



(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
30.06.1999 Bulletin 1999/26

(51) Int. Cl.⁶: G07D 7/00

(43) Date of publication A2:
09.12.1998 Bulletin 1998/50

(21) Application number: 98115458.6

(22) Date of filing: 14.01.1991

(84) Designated Contracting States:
DE FR GB IT NL

(30) Priority: 05.02.1990 US 475111

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
95116745.1 / 0 706 156
91903057.7 / 0 466 869

(71) Applicant:
CUMMINS-ALLISON CORPORATION
Mount Prospect Illinois 60056 (US)

(72) Inventors:
• Raterman, Donald E.
Deerfield, Illinois 60015 (US)
• Graves, Bradford T.
Arlington Heights, IL 60005 (US)

(74) Representative:
Grünecker, Kinkeldey,
Stockmair & Schwanhäusser
Anwaltssozietät
Maximilianstrasse 58
80538 München (DE)

(54) Method and apparatus for currency discrimination and counting

(57) An improved method and apparatus for discriminating between currency bills of different denominations uses an optical sensing and correlation technique based on the sensing of bill reflectance characteristics obtained by illuminating and scanning a bill. A series of detected reflectance signals are obtained by sampling and processing the reflected light as the currency bill is moved across a light strip. The sample data is subjected to processing, whereby the reflectance data represents a characteristic pattern that is unique for a given bill denomination and incorporates sufficient distinguishing features between characteristic patterns for discriminating between different currency denominations.

A plurality of master characteristic patterns are generated and stored using original bills for each denomination of currency to be detected. The characteristic pattern for a scanned currency bill is compared to each of said stored master patterns to determine the degree of correlation therebetween, and thereby to identify the denomination of said currency bill.

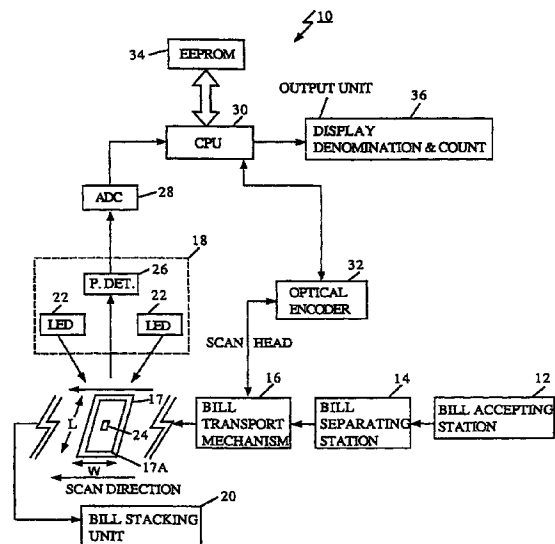


FIG. 1



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 11 5458

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 338 123 A (LGZ) 25 October 1989 * abstract *	1	G07D7/00
A	EP 0 077 464 A (LGZ) 27 April 1983 * abstract *	1	
A	EP 0 342 647 A (NIXDORF COMPUTER) 23 November 1989 * column 3, line 41 - column 6, line 28 *	1	
X Y A	EP 0 264 125 A (TOSHIBA) 20 April 1988 * column 9, line 30 - line 49 * * column 5, line 10 - line 34 * * line 40 - line 48 * * column 7, line 26 - line 45 * * column 10, line 34 - line 36 * * column 10, line 57 - column 11, line 1; claim 18 *	14,15 17,18 16	
Y	EP 0 253 935 A (LIGHT SIGNATURES) 27 January 1988 * abstract *	17,18	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			G07D G06K
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		4 May 1999	Taccoen, J-F
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

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

EP 98 11 5458

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

04-05-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0338123 A	25-10-1989	AT 85443 T	15-02-1993
		DE 3815375 A	26-10-1989
		DE 3878223 A	18-03-1993
		US 4922109 A	01-05-1990
EP 0077464 A	27-04-1983	CH 653782 A	15-01-1986
		AT 16052 T	15-10-1985
		DK 456182 A,B,	16-04-1983
		JP 58068780 A	23-04-1983
EP 0342647 A	23-11-1989	DE 3816943 A	30-11-1989
		DE 58909461 D	16-11-1995
		ES 2078224 T	16-12-1995
		JP 2031140 A	01-02-1990
EP 0264125 A	20-04-1988	JP 63097530 A	28-04-1988
		JP 2093160 C	18-09-1996
		JP 8003862 B	17-01-1996
		JP 63097531 A	28-04-1988
		JP 63098086 A	28-04-1988
		JP 63097550 A	28-04-1988
		DE 3775329 A	30-01-1992
		US 4845917 A	11-07-1989
EP 0253935 A	27-01-1988	US 4748679 A	31-05-1988
		AT 85441 T	15-02-1993
		CA 1263751 A	05-12-1989
		DE 3687710 A	18-03-1993
		JP 63030989 A	09-02-1988