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Minin et al.

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(54) **METHOD FOR THE CLASSIFICATION OF BANKNOTES**

(58) **Field of Classification Search**
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See application file for complete search history.

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(56) **References Cited**

U.S. PATENT DOCUMENTS

4,662,621 A * 5/1987 Lundblad 271/3.19
5,678,677 A * 10/1997 Baudat 194/206
6,621,919 B2 * 9/2003 Mennie et al. 382/135
6,721,442 B1 * 4/2004 Mennie et al. 382/135
7,212,948 B2 * 5/2007 Voser 702/182

(Continued)

FOREIGN PATENT DOCUMENTS

EP 0 874 333 A1 10/1998
RU 2 183 350 C2 6/2002
WO WO 95/23388 A1 8/1995
WO WO 2007/068867 6/2007

OTHER PUBLICATIONS

International Search Report with English translation, mailing date
Aug. 18, 2011, for corresponding International Application No. PCT/
RU2011/000232.

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(57) **ABSTRACT**

The invention group relates to the banknote detecting means. The technical result is increase in the banknote identification accuracy. The method is based on a computational processing of the banknote scan formed in the device during scanning. The banknote digital image is separated into areas; for each area a function is calculated and a feature vector is composed with further calculation of the distance to the known classes represented by the parameters available beforehand. Moreover, the calculated function of the banknote digital image allows calculation of its signature in a form of binary number that is compared with the classes known beforehand.

24 Claims, 12 Drawing Sheets

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