



US008600145B2

(12) **United States Patent**
Minin et al.

(10) **Patent No.:** **US 8,600,145 B2**
(45) **Date of Patent:** **Dec. 3, 2013**

- (54) **METHOD FOR PROCESSING BANKNOTES**
- (75) Inventors: **Petr Valer'evich Minin**, Moscow (RU); **Vladislav Igorevich Korotenko**, Moscow (RU); **Dmitry Evgen'evich Sheshukov**, Moscow (RU); **Dmitry Gennadievich Pis'Menny**, Moscow (RU)
- (73) Assignee: **Obshchestvo S Organichennoj Otvetstvennost' Ju "Konstruktorskoe Bjuro "Dors" (OOO "KB "Dors")**, Moscow (RU)
- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

- (21) Appl. No.: **13/639,854**
- (22) PCT Filed: **Apr. 7, 2011**
- (86) PCT No.: **PCT/RU2011/000233**
§ 371 (c)(1), (2), (4) Date: **Oct. 5, 2012**
- (87) PCT Pub. No.: **WO2011/126411**
PCT Pub. Date: **Oct. 13, 2011**

(65) **Prior Publication Data**
US 2013/0044935 A1 Feb. 21, 2013

(30) **Foreign Application Priority Data**
Apr. 8, 2010 (RU) 2010113708

- (51) **Int. Cl.**
G06K 9/00 (2006.01)
- (52) **U.S. Cl.**
USPC **382/135; 382/137; 382/138; 382/140**
- (58) **Field of Classification Search**
USPC **382/135-140**
See application file for complete search history.

- (56) **References Cited**
- U.S. PATENT DOCUMENTS
- 6,621,919 B2 * 9/2003 Mennie et al. 382/135
- 6,721,442 B1 * 4/2004 Mennie et al. 382/135
- (Continued)
- FOREIGN PATENT DOCUMENTS
- CN 2499902 Y 7/2002
- DE 19915440 A1 9/2000
- (Continued)
- OTHER PUBLICATIONS

International Search Report with English translation, mailing date Jul. 21, 2011, for corresponding International Application No. PCT/RU2011/000233.

Primary Examiner — Wesley Tucker
(74) *Attorney, Agent, or Firm* — Intellectual Property Law Group LLP

(57) **ABSTRACT**

The method may be used in the devices for banknote detecting, counting or sorting; it may be used to determine the banknote main characteristics: its currency type and denomination. The method is based on a computational processing of the banknote digital image formed in the device during scanning. Increase in the banknote processing speed is the technical result. The first variant of the method envisages a preliminary classification and further checking of correspondence to selected possible classes according to several criteria typical for each particular class. For checking of correspondence, an admissibility of the value of interrelation characteristic for two areas is validated. According to the second variant, there is made classification on the base of a banknote digital image and for each possible class the measure of the banknote correspondence to the image is calculated and used for ranking, the banknote is referred to the class closest to it by the measure of correspondence.

6 Claims, 9 Drawing Sheets

