

US009185291B1

# (12) United States Patent Shabtay et al.

#### (10) **Patent No.:**

US 9,185,291 B1

(45) **Date of Patent:** 

Nov. 10, 2015

#### (54) DUAL APERTURE ZOOM DIGITAL CAMERA

(71) Applicant: Corephotonics Ltd., Tel-Aviv (IL)

(72) Inventors: **Gal Shabtay**, Tel-Aviv (IL); **Ephraim** 

Goldenberg, Ashdod (IL); Oded Gigushinski, Tel-Aviv (IL); Nov Cohen,

Tel-Aviv (IL)

(73) Assignee: Corephotonics Ltd., Tel-Aviv (IL)

(\*) 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.: 14/365,711

(22) PCT Filed: Jun. 12, 2014

(86) PCT No.: **PCT/IB2014/062180** 

§ 371 (c)(1),

(2) Date: Jun. 16, 2014

(87) PCT Pub. No.: **WO2014/199338** 

PCT Pub. Date: Dec. 18, 2014

(51) **Int. Cl.** 

*H04N 5/232* (2006.01) *H04N 5/225* (2006.01)

(52) U.S. Cl.

CPC ............. H04N 5/23245 (2013.01); H04N 5/225 (2013.01); H04N 5/2259 (2013.01); H04N 5/23212 (2013.01); H04N 5/23296 (2013.01)

(58) Field of Classification Search

(56)

#### **References Cited**

#### U.S. PATENT DOCUMENTS

(Continued)

#### FOREIGN PATENT DOCUMENTS

JP 2006238325 A \* 9/2006 ...... H04N 5/232 WO 201310512 A2 7/2013

## (Continued) OTHER PUBLICATIONS

JP 2006238325 A; Camera system for clear display of video in display apparatus, displays simultaneously or records image of wide camera and image of tele camera by switching to tele video and wide video during movement of tele camera; CANON; Sep. 2006; English Abstract.\*

(Continued)

Primary Examiner — Roberto Velez Assistant Examiner — Cynthia Segura

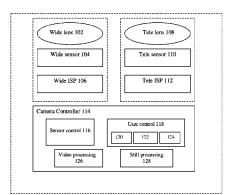
(74) Attorney, Agent, or Firm — Nathan & Associates Patent Agents Ltd.; Menachem Nathan

#### (57) ABSTRACT

A dual-aperture zoom digital camera operable in both still and video modes. The camera includes Wide and Tele imaging sections with respective lens/sensor combinations and image signal processors and a camera controller operatively coupled to the Wide and Tele imaging sections. The Wide and Tele imaging sections provide respective image data. The controller is configured to combine in still mode at least some of the Wide and Tele image data to provide a fused output image from a particular point of view, and to provide without fusion continuous zoom video mode output images, each output image having a given output resolution, wherein the video mode output images are provided with a smooth transition when switching between a lower zoom factor (ZF) value and a higher ZF value or vice versa, and wherein at the lower ZF the output resolution is determined by the Wide sensor while at the higher ZF value the output resolution is determined by the Tele sensor.

#### 22 Claims, 8 Drawing Sheets

100



Apple v Corephotonics



# US 9,185,291 B1 Page 2

(56)			Referen	ces Cited	2007/0146503 A	1* 6/2007	Shiraki H04N 3/1593 348/231.3
		U.S.	PATENT	DOCUMENTS	2008/0030592 A	1* 2/2008	Border H04N 5/232 348/218.1
6,	977,676	B1 *	12/2005	Sato G08B 13/19628 348/14.08	2008/0218613 A	1* 9/2008	Janson G03B 15/00 348/262
7.	305,180	B2	12/2007	Labaziewicz et al.	2008/0219654 A	1* 9/2008	Border H04N 5/2258
	388,182			Schofield B60Q 1/1423 250/205	2009/0273688 A	1* 11/2009	396/89 Nonaka H04N 5/2259 348/222.1
7,	561,191	B2	7/2009	May et al.	2010/0277619 A	1 11/2010	
7,	676,146	B2	3/2010	Border et al.	2011/0064327 A		Dagher et al.
7,	724,300	B2 *	5/2010	Misawa H04N 5/2253 348/333.05	2012/0026366 A		Golan H04N 5/232 348/240.2
7,	843,499	B2 *	11/2010	Watanabe G08B 13/19643	2015/0029601 A	1/2015	Dror et al.
				348/143	2015/0085174 A	1* 3/2015	Shabtay H04N 5/23296
8,	149,327	B2	4/2012	Lin et al.			348/336
8,	439,265	B2	5/2013	Ferren et al.	2015/0244942 A	1* 8/2015	Shabtay H04N 5/23296
8,	542,287	B2	9/2013	Griffith et al.			348/240.3
8,	553,106	B2	10/2013	Scarff			
8,	660,420	B2	2/2014	Chang	FOREIGN PATENT DOCUMENTS		
8,	731,390	B2	5/2014	Goldenberg et al.			
8,	860,849	B2 *	10/2014	Misawa H04N 5/2258	WO 201	5001519 A2	1/2015
				348/240.2	WO 201	5015383 A2	2/2015
2003/0	0227556	A1*	12/2003	Doyle G06F 3/0481 348/239		OTHER PU	BLICATIONS
2006/0	0275025	A1*	12/2006	Labaziewicz H04N 5/225	PCT/IB2014/0621	80 Search R	eport of the international search
				396/72	authority, Mar. 201		
2007/0	0109399	A1*	5/2007	Sekimoto H04N 5/2253	• ,		
				348/36	* cited by exami	ner	



#### <u>100</u>

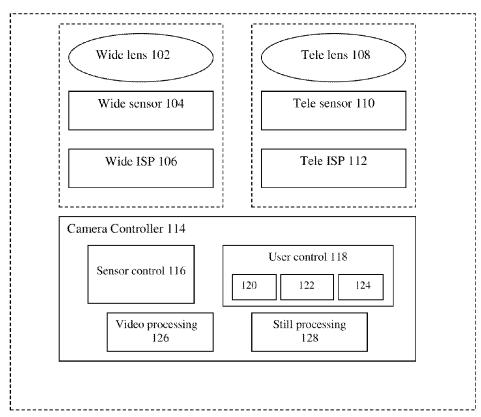


FIG. 1A

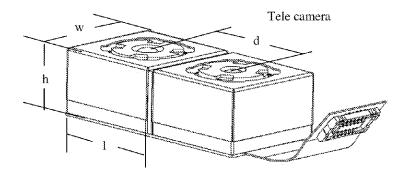


FIG. 1B

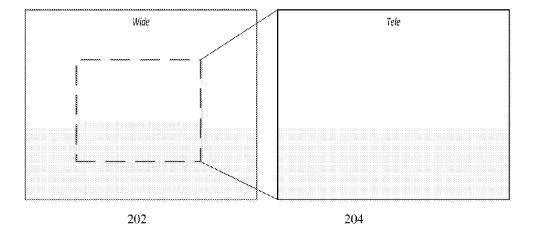


FIG. 2

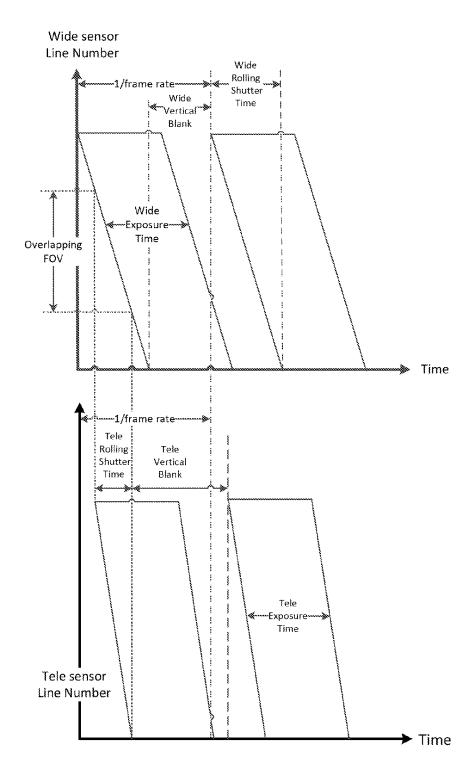


FIG. 3

# DOCKET A L A R M

# Explore Litigation Insights



Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## **Real-Time Litigation Alerts**



Keep your litigation team up-to-date with **real-time** alerts and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

### **Advanced Docket Research**



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

### **Analytics At Your Fingertips**



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

#### API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

#### **LAW FIRMS**

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

#### **FINANCIAL INSTITUTIONS**

Litigation and bankruptcy checks for companies and debtors.

#### **E-DISCOVERY AND LEGAL VENDORS**

Sync your system to PACER to automate legal marketing.

