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(71) Applicant: **STEELCASE, INC.** [US/US]; 901 44th Street SE, Grand Rapids, MI 49501-1967 (US).

(72) Inventors: **WILSON, Scott E.**; 2742 NW Cannon Way, Portland, OR 97229 (US). **HILDEBRANDT, Peter W.**; 244 Southern Hill Drive, Duluth, GA 30097 (US).

(74) Agents: **GLASS, Christopher W.** et al.; Troutman Sanders LLP, Bank of America Plaza, 600 Peachtree Street, NE, Suite 5200, Atlanta, GA 30308-2216 (US).

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(54) Title: DOCUMENT UNBENDING AND RECOLORING SYSTEMS AND METHODS

(57) Abstract: According to one aspect, a system for processing a document image is disclosed. In an exemplary embodiment, the system includes an edge-detection unit configured to identify an edge of a document from a document image. The system also includes a keystone-correction unit and a flattening unit. The keystone-correction unit is configured to correct keystone distortion in the document image. The flattening unit is configured to flatten content of the document in the document image.

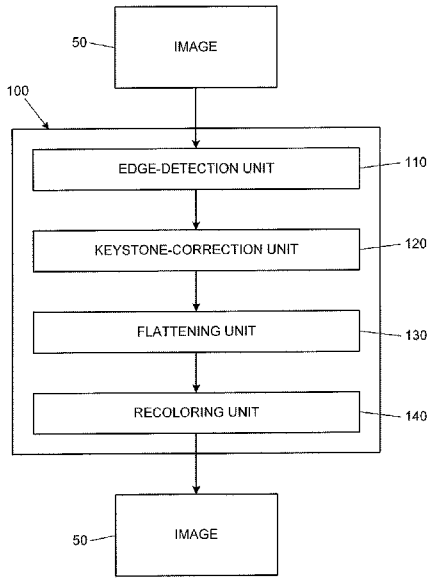


Fig. 1

WO 2013/192508 A3

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
INV. G06T5/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06T H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JIAN LIANG ET AL: "Camera-based analysis of text and documents: a survey", INTERNATIONAL JOURNAL OF DOCUMENT ANALYSIS AND RECOGNITION (IJDAR), SPRINGER, BERLIN, DE, vol. 7, no. 2-3, 1 July 2005 (2005-07-01), pages 84-104, XP019352711, ISSN: 1433-2825, DOI: 10.1007/S10032-004-0138-Z	1-5,10, 16-19, 21,23, 25-30,32
Y	Secs. 4.1.1, 4.2.1, 4.2.2, 4.3	6-8,22, 31

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 March 2014	13/03/2014

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Krawczyk, Grzegorz

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/047021

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	HYUNGSOO OHK ET AL: "A restoration method for distorted image scanned from a bound book", PROCEEDINGS OF SPIE, vol. 7866, 23 January 2011 (2011-01-23), pages 78661T-78661T-8, XP055105088, ISSN: 0277-786X, DOI: 10.1117/12.876758	1-5, 10-21, 23-30, 32,33
Y	Secs. 3.1, 4.1, 4.2; figures 12-14	6-8,22, 31

X	JIAN FAN ET AL: "A Comprehensive Image Processing Suite for Book Re-mastering", EIGHTS INTERNATIONAL PROCEEDINGS ON DOCUMENT ANALYSIS AND RECOGNITION, IEEE, 31 August 2005 (2005-08-31), pages 447-451, XP010877988, DOI: 10.1109/ICDAR.2005.5 ISBN: 978-0-7695-2420-7	1-8, 11-22, 24-31,33
Y	Secs. 2.1, 2.2; figures 2,3	10,23,32

Y	US 2003/156201 A1 (ZHANG TONG [US]) 21 August 2003 (2003-08-21) corners of a document for perspective correction; figure 4	6,22,31

Y	L Jagannathan ET AL: "Perspective Correction Methods for Camera-Based Document Analysis", Proceedings of the First International Workshop on Camera-Based Document Analysis and Recognition (CBDAR 2005), 29 August 2005 (2005-08-29), XP055105117, Seoul, Korea Retrieved from the Internet: URL:http://imlab.jp/cbdar2005/proceedings/papers/P6.pdf [retrieved on 2014-03-03] Sec. 3.1	6,22,31

Y	US 7 010 745 B1 (SHIMADA MITSUNOBU [JP] ET AL) 7 March 2006 (2006-03-07) figures 6A-6C, 7A-7C	7,8

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International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 497 236 A (WOLFF GREGORY J [US] ET AL) 5 March 1996 (1996-03-05) figures 2,3,4A-4D ----	10,23,32
Y	XI ZHONG AOGANG ET AL: "Correction of scanned book images", TSINGHUA SCIENCE AND TECHNOLOGY, TSINGHUA UNIVERSITY PRESS, BEIJING, CN, vol. 8, no. 5, 1 October 2003 (2003-10-01) , pages 624-627, XP011375288, ISSN: 1007-0214, DOI: 10.1109/TST.2003.6076274 Sec. 1; figures 2,3 ----	10,23,32

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Information on patent family members

International application No
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