

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Reexamination of: Raterman et al. ) Examiner: [not assigned]  
Filing Date: August 12, 2009 ) Group Art Unit:  
U.S. Patent No.: 7,536,046 ) Confirmation No.  
Date of Issue: May 19, 2009 )  
For: METHOD AND APPARATUS FOR )  
CURRENCY DISCRIMINATION AND )  
COUNTING )  
)

**REQUEST FOR *INTER PARTES* REEXAMINATION OF  
UNITED STATES PATENT NO. 7,536,046 (RATERMAN ET AL.)**

Mail Stop INTER-PARTES REEXAM  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

This is a Request by Mahbub A. Siddiqui (“Requester”), through its undersigned counsel Conley Rose, P.C. for *inter partes* reexamination of U.S. Patent No. 7,536,046 (“the ‘046 patent”), which issued May 19, 2009. Reexamination is requested of claims 1-30, 35-48, and 53-124 of the ‘046 patent. A citation of the patents and printed publications which are presented to provide a substantial new question of patentability is provided in the attached form PTO/SB/08A.

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## II. REQUIREMENTS UNDER 37 C.F.R. § 1.915(B)

In accordance with the provisions of 37 CFR § 1.915(b)(7), it is certified that the estoppel provisions of §1.907 do not prohibit the requested *inter partes* reexamination.

The complete name and address of the Requester, the real party in interest for this Request, is as follows:

Mahbub A. Siddiqui  
725 Kapiolani Blvd., Suite 3305  
Honolulu, Hawaii 96813

All communications should be directed to the undersigned counsel for Requester:

Thomas L. Warden  
Conley Rose, P.C.  
600 Travis Street, Suite 7100  
Houston, Texas 77002

The telephone number of counsel for the Requester is (713) 238-8000.

This Request includes the following items in compliance with 35 U.S.C. § 311 and 37 CFR § 1.915(b):

1. An identification of the patent by patent number and every claim for which reexamination is requested.
2. A citation of the patents and printed publications that are presented to provide a substantial new question of patentability.
3. A statement pointing out each substantial new question of patentability based on the cited patents and printed publications, and a detailed explanation of the pertinency and manner of applying the patents and printed publications to every claim for which reexamination is requested.
4. A copy of every patent or printed publication relied upon or referred to in paragraphs (1) through (3), accompanied by an English language translation of all necessary and pertinent parts of any non-English language document.
5. A copy of the entire patent including the front face, drawings, and specification/claims (in double column format) for which reexamination is requested, and a copy of any disclaimer, certificate of correction, or reexamination certificate issued in the patent.

6. A certification by the third party Requester that a copy of the Request has been served in its entirety on the Patent Owner at the address provided for in [37 C.F.R.] § 1.33(c).
7. A certification by the third party Requester that the estoppel provisions of [37 C.F.R.] § 1.907 do not prohibit the *inter partes* reexamination.
8. A statement identifying the real party in interest to the extent necessary for a subsequent person filing an *inter partes* reexamination request to determine whether that person is a privy.

In accordance with 37 CFR § 1.915(b)(6), it is certified that a copy of this Request is being served, in its entirety and by first class mail, on the Patent Owner's attorney of record in the patent file (37 C.F.R. §§ 1.33(c)), namely:

CUMMINS-ALLISON CORP. c/o  
Nixon Peabody, L.P.  
300 S. Riverside Plaza  
16th Floor  
Chicago, Illinois 60606  
Date of Service: August 12, 2009.

Please charge Deposit Account No. 03-2769 of Conley Rose, P.C., Houston, Texas in the amount of \$8,800.00 for the reexamination fee required under 37 CFR § 1.20(c)(2). During the prosecution of this reexamination, the Director is hereby authorized to charge any additional fees or credit any overpayment of fees to Deposit Account No. 03-2769 of Conley Rose, P.C., Houston, Texas.

### III. NOTICE OF OTHER PENDING REEXAMINATION OF RELATED PATENTS

Requester hereby notifies the Patent Office that the following reexaminations are presently pending for other patents also owned by the Patent Owner and which are related to the '046 patent:

Reexam. Control No.	Filing Date	Patent
90/010,057	Jan. 15, 2008	5,966,456
90/010,059	Jan. 16, 2008	5,909,503
90/010,060	Jan. 16, 2008	6,381,354

<b>Reexam. Control No.</b>	<b>Filing Date</b>	<b>Patent</b>
90/010,212	June 27, 2008	5,966,456
90/010,217	July 8, 2008	6,381,354
95/001,029	Feb. 2, 2008	6,459,806

#### **IV. IDENTIFICATION OF CLAIMS AND PRIOR ART**

In accordance with 35 U.S.C. §311 and 37 C.F.R. §1.913, Requester respectfully seeks reexamination of claims 1-30, 35-48, and 53-124 of the '046 patent, in view of the following prior art references:

- Exhibit B: U.S. Patent No. 4,179,685 (O'Maley)<sup>1</sup>
- Exhibit C: U.S. Patent No. 4,464,786 (Nishito)
- Exhibit D: U.S. Patent No. 4,592,090 (Curl)
- Exhibit E: U.S. Patent No. 4,761,002 (Reed)
- Exhibit F: U.S. Patent No. 4,830,742 (Takesako)
- Exhibit G: U.S. Patent No. 5,680,472 (Conant)
- Exhibit H: Japanese Patent Publication No. 61-14557 (with English Translation) (Hatanaka)
- Exhibit I: Glory Ltd., Instruction Manual Model GFR-100 Currency Reader Counter (Aug. 31, 1995) ("GFR-100 Instruction Manual")
- Exhibit J: Glory Ltd., Service Manual Currency Reader Counter GFR-100 (December 1995) ("GFR-100 Service Manual")

Additionally, the following documents provide an explanation of the relevancy of the applied prior art with respect to the invalidity of the claims of the '046 patent:

- Exhibit K: Declaration of Tom Glesener
- Exhibit L: Declaration of Hiroya Mouri
- Exhibit M: Declaration of Stephen G. Emery
- Exhibit N: Declaration of Philip C. Dolsen
- Exhibit O: Declaration of Toshio Numata
- Exhibit P: U.S. Patent Application Serial No. 07/745,111 (filed February 5, 1990)
- Exhibit Q: U.S. Patent Application Serial No. 07/885,648 (filed May 19, 1992)

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<sup>1</sup> A copy of the '046 patent is attached as Exhibit A.

The bases of this reexamination Request are discussed below, and a detailed comparison of the claims to the prior art is provided in Appendices 1-9 attached hereto.

**V. SUMMARY OF SUBSTANTIAL NEW QUESTIONS OF PATENTABILITY**

The table below provides a summary of the prior art applied in this Request, with respect to each of the claims of the '046 patent for which reexamination is requested. Primary references are shown in the top row and secondary references are shown in the left column.

<i>Primary</i>	<i>O'Maley</i>	<i>Takesako</i>	<i>Hatanaka</i>	<i>Conant</i>	<i>GFR-100 Instruction Manual</i>
<b>Secondary</b>					
		1, 2, 9, 10, 17-20, 35-38, 54-57, 80-82, 101-103, 110-112		4, 6, 10, 12, 16, 17, 19, 22-24, 27, 35, 36, 40, 42, 45, 53-62, 65, 86, 104, 122	
<b>Nishito</b>	30, 48	3-8, 11-16, 21-30, 39-48, 58-79, 83-100, 104-109, 113-124			
<b>O'Maley</b>		53			
<b>Reed</b>	1-30, 35-48, 53-124				
<b>Nishito / Curl / Reed</b>			1-30, 35-48, 53-124		
<b>GFR-100 Instruction Manual</b>				1-3, 5, 7-9, 11, 13-15, 18, 20, 21, 25, 26, 28-30, 37-39, 41, 43, 44, 46-48, 63, 64, 66-76, 80-85, 87-103, 105-121, 123, 124	
<b>GFR-100 Service Manual</b>					1-30, 35-48, 53-124

## VI. THE '046 PATENT

### A. The Claims of the '046 Patent

The detailed description in the '046 patent describes a single pocket, stop-and-go optical sensing machine that uses a particular correlation technique to identify the denomination of U.S. currency bills. As stated in specification of the '046 patent, discriminating machines which denominated currency bills using optical sensing were already in use at the time of filing. (Ex. A, '046 Patent at col. 1, lines 40-65.)

The problem to be solved by the purported invention of the '046 patent, therefore, was to reach a compromise between the criteria used to define characteristic patterns for the various U.S. denominations, the time required to analyze the data, the denomination technique used to identify the bills, and the mechanical speed of the machine itself. (*Id.* at col. 1, line 66 to col. 2, line 11.) According to the specification, “the objectives enumerated above are achieved by means of an improved optical sensing and correlation technique adapted to both counting and denomination discrimination of currency bills.” (*Id.* at col. 2, lines 57-61 (emphasis added).) However, none of limitations of any of the 124 claims of the '046 patent recite any aspect of such an “improved optical sensing and correlation technique.” Rather, most claims simply recite “determining the denomination of the bills,” which would encompass any and all prior art methods of denomination.

Claims 1-16 and 53 are independent apparatus claims. Claims 17-30, 35-48, 54, 56, 58, and 66 are independent method claims. Two representative claims of the '046 patent are reproduced below:

#### **Claim 1:**

1. A currency processing device for receiving a stack of U.S. currency bills and rapidly processing all the bills in the stack, the device comprising:
  - an input receptacle adapted to receive a stack of U.S. currency bills of a plurality of denominations, the currency bills having a wide dimension and a narrow dimension;
  - a transport mechanism positioned to transport the bills, one at a time, in a transport direction from the input receptacle along a transport path at a rate of at least about 800 bills per minute with the narrow dimension of the bills parallel to the transport direction;

- a denomination discriminating unit for determining the denominations of and totaling the bills, the discriminating unit including a detector positioned along the transport path;
- a single denominated bill output receptacle positioned to receive bills whose denomination have been determined and totaled by the discriminating unit including bills of a plurality of U.S. denominations;
- a separate stacker bin, the stacker bin being separate from the denominated bill output receptacle; and
- a diverter positioned along the transport path to route bills whose denomination cannot be determined to the separate stacker bin.

**Claim 17:**

17. A method of processing U.S. currency using a U.S. currency denominating device comprising: receiving a stack of U.S. bills having a plurality of denominations to be denominated in an input receptacle of the device;
- transporting the bills, one at a time, from the input receptacle along a transport path at a rate in excess of 800 bills per minute;
- determining the denomination of bills including bills of a plurality of U.S. denominations at a rate in excess of 800 bills per minute using a discriminating unit comprising a detector positioned along the transport path and a processor;
- delivering bills that have been denominated including bills of a plurality of denominations to a single denominated bill output receptacle of the device; and
- flagging a bill when the denomination of the bill is not determined by the discriminating unit by diverting a bill whose denomination is not determined to a separate stacker bin.

As noted above, the claims of the '046 patent themselves do not recite any limitation related to the improved optical sensing and correlation technique described in the specification. The other aspects of the claims reflect basic mechanical actions, such as receiving and transporting bills, using reflected light to scan the bills, and comparing scanned bill patterns to master bill patterns, all of which were well known in the art.

**B. The Prosecution History of the '046 Patent**

***1. The May 8, 2003 Application***

The '046 patent was issued from Application Serial No. 10/434,659, filed on May 8, 2003 ("the '659 application"). The '659 application claims priority, through a series of six continuations, on Application Serial No. 07/885,648 filed 11 years earlier on May 19, 1992,

which itself is a continuation-in-part of Application Serial No. 07/475,111 filed 13 years earlier on February 5, 1990.

The '659 application was filed with the same claims 1-27 as were originally submitted with the '648 parent application on May 19, 1992. The '659 application was also filed with the same inventor's oath dated June 1992 as was submitted in the '648 parent application.

In a preliminary amendment filed with the original application on May 8, 2003, the Applicant (now Patent Owner) cancelled claims 1-18 and 20-27, and added new claims 28-88. At the time, the Patent Owner also submitted a Petition to Make Special due to alleged infringement.

In an Information Disclosure Statement ("IDS") filed with the original application on May 8, 2003, the Patent Owner disclosed, among other references, the existence of litigation filed in 2002 involving a related patent. Included in this IDS were copies of the Dolsen, Mouri, and Numata declarations made exhibits to this Request (IDS references C23-C30, C2-C11, and C94, respectively).

## ***2. Activity Between 2004 and 2007***

Between June 18, 2004 and December 2, 2005, the Patent Owner filed Second, Third, Fourth, and Fifth IDS's disclosing *inter alia*, two additional lawsuits and volumes of litigation-related information.

On December 5, 2005, the Examiner issued a Notice of Non-Compliant Amendment regarding the Patent Owner's Preliminary Amendment filed with the original application on May 8, 2003.

Between February 13, 2005 and October 31, 2007, the Patent Owner filed three additional IDS's disclosing additional references and litigation-related information, including confidential information subject to a Petition to Expunge. In the Eighth IDS filed on October 31, 2007, the Patent Owner disclosed the existence of a fourth lawsuit involving the '806 parent patent.

## ***3. The January 28, 2008 Restriction/Election Requirement***

On January 28, 2008, the Examiner issued a Restriction and/or Election Requirement applicable to all pending claims. The Examiner determined that claims 19 and 28 are "independent or distinct because they are mutually exclusive, and have materially different

designs and modes of operation.” (Office Action mailed January 28, 2008 at 2.) At the time, application claim 19 (submitted in May 1992) recited as follows:

19. (Original) An improved method for discriminating between currency bills of different denominations, each currency bill having printed indicia enclosed within a borderline defined thereupon so that the bill surface outside the borderline is substantially blank comprising the steps of:

*illuminating a predetermined section of a currency bill by focusing at least one strip of coherent light thereupon;*

*detecting the light reflected off said illuminated section of said bill to generate an analog reflectance signal;*

*generating relative lateral displacement between said strip of coherent light and said currency bill so as to illuminate or optically scan successive sections of said bill along a predetermined dimension thereof and enclosed within said borderline;*

*obtaining a series of analog reflectance signals corresponding to light reflected from each of said successive bill sections using a first relatively narrow strip of coherent light to detect said borderline as the currency bill moves across said strip by detecting the difference in magnitude of the reflectance signal obtained from the bill surface outside said borderline and the reflectance signal obtained about said borderline itself, and using a second relatively wide strip of coherent light to obtain said reflectance signals representing said characteristic patterns after said borderline has been detected;*

*digitizing and processing said series of analog reflectance signals to yield a set of digital data samples which, in combination represent a data pattern characteristic of the currency denomination of said bill;*

*generating and storing a set of master characteristic patterns corresponding to optical scanning of original bills of each of the different currency denominations to be discriminated; and*

*comparing the characteristic pattern for a scanned currency bill to each of said stored master patterns to determine the degree of correlation therebetween, and thereby to identify the denomination of said currency bill.*

In contrast, the new application claim 28 (submitted in May 2003) recited as follows:

28. (New) A currency evaluation device for receiving a stack of U.S. currency bills and rapidly evaluating all the bills in the stack, the device comprising:

*an input receptacle adapted to receive a stack of U.S. currency bills of a plurality of denominations to be evaluated, the currency bills having a wide dimension and a narrow dimension;*

- a transport mechanism positioned to transport the bills, one at a time, in the direction of the narrow dimension of the bills, from the input receptacle along a transport path at a rate of at least about 800 bills per minute;
- a *denomination discriminating unit* for evaluating the bills, the discriminating unit including a detector positioned along the transport path;
- a *single denominated bill output receptacle* positioned to receive bills whose denomination have been determined by the discriminating unit including bills of a plurality of denominations;
- a *separate stacker bin*, the stacker bin being separate from the denominated bill output receptacle; and
- a *diverter* positioned along the transport path to route bills whose denomination cannot be determined to the separate stacker bin.

(Preliminary Amendment dated May 8, 2003 at 6, 7 (emphasis added).)

On January 30, 2008, the Patent Owner submitted a Ninth IDS, and an Amendment and Response to the Examiner's Election / Restriction Requirement. Here, the Patent Owner canceled claim 19 (the last of the claims originally submitted in May 1992) and elected what it referred to as "species II," namely new claims 28-88 submitted in May 2003.

#### **4. The May 29, 2008 Office Action on the Merits**

On May 29, 2008, the Examiner issued an Office Action rejecting all pending application claims (28-88).

In this first Office Action on the merits, the Examiner objected to the drawings under 37 C.F.R. § 1.83(a) as failing to show the features as recited in the new claims, i.e., a "separate stacker bin, the stacker bin being separate from the denominated bill output receptacle." (Office Action mailed May 29, 2008 at 2.)

The Examiner also rejected claims 28-88 under 35 U.S.C. § 122, ¶ 1 as failing to satisfy the written description requirement:

Claims 28-88 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification fails to provide support for "**a separate stacker bin**, the stacker bin being separate from the denominated bill output receptacle" [as] recited in claim 28 and similarly recited in the remaining independent claims. The specification, at page 36, line 8, mentions the term "a separate stacker bin". However, it does not clearly describe that "the stacker bin being separate from the

denominated bill output receptacle". It is noted that Figures 11, 13, 14 show a single output stacker plate 242.

(*Id.* at 2-3 (emphasis added).)<sup>2</sup>

The Examiner also rejected claims 59, 77 under 35 U.S.C. § 112, ¶ 2 “as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 59, 77, the phrase ‘the strip is small relative to the size of the bills’ is indefinite because it is unclear what is meant by ‘small relative to the size of the bills’.” (*Id.* at 3.)

In his only prior art rejection during the entire prosecution, the Examiner also rejected claims 28-56, 62-74, and 80-88 under 35 U.S.C. § 103(a) as being unpatentable over O’Maley in view of U.S. Patent No. 4,114,804 (“Jones”). The Examiner held that O’Maley disclosed all limitations of the rejected claims, except transporting bills in the direction of the narrow dimension at a rate of at least 1000 bills per minute, which were disclosed by Jones. (*Id.* at 5.)

Finally, the Examiner rejected claims 28-88 on grounds of non-statutory double patenting over claims 45, 76, and 96-105 of U.S. Patent No. 6,915,893. (*Id.* at 6.)

#### **5. *The Patent Owner’s July 11, 2008 Response to the Office Action***

On July 11, 2008, the Patent Owner filed an amendment and response to the first Office Action. Here, the Patent Owner amended specification page 36, lines 4- 17, as follows:

Another advantage accruing from the reduction in processing time realized by the present sensing and correlation scheme is that the response time involved in either stopping the transport of a bill that has been identified as "spurious", i.e., not corresponding to any of the stored master characteristic patterns, or diverting such a bill to a separate stacker bin 21 (see FIG. 1), is correspondingly shortened. Accordingly, the system can conveniently be programmed to set a flag when a scanned pattern does not correspond to any of the master patterns. The identification of such a condition can be used to stop the bill transport drive motor for the mechanism. Since the optical encoder is tied to the rotational movement of the drive motor, synchronism can be maintained between pre- and post-stop conditions. In the dual-processor implementation discussed above, the information concerning the identification of a "spurious" bill would be included in the information relayed to the general processor unit which, in turn, would control the drive motor appropriately.

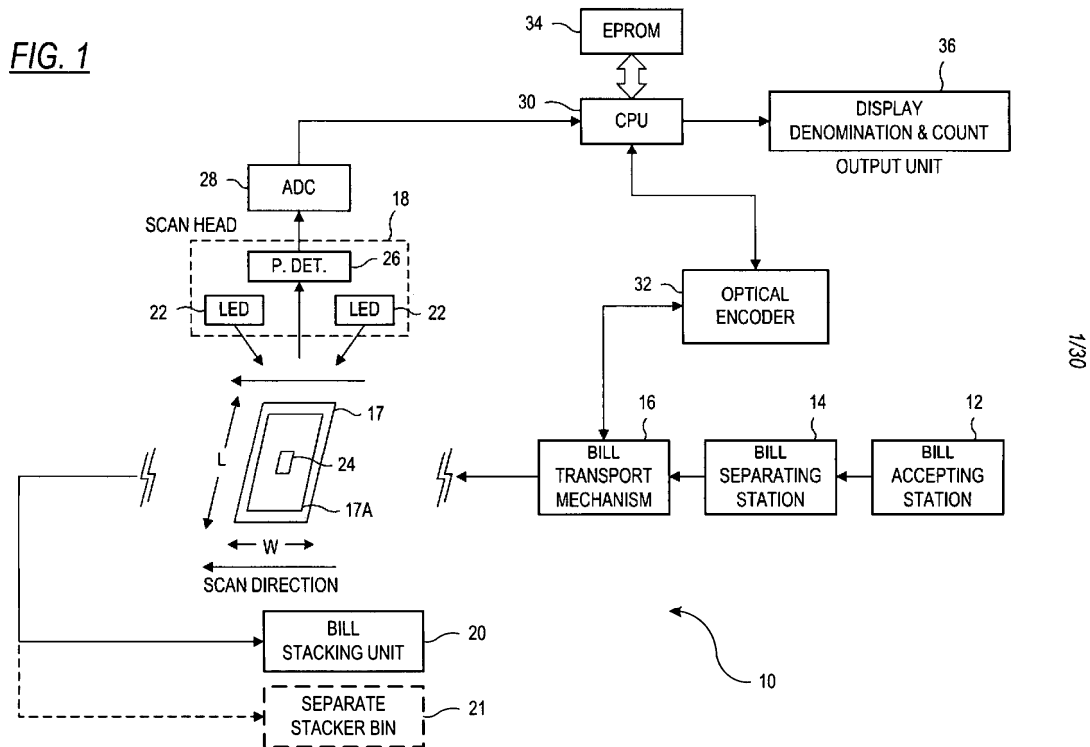
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<sup>2</sup> As noted below, the drawings should also have been objected to for failing to disclose a “diverter” as recited in the claims, and the claims should have been rejected as lacking an adequate written description for the “diverter.”

(*Id.* at 2.)

In its July 11, 2008 Amendment, the Patent Owner also canceled claims 80, 81, 84, and 87; amended claims 28-43, 45, 47, 48, 52-57, 59, 61, 64-66, 68, 70-75, 77, 79, 82, 83, 85, 86, and 88; and added new claims 89-155. (*Id.* at 3-53.)

The Patent Owner also submitted a replacement Figure 1 to add a new illustration of the “separate stacker bin 21” (shown in dashed lines below), which had also been added to the specification in the same amendment. (*Id.* at 54.)



In its July 11, 2008 Amendment, the Patent Owner also argued against the Examiner’s rejection of claims 28-88 under 35 U.S.C. § 112, ¶ 1 as lacking a written description. (*Id.* at 54-56) Here, the Patent Owner argued that the

specification at page 36, lines 7-8 describes a[n] alternate embodiment in which a second output receptacle (a separate stacker bin) is included in the device. According to such an embodiment, denominated bills proceed to the stacking unit 20 or stacker plate 242 as otherwise described in the patent application, but no call bills are directed to the separate stacker bin.

(*Id.* (emphasis added).) The Patent Owner also commented that

[t]he Office Action suggests that the specification is not clear that the separate stacker bin is separate from the stacking unit 20 or stacker plate 242. However, by

use of the phrase "diverting such a bill to a separate stacker bin," the specification is perfectly clear in this respect. In fact, the words "diverting" and "separate" make this doubly clear. According to such an embodiment, no call bills are not allowed to proceed along the transport path bills normally take to the stacking unit 20 but instead they are "diverted to another location. Furthermore, this other location is a "separate" stacker bin, a bin which is separate from the output receptacle to which other bills, namely, denominated bills, are sent.

(*Id.* at 55-56) Contrary to the Patent Owner's argument, page 36 of the specification of the original parent application does not disclose an "alternative embodiment" in which "a second output receptacle (a separate stacker bin) is included in the device" and wherein "denominated bills proceed to the stacking unit 20 or stacker plate 242." The original specification also did not mention how "no call bills are not allowed to proceed along the transport path bills normally take to the stacking unit 20," and did not disclose any structure that might perform this "diverting" function. The cited passage merely referred to a prophetic functional "advantage" of the "present sensing and correlation scheme" (which was not recited in any of the new application claims), and immediately continued to describe a stop-and-go process as described throughout the remainder of the specification:

*Another advantage accruing from the reduction in processing time realized by the present sensing and correlation scheme is that the response time involved in either [1] stopping the transport of a bill that has been identified as "spurious", i.e., not corresponding to any of the stored master characteristic patterns, or [2] diverting such a bill to a separate stacker bin, is correspondingly shortened. Accordingly, the system can conveniently be programmed to set a flag when a scanned pattern does not correspond to any of the master patterns. The identification of such a condition can be used to stop the bill transport drive motor for the mechanism. . . . In the dual-processor implementation discussed above, the information concerning the identification of a "spurious" bill would be included in the information relayed to the general processor unit which, in turn, would control the drive motor appropriately.*

(Application filed May 8, 2003 at 36 (emphasis added).)

In its July 11, 2008 Amendment, the Patent Owner also argued against the Examiner's rejection of claims 28-88 under 35 U.S.C. § 103 as obvious over O'Maley in view of Jones. (Amendment "B" and Response dated July 11, 2008 at 56-60.) Here, the Patent Owner argued that O'Maley could not be properly combined with Jones because "the Jones device relates to a simple note counter and not to devices such as that purportedly taught by O'Maley that can discriminate among the denominations of bills." (*Id.* at 56-57 (emphasis added).) The Patent

Owner therefore asserted that its limitations reciting 800 or 1000 bills per minute rendered claims 28-88 non-obvious. (*Id.* at 57-59)

The Patent Owner finally argued against the Examiner's non-statutory double patenting rejection. (*Id.* at 61-63.) Here, the Patent Owner argued that the claims of its prior patent recited denomination detectors located on both sides of a bill, whereas the presently rejected application claims did not recite a similar limitation. (*Id.*)

#### **6. *Suspension of Prosecution Pending Reexamination***

On September 2, 2008, the Patent Owner submitted a Tenth IDS disclosing the fact that a commonly owned parent patent, U.S. Patent No. 6,459,806 ("the '806 parent patent") was subject to *inter partes* reexamination, and that the '806 parent patent was also involved in litigation.

On December 5, 2008, the Examiner suspended prosecution for six months in view of the five the pending reexaminations of related patents, including the reexamination of the '806 parent patent.

On January 13, 28, and 30, 2009, the Patent Owner's attorneys and executives held in-person and telephonic interviews with the Examiner, during which the Patent Owner convinced the Examiner to lift the stay of prosecution pending reexamination.

#### **7. *Allowance and Post-Allowance***

Less than one month later, on February 10, 2009, the Examiner allowed without comment all 124 pending claims. On the same day, the PTO notified the Patent Owner that it would receive a 1390-day term extension on the issued patent (which was filed as a direct continuation of an application filed over 11 years earlier).

Two days later, on February 12, 2009, the Patent Owner filed a Request for Continued Examination ("RCE"). The RCE was filed in order to submit information previously generated between 2007 and November 2008 during the pending reexaminations. (Eleventh IDS dated February 12, 2009.)

On February 17 and 24, 2009, the Patent Owner filed two additional IDS's to disclose 90 additional documents generated during the reexaminations and during the "2007 Texas lawsuit."

Nine days later, on March 5, 2009, the Examiner again allowed without comment all 124 pending claims. (Notice of Allowance mailed March 5, 2009.)

On March 19, 23, and 27, 2009, the PTO issued four separate Office Actions in the reexamination of the Patent Owner's related patents:

- a. Office Action in Reexam Control No. 90/010,057 mailed March 19, 2009 (*rejecting all 52 claims* from U.S. Patent No. 5,966,456);
- b. Office Action in Reexam Control No. 90/010,217 mailed March 19, 2009 (*rejecting 62 of 68 claims* from U.S. Patent No. 6,381,354);
- c. Office Action in Reexam Control No. 90/010,059 mailed March 23, 2009 (*rejecting 9 of 32 claims* from U.S. Patent No. 5,909,503); and
- d. Office Action in Reexam Control No. 95/001,029 mailed March 27, 2009 (*rejecting all 133 claims* from U.S. Patent No. 6,459,806).

None of these office actions, including the Office Action rejecting all 133 claims in the '806 parent patent, were ever disclosed to the Examiner of the '046 patent.

The '046 patent was issued on May 19, 2009.

On May 28, 2009, the Patent Owner filed a Petition seeking a term extension of 1,679 days — an additional 289 days beyond the term extension previously allowed — this, on a direct continuation application with claims that could have and should have been submitted with the parent application filed 17 years earlier.

As issued, the '046 patent has 124 claims. Claims 1-124 of the '046 patent correspond to application claims 28-79, 82, 83, 85, 86, and 88-154. Thus, all issued claims of the '046 patent were first presented during prosecution of the '659 application between May 8, 2003 and May 19, 2009.

## **VII. THE PRIORITY DATE FOR ALL CLAIMS IS MAY 8, 2003**

### **A. Priority Requires Compliance With 35 U.S.C. § 112, ¶ 1**

Section 2617 of the MPEP provides that a reexamination request may point out how claims of a continuation application are not entitled to the priority of an earlier parent application:

The statement applying the prior art may, where appropriate, point out that claims in the patent for which reexamination is requested are entitled only to the filing date of that patent and are not supported by an earlier foreign or United States patent application whose filing date is claimed. For example, even where a patent is a continuing application under 35 U.S.C. 120, the effective date of some of the claims could be the filing date of the child application which resulted in the patent, because those claims were not supported in the parent application. Therefore, any intervening patents or printed publications would be available as prior art.

MPEP § 2617 (emphasis added) (citing *In re Ruscetta*, 255 F.2d 687, 118 USPQ 101 (CCPA 1958); *In re van Langenhoven*, 458 F.2d 132, 173 USPQ 426 (CCPA 1972)).

Under 35 U.S.C. § 120,

[a]n application for patent for an invention disclosed in the manner provided by the first paragraph of section 112 of this title in an application previously filed in the United States, . . . shall have the same effect, as to such invention, as though filed on the date of the prior application.

35 U.S.C. § 120 (emphasis added). As explained in MPEP § 201.11(I)(B),

Under 35 U.S.C. 120, a claim in a U.S. application is entitled to the benefit of the filing date of an earlier filed U.S. application if the subject matter of the claim is disclosed in the manner provided by 35 U.S.C. 112, first paragraph, in the earlier filed application. . . . A claim in a subsequently filed application that relies on a combination of prior applications may not be entitled to the benefit of an earlier filing date under 35 U.S.C. 120 since 35 U.S.C. 120 requires that the earlier filed application contain a disclosure which complies with 35 U.S.C. 112, first paragraph for each claim in the subsequently filed application.

MPEP § 201.11(I)(B) (emphasis added) (citing *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 47 USPQ2d 1829 (Fed. Cir. 1998); *Studiengesellschaft Kohle m.b.H. v. Shell Oil Co.*, 112 F.3d 1561, 1564, 42 USPQ2d 1674, 1677 (Fed. Cir. 1997); *In re Scheiber*, 587 F.2d 59, 199 USPQ 782 (CCPA 1978)).

#### **B. Standards for Compliance With 35 U.S.C. § 112, ¶ 1**

Pursuant to 35 U.S.C. § 112, ¶ 1, “[t]he specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same[.]” (Emphasis added.)

Sections 2163 *et seq.* of the MPEP provide the examination guidelines for determining compliance with 35 U.S.C. § 112, ¶ 1. Under MPEP § 2163.02, “[a]n objective standard for determining compliance with the written description requirement is, ‘does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed.’” (Emphasis added.) Put another way, “to satisfy the written description requirement, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention, and that the invention, in that context, is whatever is now claimed.” *Id.* (emphasis added) (citing *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991))

“An applicant shows possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention.” *Id.* (emphasis added) (citing *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997)). “Possession may be shown in a variety of ways including description of [1] an actual reduction to practice, or [2] by showing that the invention was ‘ready for patenting’ such as by the disclosure of drawings or structural chemical formulas that show that the invention was complete, or [3] by describing distinguishing identifying characteristics sufficient to show that the applicant was in possession of the claimed invention.” *Id.* (emphasis added).

**C. The Parent Applications Do Not Comply With 35 U.S.C. § 112, ¶ 1**

As discussed below, all 124 claims of the ‘046 patent lack an adequate written description in the priority applications and should be accorded an earliest priority date of May 8, 2003 (the date of filing for the application that issued as the ‘046 patent).

As a preliminary matter, Requester first notes that each of the claims for which reexamination is sought recites a limitation requiring that bills be transported or denominated at a rate of at least about 800 or 1000 bills per minute. The original priority application, Serial No. 07/745,111 (filed February 5, 1990) (“the ‘111 application”) (Ex. P) does not mention any rate or speed of transporting or denominating bills, much less the 800 or 1000 bills per minute limitation recited by the claims of the ‘046 patent. Rather, such a disclosure first appears in the next continuation-in-part application, Serial No. 07/885,648 (filed May 19, 1992) (now U.S. Patent No. 5,295,196). (Ex. Q, Application at 10-11 (800 bills per minute); *id.* at 30, 32 (1000 bills per minute).) Accordingly, all claims of the ‘046 patent, which each recite 800 or 1000 bills per minute, have an *earliest possible* priority date of May 19, 1992. 35 U.S.C. §§ 120, 112, ¶ 1; MPEP §§ 2617, 2163.

Secondly, Requester also preliminarily notes that certain claims of the ‘046 patent expressly recite a “transport mechanism” or “transporting” which does not employ a “vacuum.” (Ex. A, ‘046 Patent, Claims 61, 69, 74, 77, 80, 83, 86, 89, 92, 95, 98, 101, 104, 107, 110, 113, 116, 119, 122.) However, none of the priority application mentions a vacuum or any similar theory or methodology, whether or not in connection with a transport mechanism. Accordingly, claims 61, 69, 74, 77, 80, 83, 86, 89, 92, 95, 98, 101, 104, 107, 110, 113, 116, 119, and 122 of

the '046 patent lack an adequate written description in the priority applications and are entitled to an *earliest* priority date of May 8, 2003, the filing date of the application that issued as the '046 patent. 35 U.S.C. §§ 120, 112, ¶ 1; MPEP §§ 2617, 2163.

More importantly, all claims of the '046 patent also recite several additional limitations that lack a adequate written description in any of the earlier applications upon which the '046 patent claims priority. Here, all claims of the '046 patent are drawn to a currency processing device or method which includes: (a) a “separate stacker bin” which receives bills whose denomination cannot be determined; and (b) a “diverter” positioned along the transport path to route bills to the separate stacker bin. For example:

**Claim 1:**

1. A currency processing device for receiving a stack of U.S. currency bills and rapidly processing all the bills in the stack, the device comprising:  
an input receptacle adapted to receive a stack of U.S. currency bills of a plurality of denominations, the currency bills having a wide dimension and a narrow dimension;  
a transport mechanism positioned to transport the bills, one at a time, in a transport direction from the input receptacle along a transport path at a rate of at least about 800 bills per minute with the narrow dimension of the bills parallel to the transport direction;  
a denomination discriminating unit for determining the denominations of and totaling the bills, the discriminating unit including a detector positioned along the transport path;  
a single denominated bill output receptacle positioned to receive bills whose denomination have been determined and totaled by the discriminating unit including bills of a plurality of U.S. denominations;  
a separate stacker bin, the stacker bin being separate from the denominated bill output receptacle; and  
a diverter positioned along the transport path to route bills whose denomination cannot be determined to the separate stacker bin.

**Claim 17:**

17. A method of processing U.S. currency using a U.S. currency denominating device comprising: receiving a stack of U.S. bills having a plurality of denominations to be denominated in an input receptacle of the device;  
transporting the bills, one at a time, from the input receptacle along a transport path at a rate in excess of 800 bills per minute;

determining the denomination of bills including bills of a plurality of U.S. denominations at a rate in excess of 800 bills per minute using a discriminating unit comprising a detector positioned along the transport path and a processor;

delivering bills that have been denominated including bills of a plurality of denominations to a single denominated bill output receptacle of the device; and

flagging a bill when the denomination of the bill is not determined by the discriminating unit by diverting a bill whose denomination is not determined to a separate stacker bin.

This “diverter” limitation is recited in the claims of the ‘046 patent in one of the following alternative forms:

Claim	“Diverter”
1, 9	“a <u>diverter</u> positioned along the transport path to route bills whose denomination cannot be determined <i>to the separate stacker bin</i> ”
2-8	“a <u>diverter</u> positioned along the transport path to route bills which are denominated [or whose denomination have been determined by the discriminating unit] . . . <i>to the denominated bill output receptacle</i> and bills whose denomination cannot be determined [or have not been determined by the discriminating unit] <i>to the separate stacker bin</i> ”
13	“a <u>diverter</u> adapted to route bills which are denominated by the denomination discriminating unit <i>to the denominated bill output receptacle</i> and bills whose denomination are not determined by the denomination discriminating unit <i>to the separate stacker bin</i> ”
17-18, 35-36	“flagging a bill when the denomination of the bill is not determined . . . by <u>diverting</u> a bill whose denomination is not determined <i>to a separate stacker bin</i> ”
19-30, 37-48	“ <u>diverting</u> bills whose denomination are not determined <i>to a separate stacker bin</i> ”
53	“flagging device comprising the processor and an encoder linked to the transport mechanism, the encoder producing tracking signals in response to the physical movement of the bills, the processor generating a no call signal when the denomination of a bill is not determined by the processor . . . wherein flagging device causes bills whose denomination cannot be determined to be <u>diverted</u> <i>to the separate stacker bin</i> ”
54	“flagging a bill when the denomination of the bill is not determined by the discriminating unit, wherein flagging comprises <u>diverting</u> bills whose denomination cannot be determined <i>to a separate stacker bin</i> ”

As support for the 124 claims of the '046 patent which each recite these “separate stacker bin” and “diverter” limitations, the Patent Owner relies on a total of nine words from the specification of the parent applications. Here, in the context of discussing the allegedly novel optical sensing and correlation technique (which is not recited in any of the 124 claims), the detailed description mentions the following prophetic advantage to be gained by using this allegedly novel optical sensing and correlation technique:

*Another advantage accruing from the reduction in processing time realized by the present sensing and correlation scheme is that the response time involved in either stopping the transport of a bill that has been identified as "spurious", i.e., not corresponding to any of the stored master characteristic patterns, or diverting such a bill to a separate stacker bin, is correspondingly shortened.*

(Ex. P, '111 Application, Application filed Feb. 5, 1990 at 37 (emphasis added).) This same sentence is repeated verbatim without further explanation in all of the priority applications. However, none of the priority applications (each with 62 pages of detailed description, nine pages of claims, and 24 drawing figures) ever again mentions or refers to a “separate stacker bin” or “diverting.” None of the priority applications ever again elaborates on these nine words. No definite structure is ever described, depicted in the drawings, or recited in any of the claims. Moreover, the priority applications all fail to describe whether this “diverting” function even has a corresponding structure. Not surprisingly, the priority applications also fail to describe how such a “separate stacker bin” or “diverting” function might relate to or cooperate with the remaining aspects of the complete currency processing machine as recited by the claims. The only embodiment of a complete and operable invention described with clarity throughout the remaining 62 pages of detailed description and depicted in the 24 drawings has only a single receptacle for all bills and completely lacks any structure similar to a diverter. Figures 11 and 13, which depict a complete currency processing machine provide an excellent example:

FIG. 11

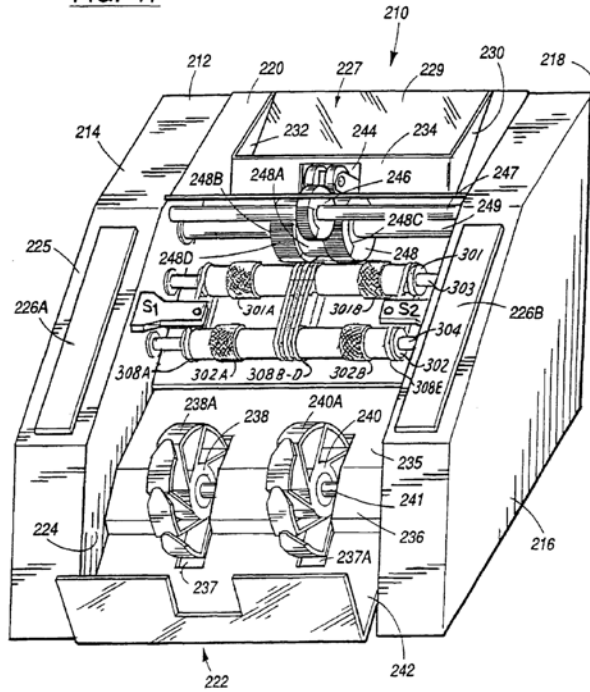
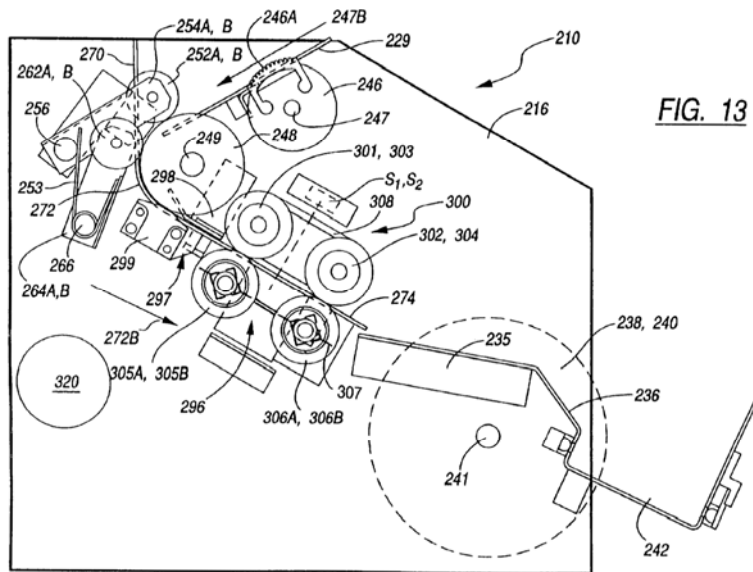


FIG. 13



Although the written description requirement is a factual inquiry that should be decided on a case-by-case basis, MPEP § 2163(II)A.3(a) provides an illustrative framework for resolving this issue with respect to claims drawn to a single embodiment or species:

For Each Claim Drawn to a Single Embodiment or Species:

- (A) Determine whether the application describes an actual reduction to practice of the claimed invention.
- (B) If the application does not describe an actual reduction to practice, determine whether the invention is complete as evidenced by a reduction to drawings or structural chemical formulas that are sufficiently detailed to show that applicant was in possession of the claimed invention as a whole.
- (C) If the application does not describe an actual reduction to practice or reduction to drawings or structural chemical formula as discussed above, determine whether the invention has been set forth in terms of distinguishing identifying characteristics as evidenced by other descriptions of the invention that are sufficiently detailed to show that applicant was in possession of the claimed invention.
  - (1) Determine whether the application as filed describes the complete structure (or acts of a process) of the claimed invention as a whole.  
...
  - (2) If the application as filed does not disclose the complete structure (or acts of a process) of the claimed invention as a whole, determine whether the specification discloses other relevant identifying characteristics sufficient to describe the claimed invention in such full, clear, concise, and exact terms that a skilled artisan would recognize applicant was in possession of the claimed invention.

\* \* \* \*

Any claim to a species that does not meet the test described under at least one of (a), (b), or (c) must be rejected as lacking adequate written description under 35 U.S.C. 112, para. 1.

MPEP § 2163(II)A.3(a) (emphasis added) (citing, e.g., *Regents of the University of California v. Eli Lilly*, 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997) (written description requirement is not satisfied by merely providing “a result that one might achieve if one made that invention”) (emphasis added); *In re Wilder*, 736 F.2d 1516, 1521, 222 USPQ 369, 372-73 (Fed. Cir. 1984) (affirming a rejection for lack of written description because the specification does “little more than outline goals appellants hope the claimed invention achieves and the problems the invention will hopefully ameliorate”) (emphasis added)). This is precisely the situation with regard to the claims of the ‘046 patent.

In the present case, (A) none of the priority applications describes an actual reduction to practice of the claimed invention, including a “separate stacker bin” and a “diverter” or

“diverting” bills. In addition, (B) none of the priority applications includes drawings or other sufficiently detailed disclosures to show that applicant was in possession of the claimed invention as a whole. Further, (C) none of the priority applications set forth the invention in terms of distinguishing identifying characteristics as evidenced by other descriptions of the invention that are sufficiently detailed to show that applicant was in possession of the claimed invention. Here, none of the priority applications (C)(1) describe the complete structure (or acts of a process) of the claimed invention as a whole, or (C)(2) describe relevant identifying characteristics sufficient to describe the claimed invention in such full, clear, concise, and exact terms that a skilled artisan would recognize applicant was in possession of the claimed invention. Accordingly, the priority applications must be viewed as lacking an adequate written description to support the claims of the ‘046 patent.

Additional facts further confirm that the priority applications do not “convey with reasonable clarity to those skilled in the art that, as of the filing date sought, . . . [the named inventors were] in possession of the invention, and that the invention, in that context, is whatever is now claimed.” MPEP § 2163.02 (citing *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991)) (noting also that “[a]n applicant shows possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention”) (emphasis added).

First, none of the seven priority applications dating back to 1990 ever claimed anything remotely similar to a “separate stacker bin” or “diverter.” Here, the inventor’s oath used for the ‘046 patent was filed with a parent application 11 years earlier, together with claims that simply recited a “stacking station.” This is highly probative that the inventors did not then believe that a “separate stacker bin” and “diverter” formed part of their invention. The table below lists the claim limitations relating to the bill transport and output features from these seven priority applications:

<b>Appl. S/N</b>	<b>Filing Date</b>	<b>Oath Date</b>	<b>Bill Transport / Output</b>	<b>Claims, New Claims</b>
10/434,659	05-08-03	6/12/92	“single output receptacle,” “ <u>separate stacker bin</u> ” and “ <u>diverter</u> ”	1-27, 28-88

Appl. S/N	Filing Date	Oath Date	Bill Transport / Output	Claims, New Claims
10/163,757	6-6-02	6/12/92	“single output receptacle”	1-27, 28-75
09/453,200	12-2-99	6/12/92	“single output receptacle”	1-27, 28-77
08/841,203	4-29-97	6/12/92	“single output receptacle”	1-27, 28-47
08/339,337	11-14-94	6/12/92	“stacking mechanism” and “output receptacle”	1-27, 28-45
08/127,334	9-27-93	6/12/92	“stacking station”	1-27, 28-35
07/885,648	5-19-92	6/12/92	“stacking station”	1-27
07/475,111	2-5-90	2/12/90	“output path”	1-16

Second, as noted above, the application for the ‘046 patent was filed during litigation with a third party, together with a Petition to Make Special due to alleged infringement, and was specifically intended to encompass this third party’s accused device.

Third, the claimed “diverter” which routes bills along some undisclosed path to the separate stacker bin is alluded to in the specification merely as a function without any corresponding structure. In stark contrast, when the prior art (and the Patent Owner’s other related patents) include a diverter or a separate stacker bin as part of the complete invention, such a structure is clearly described. (*E.g.*, O’Maley, Fig. 2 (nos. 50, 52); Takesako, Fig. 2 (no. 34); Conant, Fig. 1 (nos. 44, 122); GFR-100 Instruction Manual and Service Manual, at AMRO 01127 (“Flipper”), AMRO 01057 (“Flipper”).) An example of one of the Patent Owner’s other patents is U.S. Patent No. 5,966,456, which also claims priority on same February 5, 1990 and May 19, 1992 applications as does the ‘046 patent. Figures 10 and 14, and the accompanying text disclose a diverter (and a separate output receptacle):

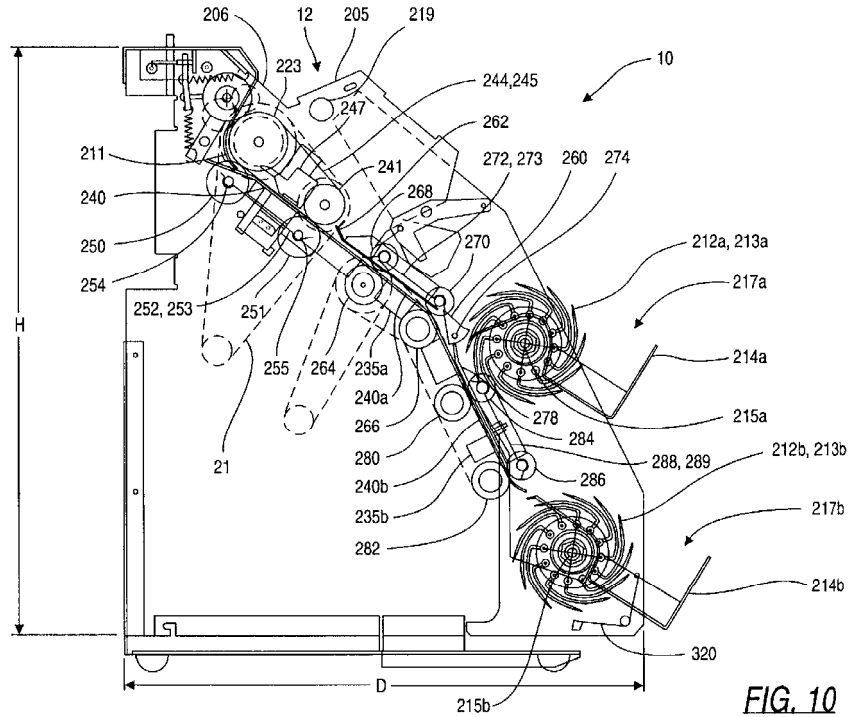


FIG. 10

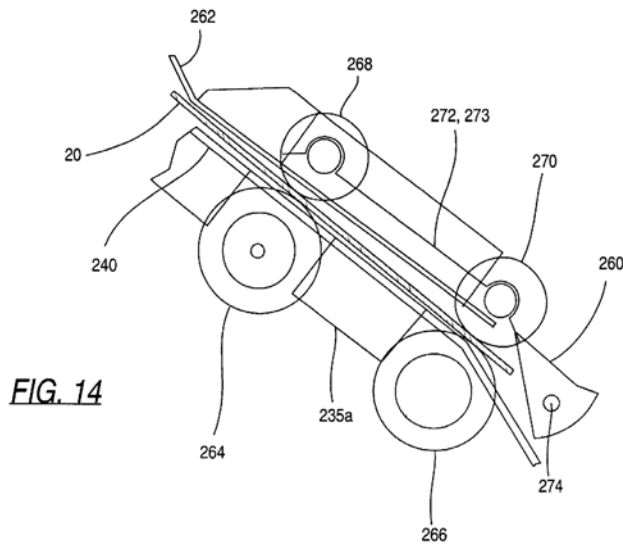


FIG. 14

“A diverter 260 is employed to direct the bill 20 to the appropriate output receptacle 217a or 217b. . . . Two solenoids 261a,b, one mounted on each end of the shaft 274 (see FIG. 13), cause the shaft and the attached diverter flanges to rotate into either a lower position or an upper position.”

U.S. Patent No. 5,966,456 at col. 22, lines 55, 63 (emphasis added). See MPEP § 2163(II)A.3(a) (“determine whether the invention has been set forth in terms of distinguishing identifying

characteristics as evidenced by other descriptions of the invention that are sufficiently detailed to show that applicant was in possession of the claimed invention).

In contrast, during prosecution of the '046 patent, the Patent Owner was forced to amend its drawings on July 11, 2008 to add a generic block in Fig. 1 to represent a separate “stacker bin.” More importantly, the Patent Owner never included any drawing or textual description of a “diverter” or any structure corresponding to a “diverting” function.

In summary, it is quite clear that all claims of the '046 patent, which are directed to a “separate stacker bin” and a “diverter,” were purely an afterthought, inserted into the application for the '046 patent simply to cover a competitor’s product 13 years after the first priority application containing the 9 words upon which the Patent Owner now relies on for an adequate written description. In view of these facts, the claims of the '046 patent clearly lack an adequate written description in the priority applications, and should therefore be accorded an earliest priority date of May 8, 2003 (the date of filing for the application that issued as the '046 patent). 35 U.S.C. §§ 120, 112, ¶ 1; MPEP §§ 2617, 2163.

## **VIII. SUMMARY OF THE PRIOR ART**

### **A. Summary of O'Maley**

The O'Maley reference (Exhibit B) was issued on December 18, 1979. As such, O'Maley is prior art under 35 U.S.C. § 102(b).

O'Maley discloses an automatic bill denominating and sorting system for U.S. currency. (Abstract). The bills are shown transported in their long dimension (Fig. 5). However, O'Maley explains that any type of transport arrangement can be used (col. 3 lines 58-63 (“It is understood that, in general, many of the numerous types of transport mechanisms well known in the art could be utilized”); col. 4, lines 38-42 (“[a]lthough a particular sorter and transport arrangement has been shown, it is understood that any type of such apparatus could be utilized with the currency identifying system of the present invention”))).

In one embodiment, the device discloses multiple output receptacles that can be used to sort bills that satisfy different criteria (col. 4, lines 25-26; Fig. 1). Another embodiment provides a two-pocket device, which, for example, can be used to send denominated bills to one pocket, while routing non-denominated bills to a second, reject, pocket (*Id.*; Fig 2).

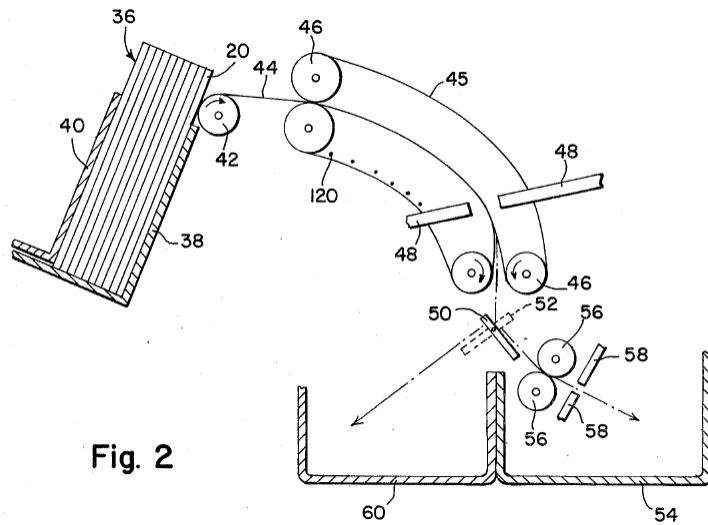


Fig. 2

Bills of different denominations are transported past a scanner and optically scanned (col. 4, lines 60-61; col. 5, lines 20-24; Fig. 4b). The optical scan head is conventional, with a light source and detectors to detect the light reflected from a scanned bill (col. 4, lines 60-67; Fig. 1). O'Maley does not explicitly disclose a rectangular strip of light, however, it would be obvious to one of ordinary skill in the art to focus the light source onto the bill in this way. Explicit teaching can be found in Nishito, as discussed below.

O'Maley further explains that various locations on the bill can be scanned (col. 7, lines 3-9; Figs. 4a, 4b).

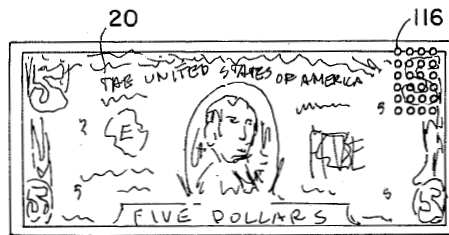


Fig. 4a

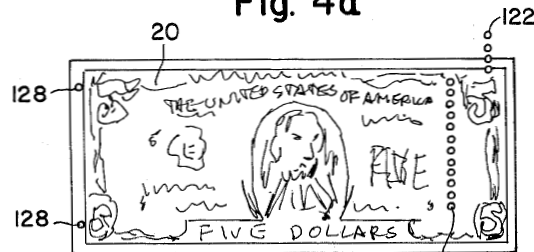


Fig. 4b

The signals from the photo detectors are bitwise A/D converted (col. 5, lines 50-52; Fig. 3). The apparatus identifies scanned bills by comparing the scanned information with reference information stored in memory (Abstract; col. 4, lines 1-11; Fig. 3). The scanned data is statistically processed to identify the bills, and a further bit-matching step combined with a skew measurement confirms the identification (col. 8, lines 56-65; Fig. 1). O'Maley discloses using a microprocessor to perform the comparison (col. 6, lines 62-64; Fig. 1). If the comparison of the scanned signal with the stored reference signals exceeds a threshold level, the bill is identified (col. 8, lines 63-65).

The O'Maley device also displays the number of bills of each denomination, and provides the total value of the scanned bills (col. 4, lines 22-23; Fig. 1).

O'Maley further discloses that the device has an encoder linked to the transport mechanism, which produces tracking signals in response to the physical movement of the bills to synchronize bill movement along the transport path (col. 7, lines 10-29 (“The strobing of the scanner elements of FIG. 4b would be accurately controlled in order that the lines used would be properly registered with respect to the printed images on the borderlines. The strobing action can be controlled by a strobe clock timer circuit. Such clock timer can be synchronized with the transport drive mechanism shown in FIG. 2.”)).

The device also has a “learning mode,” in which it can scan reference bills to adaptively obtain and store the reference patterns used to identify unknown bills (col. 9, lines 25-33).

#### **B. Summary of Nishito**

The Nishito reference (Exhibit C) was issued on August 7, 1984. As such, Nishito is prior art under 35 U.S.C. § 102(b).

Nishito describes a currency note identification system for U.S. currency. The machine uses a line sensor to generate a scanning signal corresponding to the printed pattern on a currency note (Abstract; Fig. 1).

FIG. 1



In Fig. 1 and the accompanying text, Nishito discloses that a currency note, e.g., a one-dollar bill (11) is transported by a conveyor belt and scanned by a line sensor (a CCD sensor) having 128 picture elements. The bill is conveyed at a uniform speed in a direction *parallel to the short dimension of the bill* (col. 3, lines 3-4 (noting movement “in the direction of arrow Y”); Fig. 2).

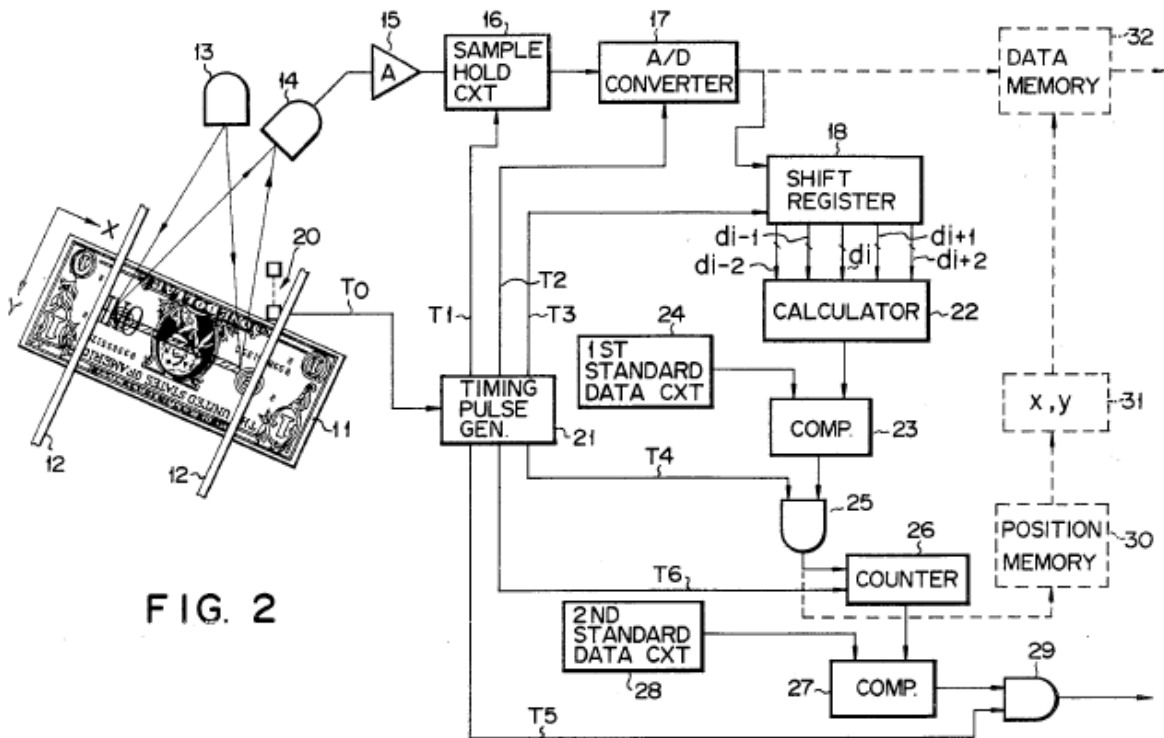


FIG. 2

Nishito also discloses a denomination discriminating unit adapted to determine the denomination of bills (col. 9, lines 28-31). The discriminating unit comprises a detector positioned along the transport path (Fig. 2; col. 2, lines 37-40 (“bill 11 is scanned, for instance by a line sensor, in the direction of X-axis shown as main scanning and is conveyed, for instance by a conveyor, in the direction of Y-axis as auxiliary scanning.”)). The detector is positioned to receive light from passing bills (col. 3, lines 3-7 (“Light reflected from the detected area A is received by a line sensor 14”)). Accordingly, a person of ordinary skill would understand that bills are illuminated by a *rectangular strip of light*, the rectangular strip of light being elongated in a direction transverse to the direction of bill movement (see cross-hatched illumination pattern in Fig. 2 above).

The detector is adapted to generate an output signal in response to received light characteristic information, whereupon the output signal is electrically coupled to a processor (Abstract (“Printed pattern data for printed patterns at predetermined positions with respect to the leading and trailing edges detected by the detecting circuit are detected”); Fig. 2; col. 2, line 66 to col. 3, line 1 (“FIG. 2 shows the circuitry of a currency note identification system, which verifies the kind and/or genuineness of a bill 11 from a scanning signal corresponding to a particular portion of the printed section”)). A processor receives the characteristic information output signal and generates a denomination signal in response thereto. (Fig. 2; col. 2, line 66 to col. 3, line 1.)

Nishito also discloses a memory used for storing master data associated with each of the denominations of bills which the device is capable of denominating (col. 7, lines 56-60, “A signal DSF(I, K) which represents a standard pattern [of] each kind of currency note for the first period  $T_F$ , is supplied from the standard pattern memory 55”).

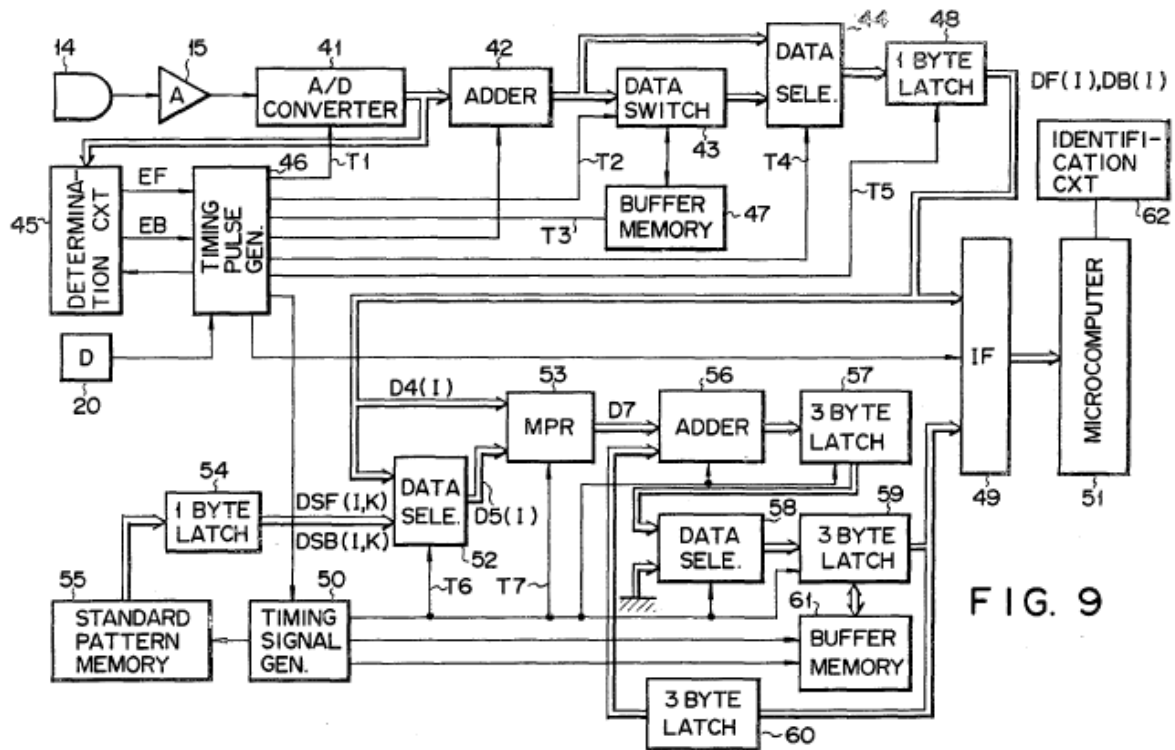


FIG. 9

The processor generates a denomination signal in response to the characteristic output signal (col. 9, lines 28-32 (“In the microcomputer 51, the determination of the kind of the currency note examined, i.e., the determination as to if the currency note is a genuine one dollar bill, ten dollar bill, one hundred dollar bill, etc., is effected with respect to the individual data DF and DB.”)). The processor determines the denomination of a bill by comparing data associated with the bill to master data stored in the memory (Abstract (“the similarity of the detected pattern data to standard pattern data is calculated by a calculator. The kind and/or genuineness of the currency note is determined from the similarity obtained from the calculator.”)). The method of determining the denomination of bills includes generating a signal indicative of the denomination of a bill when its characteristic information satisfactorily corresponds with master information stored in a memory (col. 9, lines 11-19 (“The microcomputer 51 calculates the similarity  $M(K)$  according to a predetermined program. The similarity  $MF(K)$  is calculated according to an equation  $MF(K) = RF(K)/QF.ZF(K)$  where  $ZF(K)$  is the summation of the squares of the individual standard waveform data  $DSF(I, K)$  which is stored in a memory of the microcomputer 51”)).

Nishito does not disclose a particular speed of operation, but teaches that the invention is adapted to determine the denomination of bills at a high speed (col. 1, lines 45-48 (“An object of the invention, accordingly, is to provide a currency note identification system, which permits the identification of currency notes with high accuracy, at a high speed”) (emphasis added); col. 10, lines 55-57 (“an automatic currency note sorting apparatus which is capable of high speed identification and has a high unit-time processing capacity, can be obtained.”) (emphasis added)).

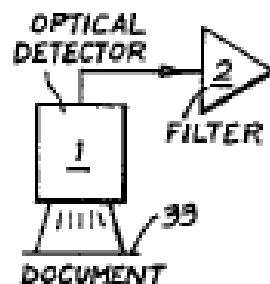
### C. Summary of Curl

The Curl reference (Exhibit D) was issued on May 27, 1986. As such, Curl is prior art under 35 U.S.C. § 102(b).

The Curl reference discloses an optical apparatus for scanning a sheet, and is particularly useful for analyzing the surfaces of banknotes by pattern recognition for sorting the banknotes in accordance with their orientation, denomination, and/or or bank of origin (col. 1, lines 6-13).

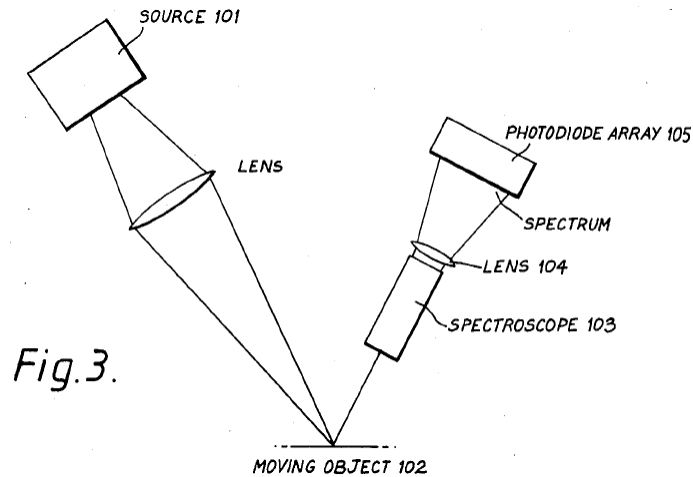
Curl discloses that “scanning at the rate of 20-30 notes per second [1,200 bills per minute] . . . [is] a common speed for banknote transport systems” (col. 1, lines 40-42). Curl also discloses that banknotes may be fed into the apparatus in any direction because “the illuminated strip is in the centre of the sheet, so that a central band of the sheet is scanned by the scanner. [In this manner,] the same band of the sheet is scanned no matter which way around the sheet is fed into the apparatus.” (Col. 2, lines 16-20).

Like Hatanaka (see below) and Nishito, Curl discloses a discriminating unit comprising an optical detector positioned along the transport path (Fig. 1; col. 4, lines 36-37 (“It incorporates a detector head 1 arranged over the path of a banknote 33”)).



The detector is also positioned to receive light reflected from passing bills (col. 4, lines 29-34; col. 7, lines 49-59 (“The banknote 33 to be scanned is mounted on a rotating drum. The detector

head includes a lamp, a first optical fibre fishtail array for directing light onto a strip of the surface of the banknote 33, and a second optical fibre fishtail array for collecting light reflected from the surface and for conveying it to photodetector.”)).



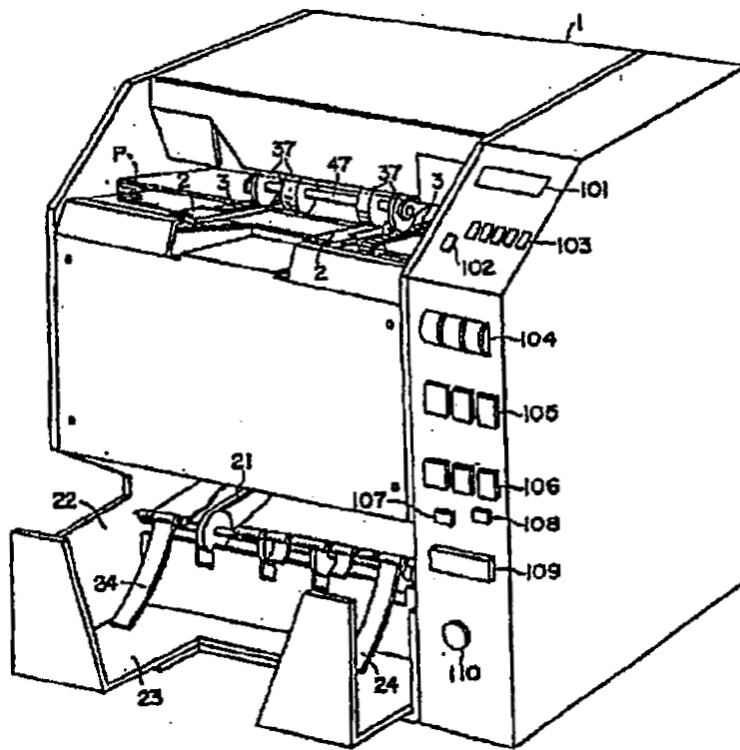
Curl discloses that its system that can be programmed to recognize any of a number of different document patterns, as stored in different memories 16. This pattern recognition technique can also be conducted simultaneously. In this way, it is possible to compare a banknote simultaneously with a number of possible banknotes. By comparing the outputs from all of the integrators 18, 19 and deciding which one exhibits the lowest value, the stored pattern matching the input waveform most closely can be chosen, and the banknote can be routed accordingly (col. 7, lines 25-35; Fig.1).

#### **D. Summary of Hatanaka**

The Hatanaka reference (Exhibit H) was published on September 16, 1986. (Ex. H at H0011.) As such, Hatanaka is a prior art printed publication under 35 U.S.C. § 102(b).

Hatanaka discloses a paper currency discriminator which transports currency bills from a stack on a placement platform, one bill at a time. The machine discriminates multiple denominations and delivers the denominated bills to a single output stacker. A count is kept for each denomination, which is displayed with a total value of the currency output in the single output stacker (see H0012, lines 20-28). More specifically, Hatanaka discloses the following:

第 1 圖



- a) an input receptacle (2) for receiving a stack of bills, and a currency feeder to remove and transport bills one sheet at a time (H0012, lines 9-14; H0014, lines 9-14; FIG. 1, placement platform 2);
- b) transporting currency from the input receptacle along a transport path with the narrow dimension of the currency parallel to the transport direction (H0014, lines 34-36; H0019; Fig. 1, Currency (P));
- c) processing single or mixed denominations (H0014, lines 29-30, H0017 31-43);
- d) transporting bills, one a time, from the input receptacle to a single output stacker (23) (H0013, lines 27 -31; FIG. 1);
- e) a transport mechanism consisting of pulleys (4) and (5), and transport motor (M) to transport currency along a transport path (Fig. 2; H0012. lines 44-47; H0013, line 1; H0014, lines 19-20);
- f) counting and determining the denomination of bills utilizing a detector (111) positioned along a transport path between the input receptacle and the output receptacles (H0017, lines 8-16);

g) the detector comprises an optical scanning, photoelectrical device with a phototransmitter (111a) (light source) to emit light (see H0014, lines 37-39) and a photoreceiver (111b) to receive light;

h) a discriminating unit (112) which discriminates the denomination of the currency based on a pattern detection signal from the pattern detection device (111), wherein the discriminating unit includes a memory (113) that stores denomination data, and the denomination comparison device (114) generates a comparison signal after comparing the discriminated denomination from the discriminating unit (112) to the stored denomination from the memory (H0014, lines 38-43);

i) a display device (101) that displays the total value and the number of each currency note that has been counted and accumulated in a single stacker (H0012, lines 24-29; H0014, lines 25-28; H0016, lines 5 -9, 18-22; H0017, lines 42-46);

j) upon a mismatch, the dissimilar denomination rejection device 123 flags the currency bill by delivering it to a rejection aperture separate from the stacker 23 (H0017, lines 1-10; H0014, lines 47-53); and

k) a control circuit as shown in Fig. 3, including a conveyor control device (121) for controlling the conveyor drive unit (120), tracking the physical movement of currency, and stopping the conveyor drive unit when the denomination comparison signal indicates a mismatch.

#### **E. Summary of Reed**

The Reed reference (Exhibit E) was issued on August 2, 1988. As such, Reed is prior art under 35 U.S.C. § 102(b).

The Reed reference discloses a compact currency denominator for detecting the denomination of notes by a self-adaptive length discriminating technique, as useful in countries where different denominations have different lengths (as measured in the feed direction) (col. 10, lines 46-53).

The Reed denominator device (10) includes an input tray for receiving a stack of currency (S) and transports the currency *in the narrow dimension* using a kicker wheel and feed rollers, to a single output receptacle (Fig. 1; col. 1, lines 53-65; col. 3, lines 59-64; col. 4, lines 9-14 (“A kicker wheel 14 having an eccentric portion 14a protrudes through the bottom of the tray

to advance the bottom sheet toward a feed nip defined by a feed roller 16 and stripper shoe 18. The feed nip feeds documents one at a time in the forward feed direction between guideway 22 and O-rings 24”).

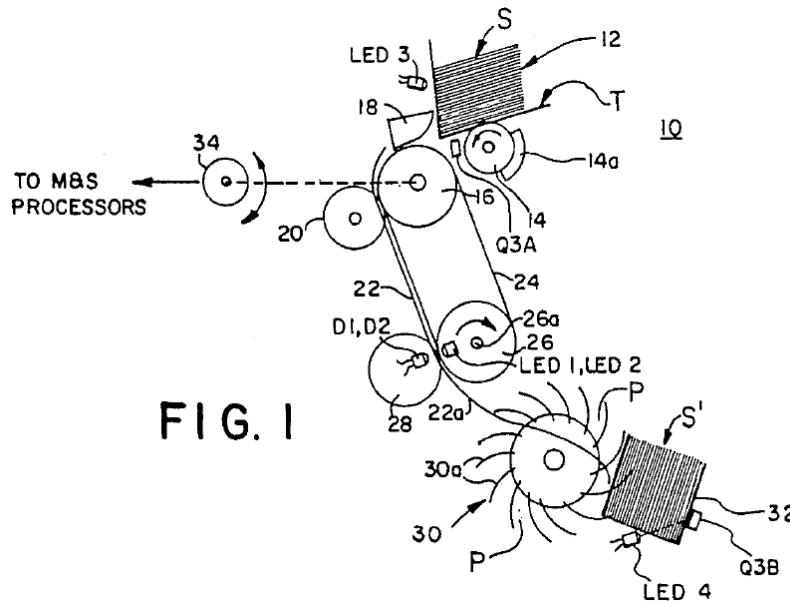


FIG. 1

Reed discloses that the operating speed of the device is 1,500 notes per minute (col. 12, lines 11-17).

The apparatus utilizes first and second light sources (LED1 and LED2) arranged on one side of the transport path. Light sensitive diodes 61a and 61b (D1, D2) are arranged on the opposite side of the transport path. The intensity of light is detected by sensors 61a, 61b whereupon operational amplifiers 63a and 63b amplify the modulated signal. The output of operational amplifier 64a generates an output utilized for counting purposes and is coupled to an A/D converter (col. 4, lines 26-35; col. 8, lines 9-22).

Reed discloses that the device includes a control unit (100) in circuitry comprising a central processing unit (CPU) which may, for example, be an F8 family 3870 processor manufactured by Mostek (Fig. 1c; Fig. 5; col. 8, lines 41-45).

Reed discloses two similar length-based denomination techniques. For example, a shaft encoder (not shown), may be coupled to the acceleration roller shaft, to generate a predetermined number of pulses for each unit of travel. The shaft encoder generates 122 pulses per inch of document travel, thus tracking the movement of currency. CPU 114 determines which sensor developed the count pulse (148, 149 and 150). Depending on which count pulse occurred first,

this condition is saved (150 or 151). The counter continues to accumulate count pulses from the shaft encoder and when the sensor which is the last to detect the trailing edge of a skewed sheet indicates the passing of the trailing edge, the count at that time is saved. The first count is subtracted from the second count to obtain the skew count which is utilized to obtain the value A and the first count is utilized to obtain the value B, and the sum of these values (C) is utilized to obtain the real length of the document from a memory table (174) (col. 9, lines 39-53).

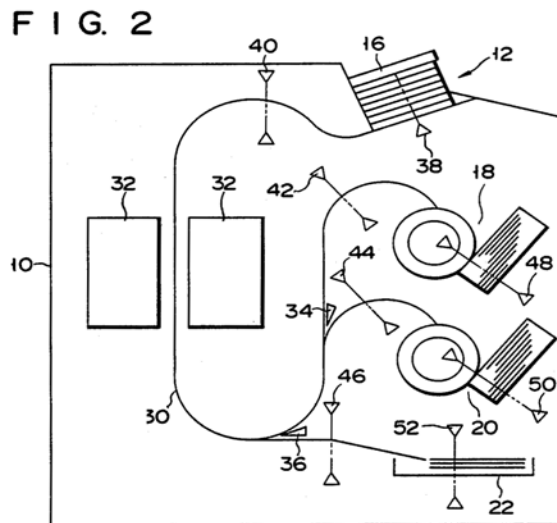
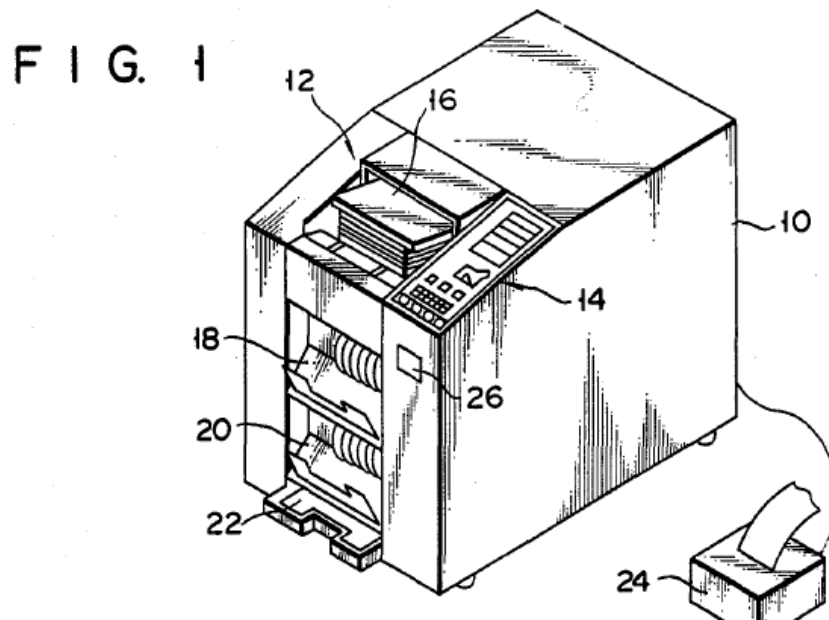
Reed notes that the major difference between its two methods is that the first method avoids the need to perform multiplication operations by using look-up tables. Here, Reed notes that digital multiplication operations are typically slower than table look-ups, but that the choice of a suitable method is dependent upon the microprocessor employed and the capacity of read-only memory (ROM). The table look-up method tends to execute faster while requiring more ROM capacity, whereas the technique performing real-time mathematical operations requires less ROM capacity but tends to execute slower. If desired, the function F(b) of the table look-up method could be calculated in real-time instead of using look-up tables, thereby reducing ROM capacity but slowing operating speed (col. 15, 30- 55).

#### **F. Summary of Takesako**

The Takesako reference (Exhibit F) was issued on May 16, 1989 from an application filed on December 24, 1987. As such, Takesako is prior art under 35 U.S.C. § 102(e)(2). However, as discussed in part VII.C, the earliest possible priority date for all claims of the '046 patent (which recite limitations of 800 or 1000 bills per minute) is May 19, 1992, in which case, Takesako is prior art under 35 U.S.C. § 102(b). More appropriately, as also discussed in part VII.C, the earliest priority date for all claims of the '046 patent (which recite a "separate stacker bin" and a "diverter") is May 8, 2003, in which case, Takesako is also prior art under 35 U.S.C. § 102(b).

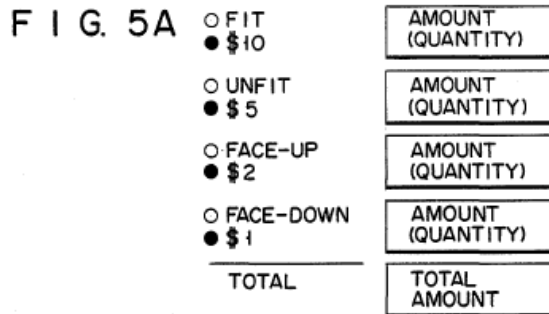
Takesako discloses a currency processing device for receiving a stack of bills and rapidly processing all the bills in the stack, wherein the device comprises an input receptacle adapted to receive a stack bills of a plurality of denominations (Abstract (noting that an "apparatus for sorting sheets is disclosed, which comprises a feeder for setting [thereon] a mixture of different kinds of sheets"); Claim 1; Fig. 1; col. 2, lines 21-22 ("The apparatus has a body 10 which has a feeder 12 at the top.")).

Takesako does not disclose a transport system using a vacuum. Rather, Takesako discloses a friction-feed bill transport system using a pair of belts (Fig. 2; col. 2, lines 62-68 (“FIG. 2 shows the internal construction of the apparatus. Bills fed from the feeder 12 are transported by a transporter 30 to the upper, lower, and reject stackers 18, 20, and 22. Although the transporter 30 is shown by a single solid line as the route of transport, actually it consists of a pair of transport belts, between which the bills are held while they are transported.”))).

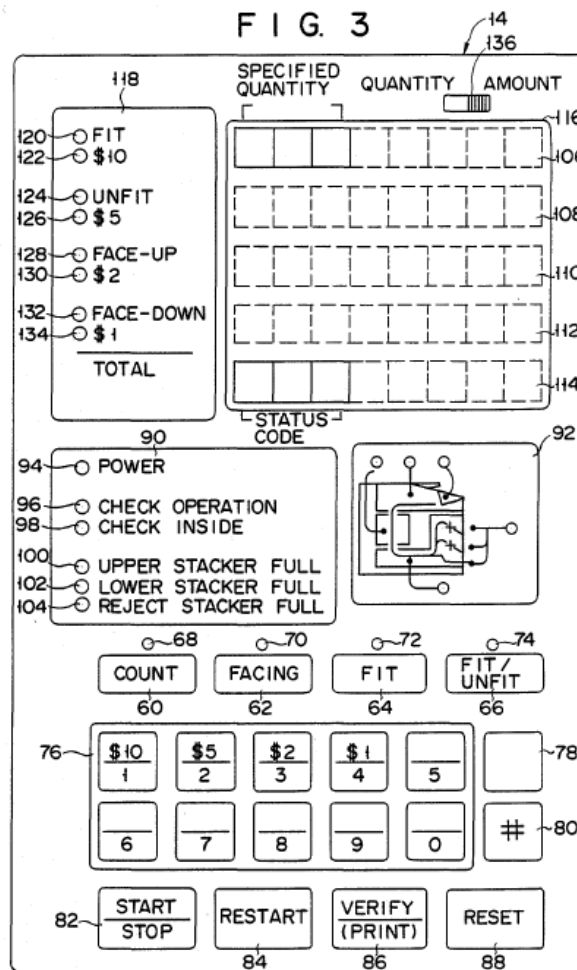


The Takesako device is adapted to process U.S. currency bills (Fig. 3 (disclosing indicators for \$1, \$2, \$5, and \$10 bills)). All U.S. currency bills have a wide and narrow

dimension. Takesako discloses displaying the total value of the bills (Fig. 3, no. 114; col. 7, line 56 (“The total amount is displayed on the fifth display row”)), as well as the number of bills of each denomination (Figs. 5a-5e).



Takesako also discloses that the content of the display can be printed (col. 2, lines 55-57 (“A printer 24 is connected to the body 10 for printing the content displayed on the operation/display panel 14)).



Takesako discloses a transport mechanism to transport the bills, one at a time, from the input receptacle along a transport path with the narrow dimension of the bills parallel to the transport direction (col. 2, lines 26-27 (“The bills in the feeder 12 are fed one by one in a horizontal state”); col. 2, lines 31-33 (“Bills are set in the feeder 12 with their leading long edge and left short edge aligned.”)).

Takesako does not disclose a transport system employing a vacuum. Rather, bills are transported by a pair of belts between which the bills are held while they are transported (col. 2, lines 67-68). One of ordinary skill in the art would understand that the ends of the belts are necessarily supported by rollers, which are driven by a motor. The ‘742 Patent specification makes numerous references to starting and stopping the motor (e.g., col. 10, lines 54-55 (“the motor as the drive source for the feeder 12 and transporter 30 is started”)).

Takesako discloses a discriminating unit including a detector positioned along the transport path (Fig. 2, no. 32 above).

Takesako also discloses a denominated bill output receptacle to receive bills whose denomination have been determined and totaled. (Abstract (“a sorting/stacking section for sorting and stacking sheets in specified quantities for specified kinds according to the result of judgment in the judging circuit”); Fig. 3, no. 114; col. 7, line 56 (“The total amount is displayed on the fifth display row”)).

Takesako illustrates an embodiment with two such output receptacles and a separate stacker bin for bills whose denomination cannot be determined (Fig. 3, nos. 18, 20; col. 2, lines 43-45 (“According to the result of judgment, the bills are sorted and . . . stacked in corresponding upper, lower, or reject stacker 18, 20 or 22”)). However, Takesako also teaches that the machine may be stopped to allow the operator to remove the bills when one stacker contains a specified number of bills (col. 2, lines 51-55 (“when bills corresponding in quantity to the stack capacity or to a specified quantity less than the stack capacity are stacked in either stacker 18 or 20, the sorting operation is automatically interrupted so that the operator can take out and bundle the bills.”)). Accordingly, it would be obvious to one of ordinary skill in the art to remove one stacker to reduce the size and cost of the machine.

Finally, Takesako also discloses a diverter positioned along the transport path to route bills whose denomination cannot be determined to the separate stacker bin (Fig. 2, no. 36; col.

15, lines 57-60 (“[I]t is determined whether the judged bill is a reject bill to be stacked in the reject stacker 22. If so, the flapper 36 is controlled to direct the bill to the reject stacker.”)).

### **G. Summary of Conant**

The Conant reference (Exhibit G) was issued on October 21, 1997. As such, Conant is prior art under 35 U.S.C. § 102(b) for all claims with an effective priority date of May 8, 2003. (See Part VII.C above (establishing May 8, 2003 priority date for all claims of the ‘046 patent).)

Conant discloses a method and apparatus for automatically determining the denomination of a plurality of U.S. currency bills (Abstract; col. 6, lines 50-52; col. 8, lines 42-46; col. 10, lines 27-30). The apparatus receives a stack of currency bills in an input receptacle (Fig. 1, no. 14). The bills may have mixed or single denominations (col. 6, lines 7-8).

The apparatus comprises a drive transport motor (col. 6, lines 9-11) and rollers (Fig. 2, nos. 16, 20, 21). The apparatus has a transport mechanism to transport the bills one at a time (Fig. 1; Fig. 2; col. 3, lines 43-48). The apparatus can process bills at a rapid rate on the order of at least 1,000 bills per minute with a high reliability in the recognition of bill denominations (col. 3, lines 11-14). The apparatus transports bills with the narrow dimension of bills parallel to the direction of transport (Fig. 1).

Conant also discloses a denomination discriminating unit with a detector positioned along the transport path (Fig. 1, Detector 54, CPU 64, etc.) with which

[a] bill classification can be done using a variety of known techniques. In the instant case, a linear discriminant technique is employed. Linear discriminant techniques are described in "*Pattern Classification and Scene Analysis*" by Duda and Hart, published by Wiley & Sons in 1973.”

(col. 7, lines 14-18).

The apparatus employs a light scanner to produce pixel signals representative of light pixels from portions of the bill surface extending across the sides of bills. The pixel signals representative of side and top edges of the printing on the bill surface are located and used to generate a deskewed array of pixels representative of bill corner images which include the bill’s denomination (Abstract).

Conant also notes that the classification of bill images by the discriminating unit is performed by storing 28 groups for U.S. currency in image memory 116. These include images for the \$1, \$2, \$5, \$10, \$20, \$50 and \$100 bills in each of four orientations. The orientations are

referred to as front (f), back (b), front upside-down (fu), and back upside-down (bu). Linear discriminant-functions are used to classify the bill image (col. 10, lines 27-34). Note that all U.S. currency bills have unique images corresponding to each of the plurality of denominations.

The detector (Fig. 1, nos. 54, 55) is electrically coupled to a processor (Fig. 1, no. 64) via a multiplexer (Fig. 1, no. 60) and an analogue-to-digital converter (Fig.1, no. 62). A memory 114 is used for storing master data associated with the denomination of bills (Fig. 1, no. 114). Memory 114 also includes a memory segment 118 for storing particular coefficient values used in the linear discriminant functions associated with particular bill denominations. These are used for classifying bill images. CPU 64 generates various outputs as a result of its signal processing. One output is applied on line 120 to actuate, for example, a solenoid 122 connected to operate switch 44. The switch diverts a bill into either hopper 40 or 42. Various other routings of bills can be employed (col. 5, lines 46-50).

Conant also discloses an output receptacle (Fig. 1, no. 42) and a separate stacker bin (Fig. 1, no. 40). The bill's appropriate classification as well as its orientation is noted at step 356, and if necessary, appropriate action taken in the sorting of the identified bill and its discharge in the correct hopper (Fig. 7; col. 11, lines 27-37). If “the image is identified as unknown at 352, and if necessary, at 354 an action is undertaken such as . . . the diversion of the unclassified bill to a discard hopper” (col. 11, lines 33-35). Here, “CPU 64 . . . actuate[s] for example a solenoid 122 connected to operate switch 44 . . . [to] divert[]a bill either into hopper 40 or 42” (col. 5, lines 51-54). Thus, bills whose denominations have been determined are delivered to a single output receptacle, whereas unknown bills are diverted to a separate stacker bin.

Conant also discloses a display connected to the CPU (Fig. 1, no. 112), however, it does not explicitly disclose displaying bill denominations, amounts, or a total of the denominated bills.

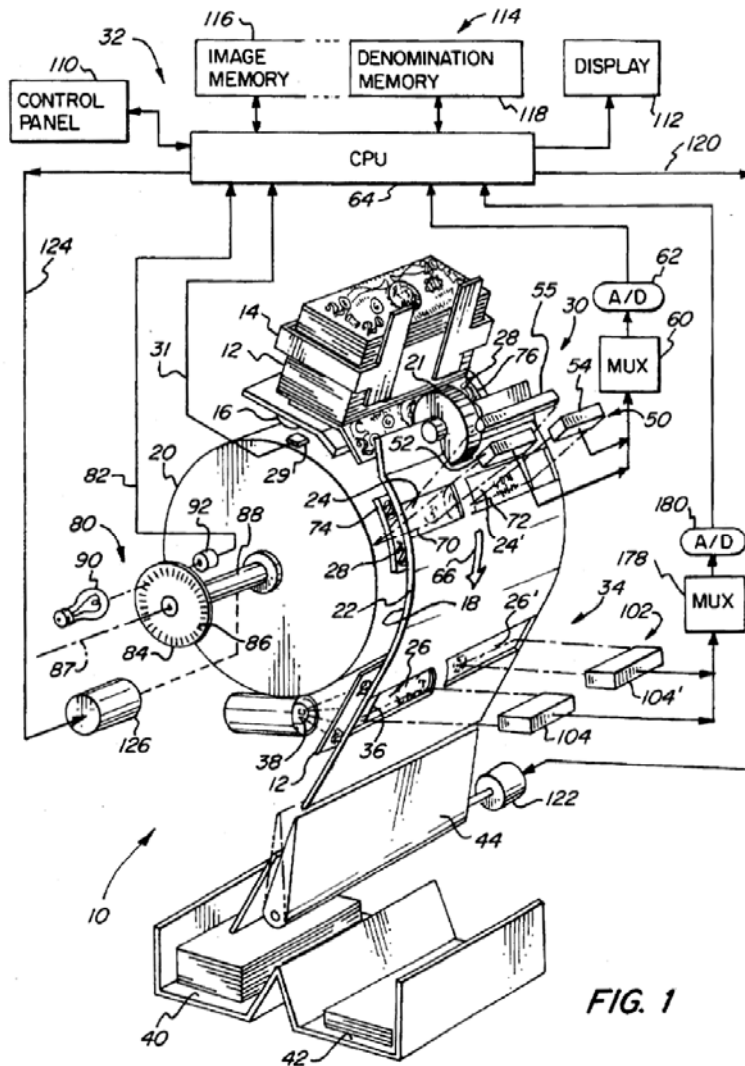


FIG. 1

Finally, Conant does not teach the use of a vacuum in the transport mechanism. Rather, Conant discloses a transport mechanism in which bills are removed from the bottom of the hopper by “pick-off roller 16” which “sends the bills along a travel path 18 defined between a main roller 20[,] a free-wheeling roller 21[,] and a guide plate 22” (col. 3, lines 41-46; Figs. 1, 2). A motor is used to rotate the main roller (e.g., col. 5, lines 58-60).

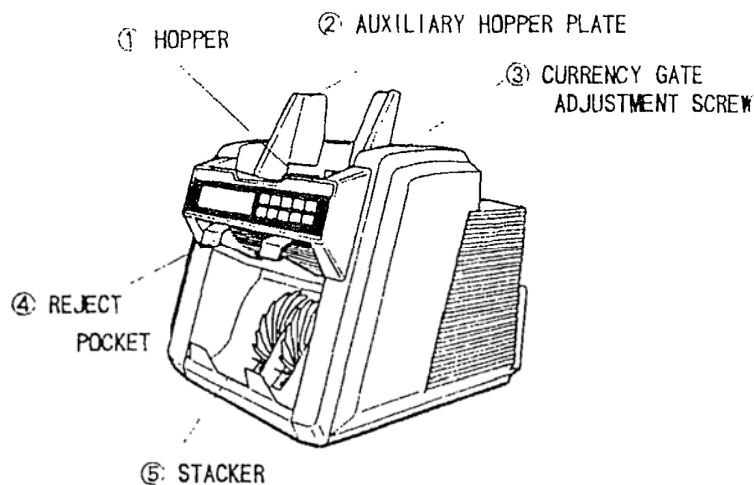
**H. Summary of the GFR-100 Instruction Manual**

The GFR-100 Instruction Manual (Exhibit I) is dated August 31, 1995 (AMRO 01132). It was made available to persons interested in the art of currency discriminators in the mid-1990s, well more than one year before the effective priority date for all claims of the ‘046 patent. (Ex. K, Glesener Decl. at ¶ 5; *see also* Part VII.C above (establishing May 8, 2003 priority date

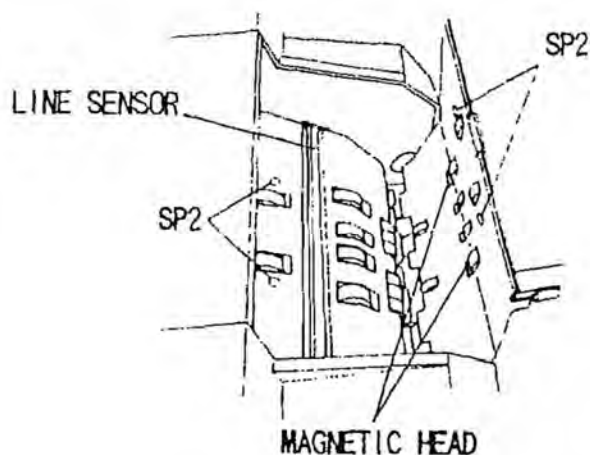
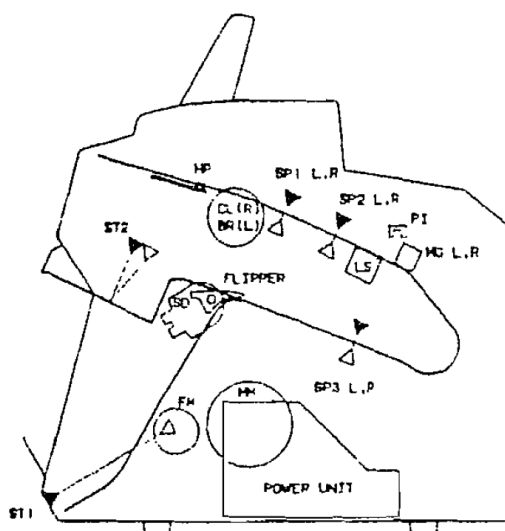
for all claims of the '046 patent).) As such, the GFR-100 Instruction Manual is a prior art printed publication under 35 U.S.C. § 102(b).

The GFR-100 Instruction Manual discloses a device for counting and denominating U.S. currency at 1000 bills per minute (AMRO 01104 (noting operation with US currency), AMRO 01115 (noting that the “Machine counts mixed denomination notes” and is used by setting “mixed denomination notes on the hopper face up”); AMRO 01131 (1000 bills per minute)). GFR-100 devices were sold commercially in the U.S. beginning at least as early as June 1995. (Ex. K, Glesener Decl. at ¶ 4; Ex. L, Mouri Decl. at ¶¶ 32-34.)

The GFR-100 Instruction Manual discloses a device having: (1) an input receptacle; (2) a single stacker for denominated notes; and (3) a separate reject pocket for bills whose denomination cannot be determined (AMRO 01107).

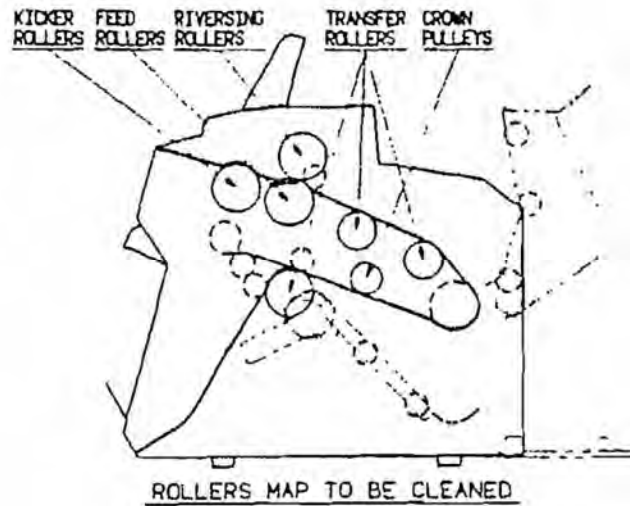


The diagram at AMRO 01127 shows the transport path dividing into two parts, at the flipper (diverter), to route bills to either the stacker or the reject pocket:



As shown above, the GFR-100 Instruction Manual also discloses that the device has a transport path with detectors, including a line sensor (“LS” in the top figure), forming a discriminating unit positioned along the transport path (AMRO 01127 (“Sensor map”), AMRO 01130 (disclosing position of line sensor)). One of ordinary skill in the art would understand that the purpose of the line sensor is to scan or to receive light reflected off passing bills and generate image signals characteristic of the bill.

The GFR-100 Instruction Manual also discloses a transport mechanism comprising a friction-type roller system, i.e., one which does not employ vacuum (AMRO 01130, 1131 (roller map diagram and friction-type rollers); see also AMRO 01127 (discussing correction of “Motor Error” )):



In "Mix" mode, the GFR-100 counts mixed denomination notes and displays the total amount counted (AMRO 01115). In this mode, the reject pocket contains notes which may be face down, suspicious, skewed, chained, doubled, or mutilated (i.e., notes whose denomination cannot be determined) (AMRO 01115). Therefore, a single stacker receives mixed denomination bills that have been denominated and totaled by the discriminating unit.

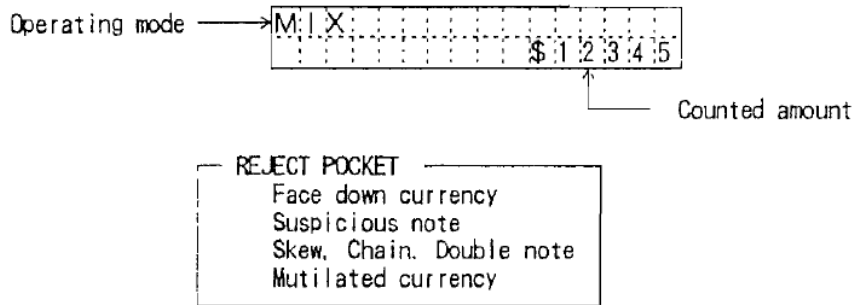
The GFR-100 Instruction Manual discloses that the machine includes a display for displaying individual bill quantities and denominations, as well as a total amount of all denominated bills delivered to the stacker (AMRO 01108, 1115).

(5) Counting Display (9 Digits from the right)

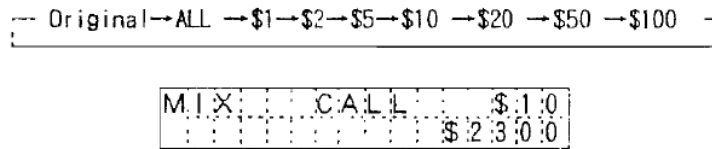
- Display of Note numbers or Amount.
- Display of each denomination counting numbers or Total Amount by pressing

the  or  key.

③ Machine counts all denomination, and total amount is shown on display.



★ To see the amount of each denomination, press the **CALL** key.



The GFR-100 Instruction Manual also discloses that the machine includes a printer interface. In the Mix mode, the printer prints the number of pieces (notes) of each denomination, the total number of bills and the total amount (AMRO 01123; AMRO 01124).

- ① Printer (CITIZEN MODELS IDP3540 RS-232C or Compatible model) can be connected to the GFR-100.
- ② After counting completed, press the **\*** key. The data will print and be added to total.

EX. Start from NO.001 after DATA CLEAR

SEQ-NO. 0001	PCS.	MIXED AMOUNT	Mode of operation
\$ 1	12	12.00	MIXED or D.D.
\$ 20	10	200.00	
\$100	15	1,500.00	
TOTAL	37	1,712.00	

③ The grand total can be printed anytime in idle condition by pressing the **TOTAL** and **\*** keys.

EX.

GRAND TOTAL		
NO. OF TRANSACTION	0010	MIXED
PCS.		AMOUNT
\$ 1	250	250.00
\$ 5	120	600.00
\$ 20	125	2,500.00
\$ 50	30	1,500.00
\$100	15	1,500.00
TOTAL	540	6,350.00

Operation mode  
 MIXED or D.D.

Number of transaction  
 in each Mode.

### I. Summary of the GFR-100 Service Manual

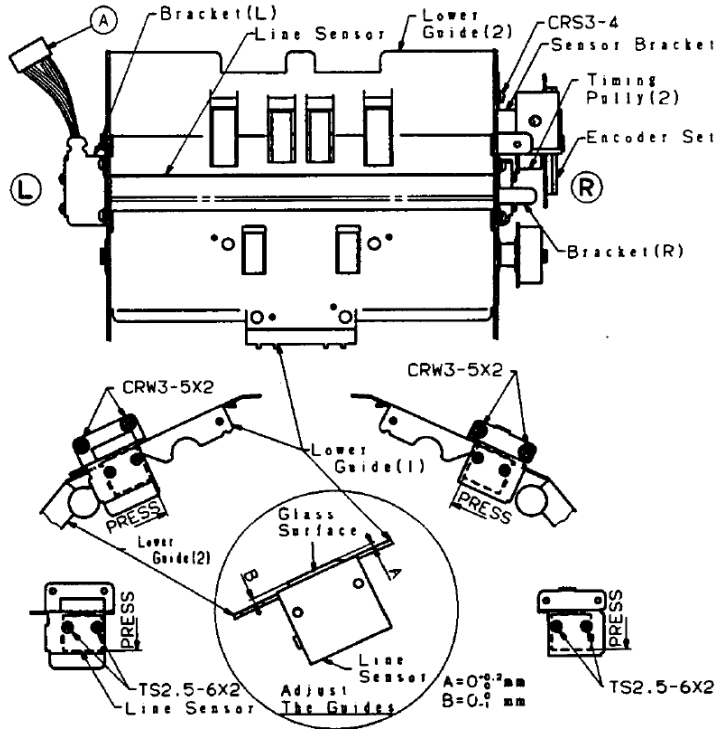
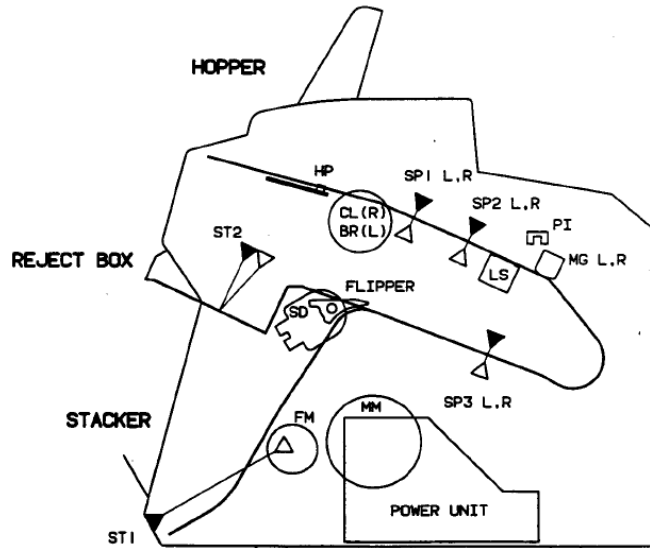
The GFR-100 Service Manual (Exhibit J) is dated December 1995 (AMRO 01031). It was made available to persons interested in the art of currency discriminators in the mid-1990s, well more than one year before the effective priority date for all claims of the '046 patent. (Ex. K, Glesener Decl. at ¶ 6; *see also* Part VII.C above (establishing May 8, 2003 priority date for all claims of the '046 patent).) As such, the GFR-100 Service Manual is a prior art printed publication under 35 U.S.C. § 102(b).

The GFR-100 Service Manual pertains to the same GFR-100 machine as described in the GFR-100 Instruction Manual. (Ex. K, Glesener Decl. at ¶¶ 4-6; *compare* AMRO 01035 to AMRO 01107.) GFR-100 devices were sold commercially in the U.S. beginning at least as early as June 1995. (Ex. K, Glesener Decl. at ¶ 4; Ex. L, Mouri Decl. at ¶¶ 32-34.)

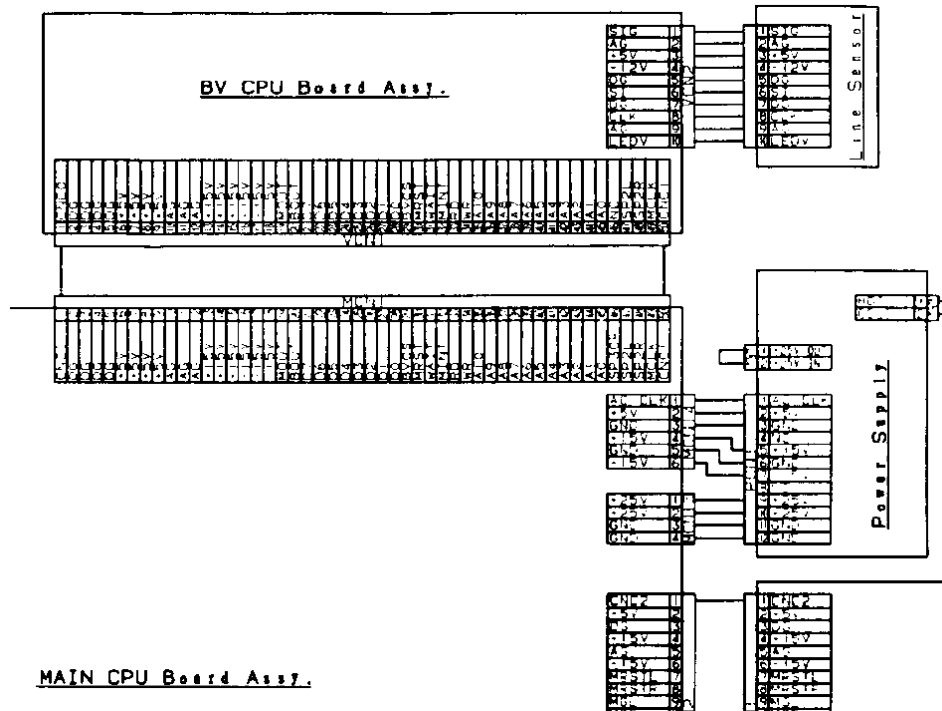
The GFR-100 Service Manual discloses a denomination discriminating unit including a line sensor positioned along the transport path for scanning images of bills (AMRO 01045 (“how to replace the line sensor”); AMRO 01056-57 (“Adjustment of line sensor” and “sensor layout”); AMRO 01084 (“The reading of the type of denomination” by the line sensor and CPU board); AMRO 01102 (disclosing line sensor connection to the CPU board)).

APPEARANCE

SP...PHOTO SENSOR	▽ THROW
ST...STACKER SENSOR	▲ CATCH
HP...AUTO START SENSOR	
PI...PHOTO INTERRUPTER	
CL...CLUTCH	
BR...BRAKE	
LS...LINE SENSOR	
MG...MAGNETIC HEAD	
SD...SOLENOID	
MM...MAIN MOTOR	
FM...FIN MOTOR	



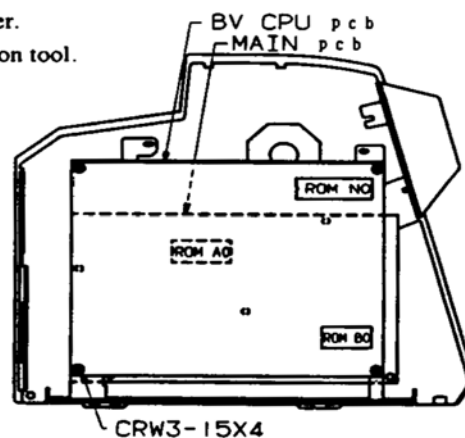
The GFR-100 Service Manual also discloses a wiring diagram explaining that the line sensor is electrically coupled to the CPU (AMRO 01102 (line sensor connected to BV CPU Board Assy., which is connected to the MAIN CPU Board Assy.)).



As noted, the GFR-100 Service Manual discloses that the line sensor (which scans and transmits image data) is connected to the CPU, which is also connected to device memory units (AMRO 01043 (disclosing three ROM units on BV CPU board and the main CPU board), AMRO 1073 (also disclosing the ROM(A), ROM(B), and ROM(N) units); see also AMRO 01061, AMRO 01056, AMRO 01090 (discussing “EEPROM”)).

**5) How to replace ROMs**

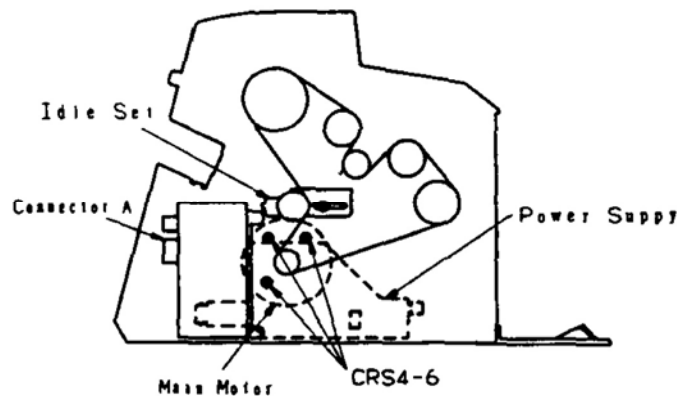
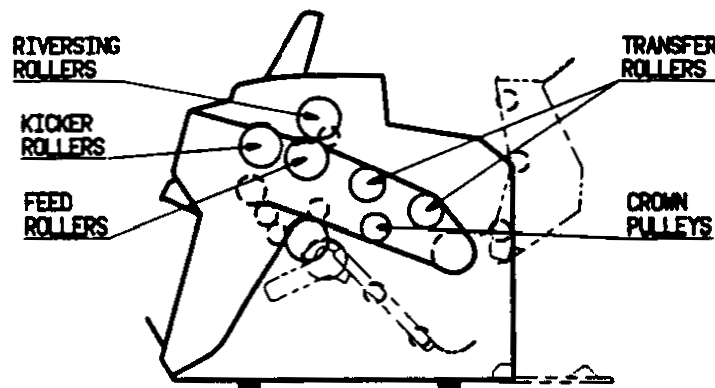
- ① Remove the left cover and EMI cover.
- ② Remove the ROM using the extraction tool.
- ③ Attach the new ROM



A person skilled in the art of currency discriminators would understand that the CPU compares image data from the line sensor to master image data stored in the device memory. Because the GFR-100 operates with all denominations, the device memory inherently stores master image data for each of the denominations. The CPU is also connected to the machine display (AMRO 01102), which as noted in the GFR-100 Instruction Manual, displays the denomination information.

Like the GFR-100 Instruction Manual, the GFR-100 Service Manual discloses a printer interface for connecting a Citizen printer model IDP3540 or equivalent, using a printer connection cable (AMRO 01059).

Like the GFR-100 Instruction Manual, the GFR-100 Service manual also discloses a motor-driven, friction-feed roller transport mechanism which does not operate using vacuum (AMRO 01042, 1046-53).



## IX. THE SUBSTANTIAL NEW QUESTIONS OF PATENTABILITY

Pursuant to 37 C.F.R. § 1.915(b)(3) and MPEP § 2617(I), attached as Appendices 1-9 are detailed claim charts that compare, limitation by limitation, each claim for which reexamination is requested with the relevant teachings of each reference cited in the Request, in support of each substantial new question of patentability (“SNQ”).

**SNQ 1: Claims 1-29, 35-47, and 53-124 Are Unpatentable Under 35 U.S.C. § 103 as Obvious Over O’Maley in View of Reed**

**SNQ 2: Claims 30 and 48 Are Unpatentable Under 35 U.S.C. § 103 as Obvious Over O’Maley in view of Reed and Nishito**

As discussed in parts VIII.A, B, and E above, O’Maley, Reed, and Nishito are all prior art.

Neither Reed nor Nishito was raised in any prior office action during prosecution of the ‘046 patent, such that they form a proper basis for a substantial new question of patentability. MPEP §§ 2616, 2642.I(B) (noting that, “for ‘a substantial new question of patentability’ to be present, it is only necessary that: . . . (B) The same question of patentability as to the claim has not been decided by the Office in a previous examination”).

During prosecution of the ‘046 patent, the application claims were rejected as obvious over O’Maley in view of U.S. Patent No. 4,114,804 (“Jones”). In response, the Patent Owner argued that O’Maley could not be properly combined with Jones because “the Jones device relates to a simple note counter and not to devices such as that purportedly taught by O’Maley that can discriminate among the denominations of bills.” (Amendment “B” and Response to Office Action dated July 11, 2008 at 56-57.) In the present Request, the Reed reference (which was never applied against any application claims) discloses a currency discriminating device (not a “simple note counter”) and for at least this reason, O’Maley is presented in a “new light or a different way that escaped review during earlier examination.” Accordingly, O’Maley and Reed in combination form a proper basis for a substantial new question of patentability. MPEP § 2616, 2642.II(A) (“a substantial new question of patentability may be based solely on old art where the old art is being presented/viewed in a new light, or in a different way, as compared with its use in the earlier examination(s), in view of a material new argument or interpretation presented in the request”).

As discussed in part VII.A above and explained in more detail in the attached Appendices 1 and 2, O'Maley discloses all the limitations of claims 1-30, 35-48, and 53-124 of the '046 patent, with the following exceptions: a) transporting bills at 800 or 1000 bills per minute along the narrow dimension, without using a vacuum; b) displaying or printing the bill quantities or a total of all denominated bills; and c) illuminating bills with a rectangular strip of light (claims 30 and 48).

a) SNQ 1, 2. O'Maley does not disclose a particular transport rate, or transporting bills along the narrow dimension without using vacuum. However, O'Maley is primarily directed to a method of denominating currency, rather than a mechanism for transporting bills, and it expressly states: "It is understood that, in general, many of the numerous types of transport mechanisms well known in the art could be utilized" (col. 3, lines 60-63). O'Maley similarly notes that "[a]lthough a particular sorter and transport arrangement has been shown, it is understood that any type of such apparatus could be utilized with the currency identifying system of the present invention" (col. 4, lines 38-42).<sup>3</sup> Reed discloses a currency discriminator with a transport mechanism for transporting currency bills one at a time along the narrow dimension using a kicker wheel and feed rollers (without vacuum), at 1500 bills per minute (Fig. 1; col. 1, lines 55-65; col. 12, lines 11-17). It would be obvious to combine Reed with O'Maley in this manner based on O'Maley's explicit suggestion to use other types of transport mechanisms. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 417 (2007) (noting that "when a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious" . . . and, therefore, the determination of obviousness asks "whether the improvement is more than the predictable use of prior art elements according to their established functions").

b) SNQ 1, 2. O'Maley discloses displaying the number of bills of each denomination recognized, from which it would be obvious to one of ordinary skill in the art to program O'Maley's microprocessor to also calculate a total value of the bills by simple multiplication and addition, and either show the result on O'Maley's display or connect a printer to the microprocessor and print the results (col. 4, lines 21-23 ("The output from the

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<sup>3</sup> Notably, these teachings in O'Maley to use other types of transport mechanisms was overlooked during prosecution of the '046 patent.

microprocessor system 22 is sent to a display 24 which can display the number counted of each particular denomination”).

c) SNQ 2. O’Maley does not explicitly disclose a rectangular strip of light, as recited by claims 30 and 48 of the ‘046 patent. However, it would be obvious to a person skilled in the art of currency denominators to focus the light source of O’Maley onto the bill in this way. An explicit teaching for U.S. currency is disclosed by Nishito (col. 3, lines 3-5 (“detected area A is irradiated from a light source 13”); Fig. 2 (disclosing rectangular strip)).

Accordingly, as discussed in more detail in the attached Appendix 1, claims 1-29, 35-47, and 53-124 are unpatentable under 35 U.S.C. § 103 as obvious over O’Maley in view of Reed.

Accordingly, as discussed in more detail in the attached Appendix 2, claims 30 and 48 are unpatentable under 35 U.S.C. § 103 as obvious over O’Maley in view of Reed and Nishito.

**SNQ 3: Claims 1-30, 35-48, and 53-124 Are Unpatentable Under 35 U.S.C. § 103 as Obvious Over Hatanaka in View of Nishito, in Further View of Curl and Reed**

As discussed in parts VIII.B-E above, Hatanaka, Nishito, Curl, and Reed are all prior art. None of these references was raised in any prior office action during prosecution of the ‘046 patent, such that they form a proper basis for a substantial new question of patentability. MPEP §§ 2616, 2642.I(B).

Hatanaka discloses all of the claim limitations recited in claims 1-30, 35-48, and 53-124 of the ‘046 patent with the exception of: a) processing U.S. currency; b) a detector adapted to generate a reflected light characteristic information output signal in response to detected characteristic information; c) a particular bill transport rate; and d) a printer configured to print the total value of bills and the number of bills of each of the plurality of denominations contained in the denominated bill output receptacle.

a) SNQ 3. Hatanaka does not disclose processing any particular currency system. However, the specification does discuss a general, optical pattern detector using a characteristic information output signal generated in response to detected characteristic information (see H0014, lines 35-41). By comparing the output signal with stored pattern in the memory (step 203), the apparatus could denominate mixed denominations of Japanese Yen (H0021, Fig. 3). A person of ordinary skill would seek to employ a known discrimination method, e.g., the method disclosed by Nishito, in order to denominate U.S. currency.

b) SNQ 3. It is well known in the art that optical sensing techniques could use reflective and/or transmissive sensors to detect and analyze variances in light reflectance or transmissivity characteristic information occurring when currency is illuminated and scanned by a strip of focused light. Nishito describes such a currency note identification system for U.S. currency, with a line sensor that generates a scanning signal corresponding to the printed pattern on a currency note (Abstract; Fig. 1). The Curl reference also suggests that the two types of sensors are similar or interchangeable: “a banknote is scanned by means of visible light reflected from its surface. Other embodiments of the invention, however, are envisioned, in which light transmitted through a sheet is detected by a strip scanner” (col. 10, lines 13-17). The ‘046 patent also suggests that both types of sensing are common: “The more commonly used optical sensing technique, on the other hand, is based on detecting and analyzing variations in light reflectance or transmissivity characteristics” (col. 1, lines 49-65 (emphasis)). Examples of other bank note discriminators using optical pattern detection, which are not relied on in this Request, include the following:

U.S. Patent No. 4,487,306 (Nao et al.)	Fig. 14; col. 1, lines 50-67; col. 2, lines 1-2
U.S. Patent No. 4,429,991 (Williams)	Abstract; col. 2, lines 34-58
U.S. Patent No. 4,880,096 (Kobayashi et al.)	Abstract; col. 1, lines 66-68; col. 2, lines 1-3
U.S. Patent No. 4,288,781 (Sellner et al.)	Abstract

Therefore, a person of ordinary skill in the art would recognize that Nishito’s reflective line scanner could be used *predictably* with Hatanaka’s compact, single output stacker configuration in order to denominate U.S. currency in a desirably small and simple apparatus.

c) SNQ 3. Hatanaka does not disclose any particular bill transport rate as recited by all claims of the ‘046 patent. However, at the time that Hatanaka was published, 1,200 bills per minute was a common speed for banknote transport systems, as noted in the Curl reference (col. 1, lines 40-42 (noting in application filed in 1982 existence of “scanning at the rate of 20-30 bills per second . . . [was] a common speed for banknote transport systems”). *See also* Reed at col. 12, lines 11-17 (disclosing a currency discriminator operating at 1,500 bills per minute). Accordingly, the desired bill processing rate (e.g., 800 or 1000 bills per minute) should be viewed as a matter of simple design choice and obvious to a person of ordinary skill in the art.

d) SNQ 3. Hatanaka discloses a bill discriminator which, *inter alia*, calculates and displays the quantity of each denomination and the total of mixed bills accumulated in a single stacker (H0012 at lines 24-29). It would have been obvious to one of ordinary skill in the art to connect a printer (e.g., to the control circuit in Fig. 3) to keep a written record of the same information that was already displayed by Hatanaka.

Accordingly, as discussed in more detail in the attached Appendix 3, claims 1-30, 35-48, and 53-124 of the '046 patent are unpatentable under 35 U.S.C. § 103 as obvious over Hatanaka in view of Nishito, in further view of Curl and Reed.

**SNQ 4: Claims 1, 2, 9, 10, 17-20, 35-38, 54-57, 80-82, 101-103, and 110-112 Are Unpatentable Under 35 U.S.C. § 103 as Obvious Over Takesako**

**SNQ 5: Claims 3-8, 11-16, 21-30, 39-48, 58-79, 83-100, 104-109, and 113-124 Are Unpatentable Under 35 U.S.C. § 103 as Obvious Over Takesako in View of Nishito**

**SNQ 6: Claim 53 Is Unpatentable Under 35 U.S.C. § 103 as Obvious Over Takesako in View of O'Maley**

As discussed in parts VIII.A, B, and F above, the Takesako, Nishito, and O'Maley references are all prior art.

Neither Takesako nor Nishito were raised in any prior office action during prosecution of the '046 patent, such that they form a proper basis for a substantial new question of patentability. MPEP §§ 2616, 2642.I(B).

During prosecution of the '046 patent, the application claims were rejected as obvious over O'Maley in view of U.S. Patent No. 4,114,804 ("Jones"). However, O'Maley was not raised or relied on in an office action either (1) in combination with Takesako, or (2) for its disclosure of an encoder as proposed in SNQ 6. Accordingly, Takesako and O'Maley in combination form a proper basis for a substantial new question of patentability. MPEP § 2616, 2642.II(A).

As discussed in part VIII.F above and explained in more detail in the attached Appendices 4-6, Takesako discloses all of the limitations of the claims of the '046 patent, or their equivalent, with the exception that Takesako does not disclose: a) a particular speed of transporting bills at 800 or 1000 bills per minute; b) using reflected light and/or comparing scanned data with master data; or c) an encoder for tracking the passage of a note (as recited by claim 53).

a) SNQ 4, 5, 6. Claims 1-30, 35-48, and 53-124 of the '046 patent recite transporting bills at a rate of at least about 800 or 1000 bills per minute. Takesako teaches transporting the bills at a rate of 600 bills per minute (col. 2, l. 28 (“at a rate of, for instance, 10 bills per second”) (emphasis added)). However, this is stated as indicative, not definitive, and a person skilled in the art of currency discriminators would understand that the rate of transporting was a design choice. Using advances in microprocessor technology introduced since the filing of Takesako (which claims priority on a Japanese application filed in April 1983), it would have been obvious and well within the capabilities of a person skilled in the art of currency discriminators to update the device illustrated by Takesako with a modern microprocessor in order to predictably increase the rate of processing to at least 800 or 1000 bills per minute. (Ex. M, Emery Decl. at ¶¶ 11-25; Ex. N, Dolsen Decl. at ¶¶ 9-10, 14-15; Ex. O, Dolsen Decl. at ¶¶ 11, 12, 26.)

b) SNQ 5. With respect to claims that recite using reflected light and/or comparing scanned data with master data (claims 3-8, 11-16, 21-30, 39-48, 58-79, 83-100, 104-109, and 113-124), a person skilled in the art of currency discriminators would be motivated to look to other prior art methods that were known at the time to be suitable for denominating U.S. currency. One suitable technique for denominating U.S. currency is disclosed in Nishito, which uses reflected light and comparing scanned data with master data.

c) SNQ 6. It would also be obvious to one skilled in the art to employ an encoder linked to the transport mechanism of Takesako in order to track the physical movement of the bills, as recited by claim 53. The use of encoders for just this purpose was well known in the art. For example, O'Maley (issued in 1979) discloses such an encoder (col. 7, lines 10-29 (“The strobing of the scanner elements of FIG. 4b would be accurately controlled . . . by a strobe clock timer circuit. Such clock timer can be synchronized with the transport drive mechanism shown in FIG. 2.)).

Accordingly, as discussed in more detail in the attached Appendix 4, claims 1, 2, 9, 10, 17-20, 35-38, 54-57, 80-82, 101-103, and 110-112 are unpatentable under 35 USC § 103 as obvious over Takesako.

As discussed in more detail in the attached Appendix 5, claims 3-8, 11-16, 21-30, 39-48, 58-79, 83-100, 104-109, and 113-124 are unpatentable under 35 U.S.C. § 103 as obvious over Takesako in view of Nishito.

As discussed in more detail in the attached Appendix 6, claim 53 is unpatentable under 35 U.S.C. § 102 as obvious over Takesako in view of O'Maley.

**SNQ 7: Claims 4, 6, 10, 12, 16, 17, 19, 22-24, 27, 35, 36, 40, 42, 45, 53-62, 65, 86, 104, and 122 Are Unpatentable Under 35 U.S.C. § 102(b) as Anticipated by Conant**

As discussed in part VIII.G above, the Conant reference is prior art. Conant was not raised in any prior office action during prosecution of the '046 patent, such that its forms a proper basis for a substantial new question of patentability. MPEP §§ 2616, 2642.I(B).

As discussed in more detail in the attached Appendix 7, claims 4, 6, 10, 12, 16, 17, 19, 22-24, 27, 35, 36, 40, 42, 45, 53-62, 65, 86, 104 and 122 are unpatentable under 35 USC § 102(b) as anticipated by Conant.

**SNQ 8: Claims 1-3, 5, 7-9, 11, 13-15, 18, 20, 21, 25, 26, 28-30, 37-39, 41, 43, 44, 46-48, 63, 64, 66-76, 80-85, 87-103, 105-121, 123, and 124 Are Unpatentable Under 35 U.S.C. § 103 as Obvious Over Conant in View of the GFR-100 Instruction Manual**

As discussed in parts VIII.G and H above, Conant and the GFR-100 Instruction Manual are both prior art. Neither Conant nor the GFR-100 Instruction Manual was raised in any prior office action during prosecution of the '046 patent, such that they form a proper basis for a substantial new question of patentability. MPEP §§ 2616, 2642.I(B).

As explained in part VIII.G above, Conant discloses a method and apparatus for automatically determining the denomination of U.S. currency bills. As demonstrated in Appendix 8, the only limitations recited in the foregoing claims which are not disclosed by Conant are totaling the denominated bills, and displaying and printing this total together with the number of bills of each denomination. As discussed in part VIII.H above, the GFR-100 Instruction Manual clearly discloses each of these limitations. (Ex. I at AMRO 01108, 1115, 1123-24.) Thus, a person of ordinary skill would be motivated to achieve predictable results by combining Conant and the GFR-100 Instruction Manual because Conant already discloses a that results from the CPU are output to a display mounted on the apparatus. (Ex. G, Fig. 1, display 112.) As taught by the GFR-100 Instruction Manual, results from the CPU could also be output

to a printer and conveniently include the quantity of each denomination and a total of denominations.

Accordingly, as discussed in more detail in the attached Appendix 8, claims 1-3, 5, 7, 8, 9, 11, 13-15, 18, 20, 21, 25, 26, 28-30, 37-39, 41, 43, 44, 46-48, 63, 64, 66-76, 80-85, 87-103, 105-121, 123, and 124 are unpatentable under 35 U.S.C. § 103 as obvious over Conant in view of the GFR-100 Instruction Manual.

**SNQ 9: Claims 1-30, 35-48, and 53-124 Are Unpatentable Under 35 U.S.C. § 103 as Obvious Over the GFR-100 Instruction Manual in View of the GFR-100 Service Manual**

As discussed in parts VIII.H and I above, the GFR-100 Instruction Manual and the GFR-100 Service Manual are both prior art. Neither of these references was raised in any prior office action during prosecution of the '046 patent, such that they form a proper basis for a substantial new question of patentability. MPEP §§ 2616, 2642.I(B).

As discussed in parts VIII.H and I above, and explained in more detail in the attached Appendix 9, the GFR-100 Instruction Manual and GFR-100 Service Manual together disclose all of the limitations of claims 1-30, 35-48, and 53-124 of the '046 patent. A person of ordinary skill in the art of currency discriminating machines would be motivated to combine the teachings of the GFR-100 Instruction Manual and the GFR-100 Service Manual with *predictable* results because the two manuals both relate to the *same* machine.

Accordingly, as discussed in more detail in the attached Appendix 9, claims 1-30, 35-48, and 53-124 are unpatentable under 35 U.S.C. § 103 as obvious over the GFR-100 Instruction Manual in view of the GFR-100 Service Manual.

**X. CONCLUSION**

For all of the above reasons, Requester Mahbub A. Siddiqui respectfully requests that the Patent Office issue an Order granting the Request for Reexamination of claims 1-30, 35-48, and 53-124 of the '046 patent.

Date: August 12, 2009

Respectfully submitted,

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**CERTIFICATE OF SERVICE**

It is hereby certified that in accordance with 37 C.F.R. § 1.903 and § 1.248, a copy of the foregoing Request for *Inter Partes* Reexamination of United States Patent No. 7,536,046 (Raterman et al.), including all attachments, is being forwarded on this 12th day of August by first class mail, postage prepaid, to CUMMINS-ALLISON CORP. c/o, Nixon Peabody, L.P., 300 S. Riverside Plaza, 16th Floor, Chicago, Illinois 60606, counsel representing the Patent Owner.

/Thomas L. Warden, Reg. No. 47,165/