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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor	:	James Jannard, et al.
App. No.	:	90/012550
Filed	:	September 13, 2012
For	:	VIDEO CAMERA
Examiner	:	Tran, Henry N.
Art Unit	:	3992
Conf No.	:	1159

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DECLARATION OF GRAEME NATTRESS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, Thomas Graeme Nattress, declare that:

I. BACKGROUND

1. I am a lead camera systems architect at Red.com, Inc. (dba Red Digital Camera) ("RED"), the assignee of U.S. Patent No. 8,174,560 ("the 560 patent"), which is a subject of the present reexamination proceeding. I am also a listed inventor on the '560 patent and an inventor on seven additional issued patents that belong to RED.

2. In addition to my position at RED, I am founder and co-owner of Nattress Productions Inc., where I have been developing and selling a range of custom image processing software solutions since 2004. Before joining RED I held positions from about 2001 to 2004 as Vice President of Research and Development at Noitaminanimation Inc. and Cinerio

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Entertainment, Inc., where I developed custom animation software for internal company use. At Noitaminanimation I worked with digital cinematography cameras to do matching of computer animation to real footage.

3.   I hold a Bachelor's of Science in Mathematics from the University of Newcastle upon Tyne, and a Postgraduate Certificate in Education from the University of Sunderland. During my university years, I was heavily involved with video production, and this is where my passion and interest in motion imagery really began to take form. During this time I was an early adopter of non-linear video editing and special effects software, and was a professional reviewer of such software for Content Creation Europe magazine.

4.   I have also edited a number of books in the digital video field. One of these books—*The Filmaker's Handbook: A Comprehensive Guide for the Digital Age, by Steven Ascher and Edward Pincus*—is widely acknowledged as the "bible" of film and video production.

5.   At RED, my responsibilities include designing and implementing image processing algorithms, pipelines and workflow. I have been intimately involved in the process of designing and building all of RED's camera models from the ground up.

6.   I joined RED in 2005, and based upon the investment of an enormous amount of effort and resources, we created the first ever digital cinematography camera which was capable of capturing and recording compressed RAW image data, on board, at 2k and higher resolution, and at a frame rate of at least about 23 frames per second. Specifically, our cameras compress and record raw digital image data having a resolution of at least 2k (including 4k) into a storage device of the camera (e.g., carried on or within a portable

housing of the camera) at a frame rate of at least about twenty-three frames per second, where the data remains substantially visually lossless upon decompression.

7.   I have reviewed all of the outstanding rejections in the Office Actions dated October 31, 2013 and March 29, 2013, as well as any references cited in the September 13, 2012 Request for Reexamination. The cumulative list of references includes:

- U.S. Patent Publication No. 2006/0061822 to Sung et al. ("Sung '822")
- U.S. Patent Publication No. 2007/0092149 to Sung et al. ("Sung '149")
- *On the Dependency Between Compression and Demosaicing in Digital Cinema,* by D. Menon, et al. ("Menon")
- U.S. Patent Publication No. 2010/0014590 to Smith et al. ("Smith")
- English Language Patent Abstract of Japanese Published Application No. JP-06054239 to Nishimura ("Nishimura")
- U.S. Patent Publication No. 4,450,487 to Koide ("Koide")
- *The ISO Standard 15444 (Part 1): Information Technology – JPEG 2000 Image Coding System: Core Coding,* pages i-v, xiv, 1-11, and 120-122 (ISO/IEC 15444-1) ("JPEG 2000")
- *Single-sensor Camera Image Compression* by Lukac et al., IEEE Transactions on Consumer Electronics, Vol. 52, pages 299-307 ("Lukac")
- U.S. Patent No. 6,825,876 to Easwar et al. ("Easwar")

8.   I have carefully reviewed the entire text of each of the above references, as well as any comments by the Examiner relating to the references, where applicable. The following is an explanation of certain deficiencies of each of the references as it relates to the claims of the '560 patent.

9.   Those of ordinary skill in the art of cinema-grade digital movie camera design and video image processing, at the time of filing of the '560 patent, typically had a 4-year university degree in a field such as Mathematics as well as at least two years of experience with high-end digital photography equipment and processing techniques used in broadcast, mass

publication or cinema production. Additionally, one could acquire such a level of skill, without a university degree, through at least two years hands-on involvement with high-end digital photography equipment and processing techniques used during participation in broadcast, mass publication or cinema productions along with associated on-the-job training.

II. DESCRIPTION OF TYPICAL PRIOR ART DATA FLOW FOR HIGH END PHOTOGRAPHY

10.   To understand the reasoning of those of ordinary skill in the art of cinema-grade movie cameras, it is important to consider the needs, requirements, and expectations of the customer base of those of skill in the art. For example, a camera user in the cinema production market must face the reality of the costs required to prepare a scene for "filming" a cinema production, as well as the unique requirements of cinema recording. The filming of some scenes in modern movies can generate $100,000 per hour of costs for preparation and support during actual filming. During filming, all of that cost is transferred into the media used for "filming". As such, the recording system associated with the camera must reliably capture the desired motion video at a level of quality that can withstand intense scrutiny.

11.   The final goal of a movie production effort is to provide a motion video that can be enlarged to larger-than-life scales, on screens that can be 50 feet wide or larger, without any audience member being distracted by errors or artifacts, throughout the length of the production which is often over 2 hours long. To achieve that level quality and consistency,

nearly every frame of a cinema production is studied by experts to ensure the absence or successful elimination of undesirable characteristics found in the recorded video.

12. At the time we filed the '560 patent, the cinema industry did not employ any video compression techniques for processing digital video recordings, either in camera or downstream. Thus, when we released the first RED camera, cinema industry professionals were reluctant to even attempt to use a cinema-grade camera that employed any compression, let alone an unprecedented technique of compressing and storing raw mosaiced image data (e.g., Bayer pattern image data or other color filter array image data) on board the camera. This is because the best known compression techniques, which were designed for use with full color plane, demosaiced image data has already proven inadequate for cinema applications. Thus, the risks of wasted production costs were too great to attempt to use unproven techniques in actual cinema projects.

III. DESCRIPTION OF TYPICAL PRIOR ART DATA FLOW FOR HIGH END PHOTOGRAPHY

13. Set forth below is a basic explanation of video image processing in the context of the concerns of one of ordinary skill in the art of cinema quality video image data capture and processing.
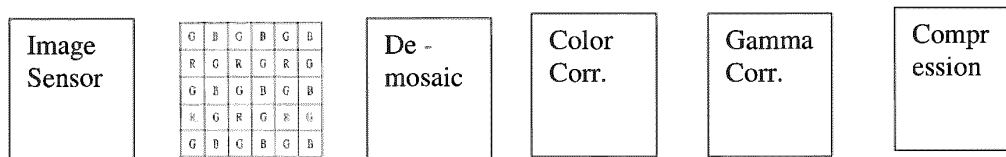
14. In the flowchart set forth above, an original image of light is captured by an image sensor. In this case, the image sensor includes a Bayer-pattern sensor in which each point of the

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