denominations is placed on the placement platform 2, the conveyer drive unit 120 is actuated and the paper currency is fed and conveyed one note at a time, and the pattern detector device 111 outputs pattern detection signals for discriminating the denominations of the paper currency [notes] being conveyed. Although the discriminator unit 112 outputs discrimination signals indicating the denominations, at this time the denomination comparator device 114 inputs the mode signal MS from the mode selector device 127, and so does not operate. Consequently, the adder gate 201 inputs the conveyed paper currency detector signals TN from the conveyed paper currency detector device 126 into the respective registers 202a through 202d for the individual denominations in the temporary memory 202, according on the denomination signals, where the conveyed paper currency detector signals TN are counted. The note count, by denomination, and the monetary value are displayed on the note count display unit 101a and the monitor value display unit 101b of the display unit 101. Note that this display device may be equipped with only a single display means that may display sequentially the various denominations depending on the operation of separate denomination display keys, or may have a display means corresponding to the individual denomination registers.

The same is true for the display of the monetary values.

Next, when the "adder mode" is selected and the multiple denomination mixed paper currency placed on the placement platform 2 has been depleted so that the counting complete signal CF is outputted by the counting complete detector device 128, the counting calculation control device 204 adds the contents of the registers 202a through 202d, equipped for each individual denomination, and displays on the display device

101 the contents of the total count circuits in the main memory 203, or, in other words, displays the number of notes and the monetary value. Following this, when a stack of paper currency is again placed on the placement platform 2, the operation of the conveyer drive unit 120 is started automatically, counting is performed by the registers 202a through 202d via the adder gate 201, [the counts] are displayed on the display device 101, and when the counting has been completed, again the total number of notes and monetary values are displayed for each denomination. Note that when "Mixed Denominations" or "Single Denomination" is selected, multiple denominations to be counted may be specified using the denomination specification keys 103 so that the discrimination signals from the discriminator unit 112 are compared by the denomination comparator device 114 so that if there is paper currency of a denomination other than the specified denomination(s), the paper currency will be discharged to a discharge aperture, equipped separately, by a dissimilar denomination paper currency rejecter device 123 so that only paper currency of the specified denominations will be sent to the stacker unit 23 and counted by denomination.

Moreover, when "plain paper" or "batching mode" is selected, the denomination discrimination is not performed, and the denomination specification keys 103 are locked.

Note that even though in the example embodiment described above, the denominations specified using the denomination specification keys 103 were stored by the denomination memory device 113 so that the stored denominations were compared in the denomination comparator device 114, instead the denomination initially discriminated by the discriminator unit 112 may be stored in the denomination memory device 113, and this [denomination] may be inputted into the denomination comparator device 114.

(Effects of the Invention)

The paper currency discriminator counter machine according to the present invention not only counts the number of notes of a paper currency, but calculates and displays the total monetary value, and thus is able to increase operational efficiency by eliminating the work involved with the operator doing the calculations, and is able to increase accuracy, and is especially convenient when multiple denominations are mixed together.

Moreover, because the paper currency that has been counted is restacked all together, it is possible for the staff member to remove all of the paper currency at once, improving the efficiency by making it possible to quickly confirm the count of deposited paper currency.

Simple Explanation of Drawings

Fig. 1 is an external oblique view of a paper currency discriminator counter machine according to the present invention. Fig. 2 is a figure showing the internal mechanism thereof. Fig. 2 is a block diagram of the control circuitry. Fig. 4 is a figure showing the structure of the pattern detector device.

101:	Display device	122, 129:	Receptacle paper currency detector device
102:	Clear key	123:	Dissimilar denomination paper currency rejecter device
103:	Denomination specification keys	124:	Fault detector device
104:	Note count setting device	125:	Timer circuit
105:	Count type selection buttons	126:	Conveyed paper currency detector device
106:	Operating mode selection buttons	127:	Mode selector device
107:	Total key	128:	Counting complete detector device
108:	Subtotal key	200:	Count calculation device
109:	Stop button	201:	Adder gate
110:	Power supply switch	202:	Temporary memory
111:	Pattern detector device	203:	Main memory
112:	Discriminator unit	204:	Calculation control device
113:	Denomination memory device		
114:	Denomination comparator device		
120:	Conveyer drive unit		
121:	Conveyer control device		

Representative of Applicant: Representative: SATO, Kazuo, and one other

Figure 1

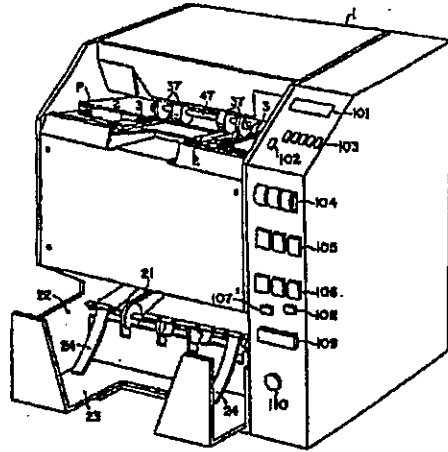


Figure 2

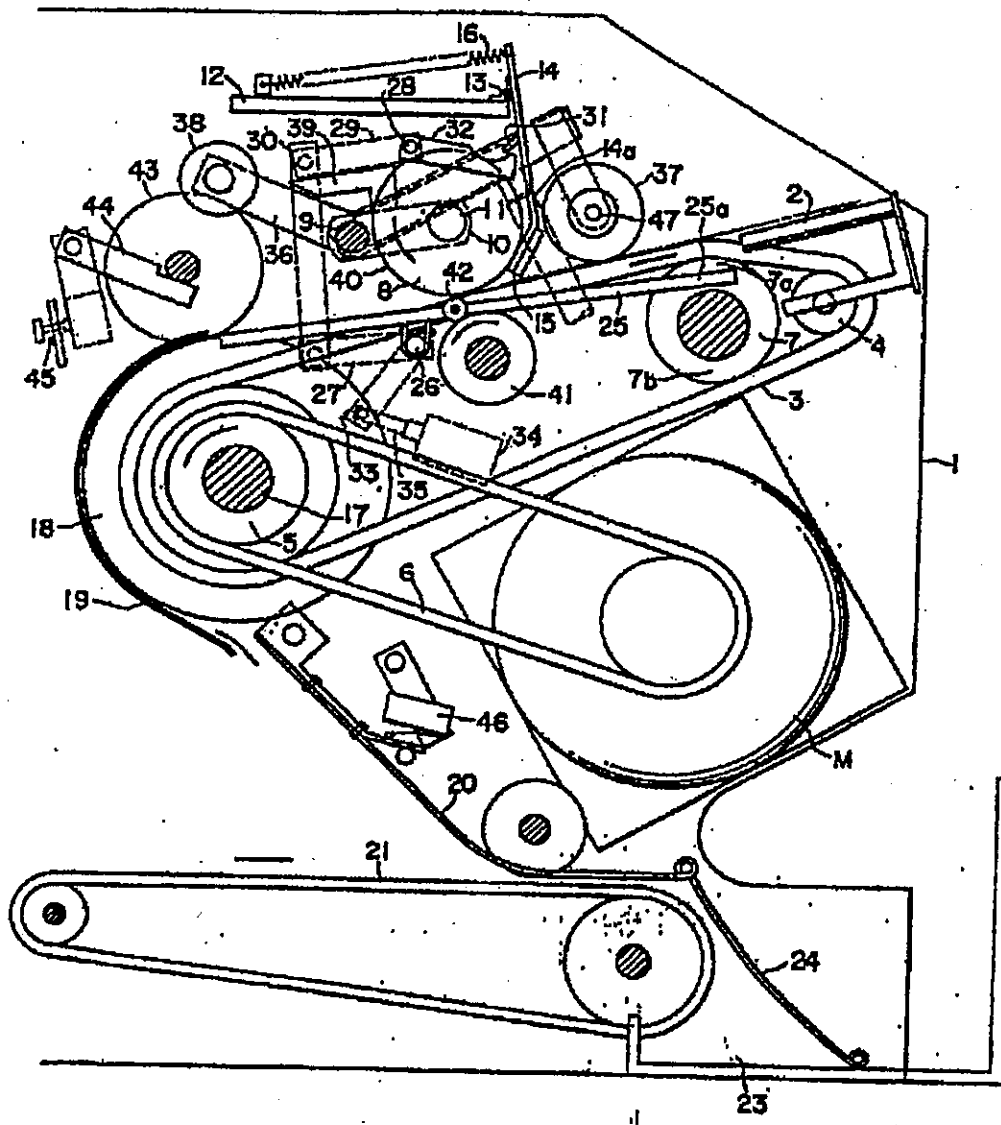


Figure 4

