DECLARATION OF NABIL J. SARHAN, PH.D.,
UNDER 37 C.F.R. § 42.100 REGARDING
U.S. PATENT NOS. 10,523,901 AND 10,965,910

Declaration

I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: August 15, 2024 By: _____

Nabil J. Sarhan, Ph.D.

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I, Nabil Sarhan, do hereby declare:

1. I am making this declaration at the request of Motorola Solutions, Inc. ("Motorola") and Watchguard Video, Inc. ("Watchguard") in the matter of the *Inter Partes* Reviews ("IPRs") of U.S. Patent Nos. 10,523,901 (the '901 patent) and 10,965,910 (the '910 patent). I understand that Motorola is the Petitioner in these IPRs.

2. I am being compensated for my work in this matter at my standard hourly rate of $390 for such consulting services. My compensation in no way depends on the outcome of this proceeding.

I. Qualifications

3. My qualifications generally are set forth in my *curriculum vitae*, which is submitted as Appendix A. Appendices A-NN cited herein are found in Exhibit 1041, Appendices OO and PP are found in Exhibit 1052[1], and Appendices QQ-GGG are found in Exhibit 1063. Below, when referencing an appendix, I include a parenthetical indicating whether the appendix is found in Exhibit 1041, 1052, or 1063.

4. I received my Ph.D. and M.S. degrees in Computer Science and Engineering from the Pennsylvania State University (Penn State) in 2003 and a B.S. degree in Electrical Engineering from Jordan University of Science and Technology in

[1] Exhibit 1041 is the appendix to my declaration on U.S. Patent Nos. 7,593,034, 9,485,471, 8,692,882, and 9,912,914 filed in IPR2024-01205, 01206, -01207, and -01208. Exhibit 1052 is the appendix to my declaration on U.S. Patent Nos. 8,310,540 and 8,928,752 filed in IPR2024-01284 and -01285.

1995. Both my M.S. thesis and Ph.D. dissertation considered the design of computer systems for supporting multimedia. In particular, my Ph.D. dissertation dealt with the design of high-bandwidth I/O systems for multimedia applications, specifically video streaming. In this dissertation, titled "On the design of scalable and high-performance multimedia servers", I proposed new methods to design multimedia systems in a way that maximizes the number of users that can stream videos at the same time.

5. I am an Associate Professor of Electrical and Computer Engineering (ECE) at Wayne State University and the Director of Wayne State Computer Systems and Deep Learning Research Laboratory. I am the Coordinator of the Interdisciplinary College of Engineering M.S. in AI Program and the Director of the Hardware and System Track. I served as the Graduate Program Director of Electrical and Computer Engineering and the Chair of the College of Engineering Faculty Assembly. I also served as the Director of the Wayne State Multimedia Computing and Networking Research Laboratory in the ECE department for approximately fifteen years. I am chairing the Computer Engineering Area in the ECE department, and I regularly teach undergraduate and graduate courses in computer architecture and computer networks and supervise Ph.D. and M.S. students.

6. I have been regularly teaching the senior-level Computer Architecture course (previously called Computer Organization and Design) since 2003. The course covers microprocessor design, memory hierarchy, and I/O. I have also been teaching the Computer Networks and Network Programming course, which includes coverage

of all network layers and different network protocols. Additionally, I taught multiple times the Advanced Computer Architecture course, which focuses on the design of parallel computer systems and covers microprocessor design, memory hierarchy, and I/O. I have recently developed a new mandatory course titled "Object-Oriented Programming for Electrical and Computer Engineering" and led the efforts to modernize the Introduction to Microcomputers course and lab by using ARM-based microcontrollers and the instruction set. Additionally, I taught the following advanced graduate courses: Scalable and Secure Internet Services and Architectures, Special Topics on Multimedia, Special Topics on Multimedia Networking, and Special Topics on Multimedia Systems and Networks. Furthermore, I taught the following undergraduate courses: "Microcomputer Systems and Programming", and "Microprocessor Interfacing Lab".

7. I am an internationally recognized expert on computer systems, particularly those for multimedia applications.

8. I supervised eight Ph.D. dissertations and four master theses related to computer systems. Seven of these Ph.D. dissertations and all four M.S. theses were focused on multimedia systems, with research areas including video streaming and automated video surveillance. Additionally, I am currently supervising three Ph.D. dissertations in computer systems. Furthermore, I served on 25 other Ph.D. dissertation committees and 10 other M.S. thesis committees.

9. I authored more than 55 refereed papers, including those in top journals and conferences in various areas including computer systems, multimedia, networking, deep learning, and I/O. I was awarded (with a collaborator) a grant from the National Science Foundation (NSF) to develop a reconfigurable hardware accelerator chip and system for deep learning and artificial intelligence. The project includes the design of inference-engine chips that are interconnected through PCI Express to build a scalable system supporting large neural models. Three of my other research projects were also sponsored by the NSF. One of these projects was on video streaming while another was on the design of a video camera security system, specifically an automated video surveillance system, for automatic detection of threats, utilizing cross-layer optimization. Another NSF-sponsored project was on reconfigurable high-performance cluster computing and medical engineering applications. Other research projects were sponsored by Silicon Mechanics and Sun Microsystems. These projects include "High Performance Computing Cluster" and "Sun's Center of Excellence in Open Source Computing and Applications". I published a book chapter: "Streaming Multimedia", The Handbook of Computer Networks, John Wiley & Sons, Inc., November 2007.

10. I am the named inventor on U.S. Patent No. 9,313,463 related to the design of automated video surveillance systems. The system optimally controls a plurality of security cameras to achieve the best threat detection accuracy.

11. I served as the Chair of the Interest Group on Media Streaming of the Institute of Electrical and Electronics Engineering (IEEE) Multimedia Communication Technical Committee and as the Co-Director of the IEEE Multimedia Communication Technical Committee Review Board. I have been an Editor of the ERTI journal since 2017. I served as an Associate Editor of the IEEE Transactions on Circuits and Systems for Video Technology. I served as a Guest Editor and Reviewer for prestigious journals and magazines. I have been involved in the organization of numerous international conferences in various capacities, including General Chair, Chair, Technical Program Committee Co-Chair, Publicity Chair, Track Chair, Session Chair, and Technical Program Committee Member. For example, I served as Co-Chair of the Technical Program Committee of ACM SIGMM Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV) in 2018. I participated as a Panelist in major international conferences.

12. I served as a Panelist for the National Science Foundation and the National Institute of Health and as a Site Review Panelist for the Natural Sciences and Engineering Research Council of Canada.

13. I have been extensively involved in internal and international educational reform, review, and accreditation activities. Specifically, I served as the chair of more than 20 international panels and as a member of seven international panels for the review and accreditation of institutions and undergraduate and graduate programs, including “electrical engineering”, “electrical and computer engineering”, “software

engineering", "computer and network engineering", "computer science", and "information technology". I was also an External Expert in reviewing and reforming computer science and computer engineering programs and courses in the U.S. and overseas. Furthermore, I am a Program Evaluator for the Accreditation Board for Engineering and Technology (ABET).

14. I received the IEEE SEM Outstanding Professional of the Year Award, the Wayne State University President's Award for Excellence in Teaching, and the College of Engineering Excellence in Teaching Award. I was elevated to a Senior Member of the Institute of Electrical and Electronics Engineering (IEEE) in 2016.

15. I have recently been inducted into the WSU Academy of Teachers for having "a significant impact on the WSU undergraduate learning experience", practicing "innovative pedagogy", and demonstrating "instructional excellence."

II. Relevant Legal Standards

16. I have been asked to provide my opinion as to whether the claims of the '901 and '910 patents would have been obvious to a person of ordinary skill in the art at the time of the invention, in view of the prior art.

17. I am an engineer by training and profession. The opinions I am expressing in this declaration involve the application of my knowledge and experience to the evaluation of certain prior art with respect to the '901 and '910 patents. My formal knowledge of patent law is no different than that of any lay person. Therefore, I have requested the attorneys from Jones Day, who represent Motorola and Watchguard, to

provide me with guidance as to the applicable patent law in this matter. The paragraphs below express my understanding of how I must apply current principles related to patent validity to my analysis.

18. It is my understanding that in determining whether a patent claim is obvious in view of the prior art, the Patent Office must apply the *Phillips* standard to construe the claim by giving the claim its plain and ordinary meaning, consistent with the specification and prosecution history. For the purposes of this review, I have construed each claim term in accordance with its plain and ordinary meaning under the *Phillips* standard, unless otherwise indicated.

19. I understand that claim terms may be drafted in means-plus-function (MPF) format where they recite a means for performing a function, and the corresponding structure for performing that function is identified in the specification.

20. I understand that, if a claim term uses the word "means," it is presumed that it is a MPF term. If, on the other hand, a claim term does not use the word "means," it is presumed that it is not a MPF term. However, this presumption may be overcome, and even a claim term that does not use the word "means" will be treated as a MPF term where it recites a function without reciting sufficient structure for performing that function. For example, if the term uses functional language and/or a nonce word that would have the same effect as though the word "means" was used instead, and does not provide sufficient structure, the presumption against MPF will be overcome.

21. If a claim term is a MPF term, the specification must supply the corresponding structure that the claim lacks. I understand that the scope of a MPF term is limited to the corresponding structure disclosed in the specification and equivalents thereof. If there is no corresponding structure in the specification, the term is indefinite.

22. It is my understanding that a claim is unpatentable under 35 U.S.C. § 103 if the claimed subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time of the invention. I understand that a person of ordinary skill in the art is a person with a level of experience, education, or training generally possessed by those individuals who work in the area or field of the invention at the time of the invention. A person of ordinary skill is also a person of ordinary creativity that can use common sense to solve problems. I also understand that an obviousness analysis takes into account the scope and content of the prior art, the differences between the claimed subject matter and the prior art, and the level of ordinary skill in the art at the time of the invention.

23. In determining the scope and content of the prior art, it is my understanding that a reference is considered analogous prior art if it falls within the field of the inventor's endeavor. In addition, a reference is analogous prior art if it is reasonably pertinent to the particular problem with which the inventor was involved. A reference is reasonably pertinent if it logically would have commended itself to an inventor's attention in considering his problem. If a reference relates to the same

problem as the claimed invention, that supports use of the reference as prior art in an obviousness analysis.

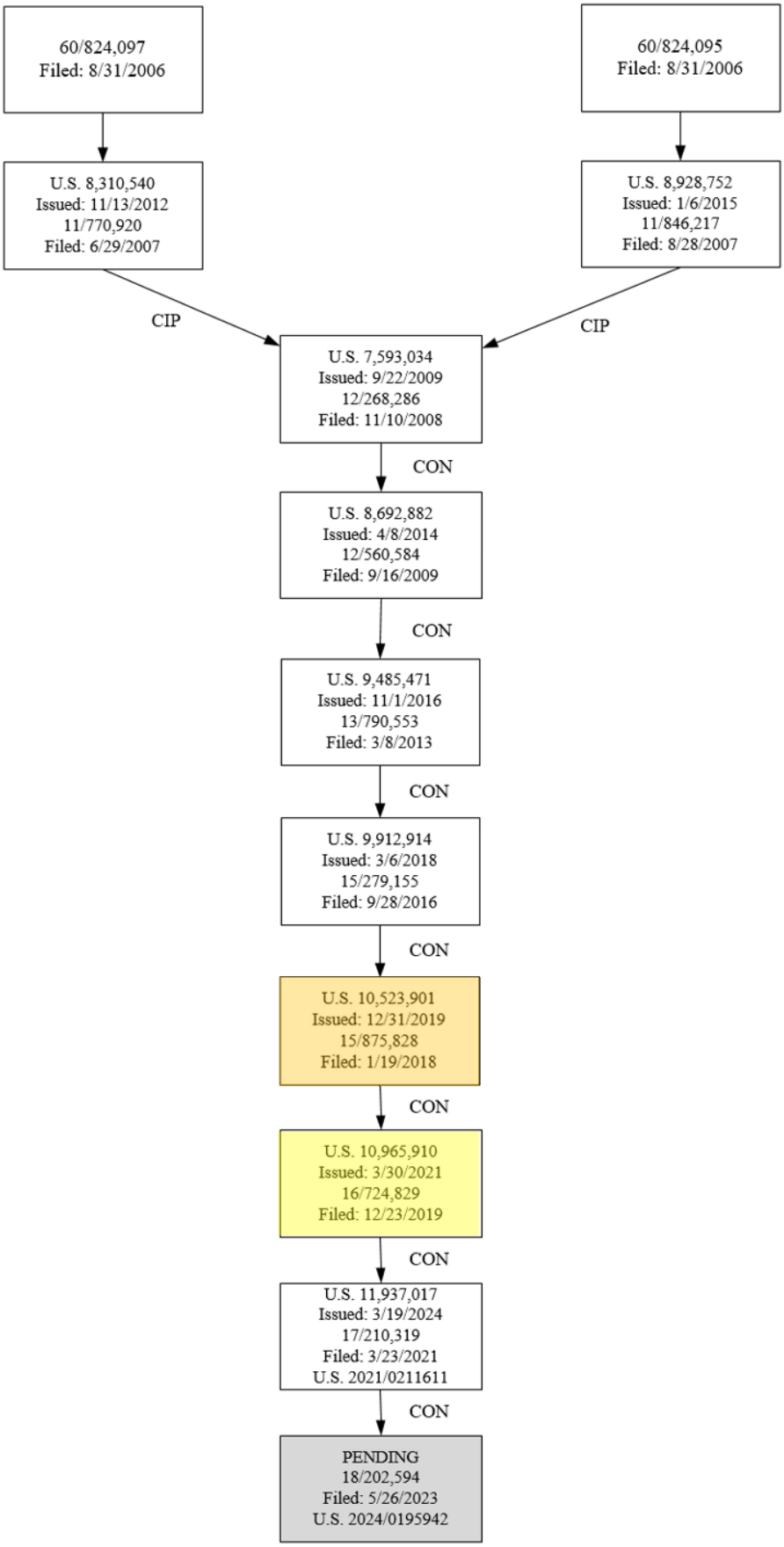
24. To assess the differences between prior art and the claimed subject matter, it is my understanding that 35 U.S.C. § 103 requires the claimed invention to be considered as a whole. This "as a whole" assessment requires showing that one of ordinary skill in the art at the time of invention, confronted by the same problems as the inventor and with no knowledge of the claimed invention, would have selected the elements from the prior art and combined them in the claimed manner.

25. It is my further understanding that the Supreme Court has recognized several rationales for combining references or modifying a reference to show obviousness of claimed subject matter. Some of these rationales include: combining prior art elements according to known methods to yield predictable results; simple substitution of one known element for another to obtain predictable results; a predictable use of prior art elements according to their established functions; applying a known technique to a known device (method or product) ready for improvement to yield predictable results; choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. As part of an obviousness analysis, I understand that I am to consider whether a reason existed at the relevant time that would have motivated a person of

ordinary skill in the art in the relevant field to combine the known elements in the way the claimed invention does. The reason could come from the prior art, the background knowledge of one of ordinary skill in the art, the nature of the problem to be solved, market demand, or common sense, for instance.

III. Person Of Ordinary Skill In The Art

26. It is my understanding that when interpreting the claims of the ’901 and ’910 patents, I must do so based on the perspective of one of ordinary skill in the art (a “POSITA”) as of the relevant priority date. I understand that ’901 and ’910 patents are part of a patent family assigned to the Patent Owner:


60/824,097
Filed: 8/31/2006
60/824,095
Filed: 8/31/2006
U.S. 8,310,540
Issued: 11/13/2012
11/770,920
Filed: 6/29/2007
U.S. 8,928,752
Issued: 1/6/2015
11/846,217
Filed: 8/28/2007
CIP
CIP
U.S. 7,593,034
Issued: 9/22/2009
12/268,286
Filed: 11/10/2008
CON
U.S. 8,692,882
Issued: 4/8/2014
12/560,584
Filed: 9/16/2009
CON
U.S. 9,485,471
Issued: 11/1/2016
13/790,553
Filed: 3/8/2013
CON
U.S. 9,912,914
Issued: 3/6/2018
15/279,155
Filed: 9/28/2016
CON
U.S. 10,523,901
Issued: 12/31/2019
15/875,828
Filed: 1/19/2018
CON
U.S. 10,965,910
Issued: 3/30/2021
16/724,829
Filed: 12/23/2019
CON
U.S. 11,937,017
Issued: 3/19/2024
17/210,319
Filed: 3/23/2021
U.S. 2021/0211611
CON
PENDING
18/202,594
Filed: 5/26/2023
U.S. 2024/0195942

27. As indicated above, it is my understanding that the ’901 and ’910 patents claim priority back to USP 7,593,034 (the ’034 patent, EX1010), filed November 10, 2008, as a continuation application. The ’034 patent claims priority as a continuation-in-part to U.S. App. No. 11/770,920 (the ’920 application, EX1011), filed on June 29, 2007, and U.S. App. No. 11/846,217 (the ’217 application, EX1012), filed August 28, 2007.

28. For the purposes of this IPR proceeding, I have been asked to apply the June 29, 2007 filing date of the ’920 application as the priority date for the challenged claims of the ’901 and ’910 patents.

29. In my opinion, a person of ordinary skill in the art for the ’901, and ’910 patents as of June 29, 2007 would have been a person having at least a Bachelor’s Degree in electrical engineering, computer science, or computer engineering, or undergraduate training in an equivalent field and at least two years of relevant experience in electronics technology. Additional graduate education could substitute for professional experience, and significant work experience could substitute for formal education.

30. Further, I note that my opinion on the level of skill of the POSITA is the same for the other, later priority dates to which the ’901 and ’910 patents could potentially be entitled: the August 28, 2007 filing date of the ’217 application, and the November 10, 2008 filing date of the ’034 patent application. On all of these dates, it is my opinion that a POSITA would have been a person having at least a Bachelor’s

Degree in electrical engineering, computer science, or computer engineering, or undergraduate training in an equivalent field and at least two years of relevant experience in electronics technology. Additional graduate education could substitute for professional experience, and significant work experience could substitute for formal education.

31. As described in detail above in the "Qualifications" section, my own training and experience exceeded that of one of ordinary skill in the art at the assumed priority date of June 29, 2007.

IV. Technology Background

A. Introduction

32. The '901 and '910 patents are directed generally to "video camera recording technology" (*see*, *e.g.*, '901 patent at 1:30-31), and more specifically to systems and apparatuses that "continuously record[] imaged data from a camera into a circular buffer in a local memory." *Id.* at Abstract. "The circular buffer is preferably organized into a series of memory segments that loops back on itself." *Id.* at 2:33-36. Receipt of a "record signal" causes "a segment of the circular buffer to be write-protected to prevent that segment from being overwritten during the next recording loop." *Id.* at Abstract, 2:46-50. "Part of the write-protected portion could be a pre-recorded subset that is recorded before the signal is received, while part of the write-protected portion could be a post-recorded subset that is recorded after the signal is received." *Id.* at 2:50-54.

33. As I explain in the sections that follow, all of these concepts described in the ’901 and ’910 patents were known in the art at the time of the purported invention. I reach this conclusion based on Applicant’s own admissions and the prior-art teachings described below. More specifically, I provide below a summary of the state of the art as understood as of the assumed priority date for the ’901 and ’910 patents for the general subject matter of these patents. The information discussed below informed the background knowledge of a POSITA at the claimed priority date of the ’901 and ’910 patents, which I understand may be relevant in determining whether and how to combine references to achieve the claimed inventions.

B. State Of The Art And Admitted Prior Art

34. In the patents of the Stellar patent family, the inventors made admissions regarding the state of the art and admitted prior art. I note some of these admissions in the sections that follow. Applicant also made admissions in prosecuting the patents of the Stellar family, and these are likewise detailed below.

1. Admissions In The Stellar Patents

a) The ’920 Application (U.S. Patent No. 8,310,540)

35. The ’540 patent specification states that “[t]he field of the invention is in digital recording.” ’540 patent at 1:9. Before describing the alleged invention, the ’540 patent specification provides a description of the admitted state of the prior art in the following “BACKGROUND”:

Conventional camcorders use a variety of disk formats such as digital video cassettes, mini-DV cassettes and DVD-R discs that offer a limited amount of memory to store data. One of the major shortcomings of the existing camcorder technology is that the memory runs out too soon. How many times does one hear, "I have no tape left" while recording? Once a portion of the memory has been recorded, there is less memory available for further recording. Then when the memory is full, users have to return to their home/work computer or media station to transfer the recorded data from the camera to free up the memory. This creates inconvenience and inflexibility for recording on the go.

One solution is the technology of loop recording in which the camera is constantly recording. When it reaches the end of the memory it records from the beginning, erasing the earliest recorded data. Such technology is often employed with surveillance cameras for long and continuous recording without much or any supervision. However, the problem with such loop recording is that it will not distinguish or differentiate any data that is of importance. The user then will have to transfer the interested data to another storage media by stopping the recording and storing the interested data onto another medium, or risk having the interested data be recorded over during loop recording.

Many surveillance recordings employ larger memory units to solve this problem. This then creates unnecessary long recordings that are not relevant or present any interest to the user. The portions of the interested data not only take up available memory for further recording but the entire loop has to be reviewed in order to select the most relevant portion.

> Again, this creates inconvenience and inflexibility for recording on the go.
>
> Furthermore, users of the surveillance camera are not able to edit a given potion on the fly without stopping and replaying the image. The user must focus his or her attention on the viewfinder or display screen to keep the subject properly framed. This seriously hinders the operator's live enjoyment of the event being recorded since their attention is on the recording device and is not immersed in the sights and sounds of the event.

Id. at 1:13-52. The '540 patent alleges "there is still a need for a camera that provides better recording and editing functions." *Id*. at 1:53-54.

b) The '217 Application (U.S. Patent No. 8,928,752)

36. The '752 patent specification states that "[t]he field of the invention is surveillance cameras." '752 patent at 1:9. Before describing the alleged invention, the '752 patent specification provides a description of the admitted state of the prior art in the following "BACKGROUND":

> It is often desirable to record an unexpected event (automobile accident, baseball hit, quick kiss, facial expression, etc.), but by the time someone pulls out a camera and focuses on the target, the moment is gone. This problem has long been addressed in the surveillance industry by recording continuously for long periods of time. It is not unusual, for example, for banks or other secure facilities to capture and maintain day after day of surveillance tapes. The downside, of course, is that continuous recordings are costly in terms of equipment, storage, bulkiness, and so forth. Moreover, continuous recording is especially

unsuitable for small recording devices such as those carried on eyeglasses.

U.S. Pat. No. 6,163,338 to Johnson et al. (December 2000) focused on the problem of filming automobile accidents. Instead of trying to record millions of frames over long periods of time, Johnson tried to solve the problem by continuously storing the most recent images in a small looping (circular) memory. Upon actuation of a trigger, the system protects the most recently used portion of the memory, and overwrites an older portion. Thus, upon receiving a trigger signal from an accident, a 30 second memory might end up storing 20 seconds before and 10 seconds after the accident.

A looping memory of a device according to Johnson is depicted in prior art FIG. 1. There a small looping memory 11 records frames or other data from a data stream "A". Each character initiates a small time period, perhaps five seconds, with the "|" character designating the current writing position. When the memory finishes writing to the last position, it returns to the first position and over-writes previously stored data. Upon receipt of a start signal (such as by actuation of a trigger), the memory continues looping for some period of time (corresponding to perhaps a third of the memory capacity), and then stops recording altogether. The recorded memory is protected until it is offloaded or reset.

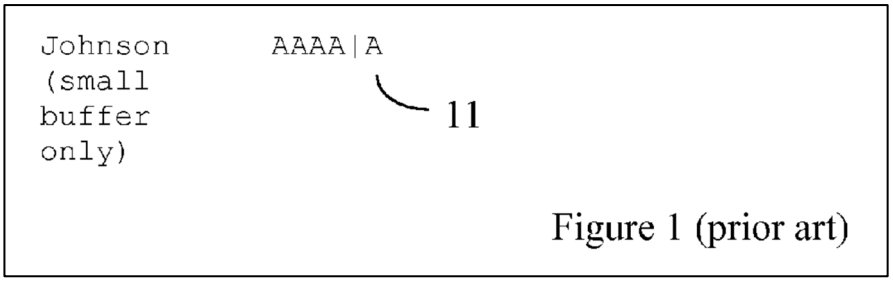
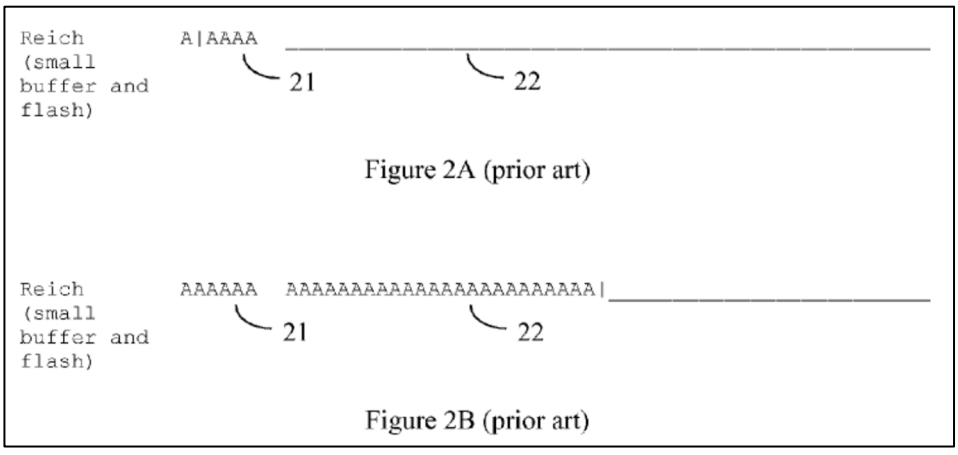


Figure 1 (prior art)

US 2004/0033058 to Reich et al. (publ. February 2004) contemplates an improvement that tries to solve that problem by using two different memories, a small (900 frame) looping buffer and a larger flash memory. In Reich, the trigger signal (record button) causes the buffer to be completely filled, and then additional images to be written to the flash memory until a stop button is pushed.

The Reich system is depicted in prior art FIGS. 2A-2B. In FIG. 2A, a small looping buffer 21 records data from data stream "A", with the current position marked with "|". The "_" character is used to initiate memory that has not been used, or has been used but has been marked for overwriting. In FIG. 2B, a start signal has been received, and the system responded by filling the buffer, and then starting to fill a flash memory 22. Regardless of whether the flash memory is eventually filled, both the buffer 21 and the flash memory 22 are effectively locked (protected) upon receipt of a stop signal.



Id. at 1:13-2:4; FIGS. 1, 2A-2B.

37. The '752 specification further describes the purported problem with the prior art Johnson and Reich references as follows:

> From FIGS. 1 and 2A-2B, one can readily appreciate that both Johnson and Reich can accommodate only a single time period. A user cannot record a second event without overwriting or offloading the stored data from a first event. In addition, both Johnson and Reich still contemplate that the looping portion memory should be very small, perhaps 30 seconds or less. Such devices are completely inadequate for storing long pre-start signal images, such as a five or ten minute period prior to a trigger signal.

Id. at 2:5-13.

38. The ’752 patent specification alleges that “there is still a need for improvements in cameras and other surveillance devices that allow recordation of multiple events without overwriting or offloading, and that can include lengthy portions of data streams prior to start signal events.” *Id.*, 2:14-17.

c) The ’286 Application (U.S. Patent No. 7,593,034)

39. The ’034 patent specification (and the ’901 and ’910 patents, continuations of the ’034 patent) states that “[t]he field of the invention is video camera recording technology.” ’034 patent at 1:19-20. Before describing the alleged invention, the ’034 patent specification provides a description of the admitted state of the prior art in the following “BACKGROUND”:

> Conventional camcorders use a variety of storage formats including digital video cassettes, mini-DV cassettes, or DVD-R discs that offer a limited amount of memory to store data. One of the major shortcomings of the existing camcorder technology is that the memory runs out too soon. Once a portion of the memory has been recorded, there is less

memory available for further recording. Then when the memory is full, users have to return to their home/work computer or media station to transfer the recorded data from the camera to free up the memory. This creates inconvenience and inflexibility for recording on the go.

WO 2006/044476 to Vanman describes an electronic camera mounted to a police vehicle with a circular buffer that is constantly recording. When the camera reaches the end of the memory it records from the beginning of memory, erasing the earliest recorded data. Such technology is often employed with surveillance cameras for long and continuous recording with little or no supervision. However, Vanman does not distinguish or differentiate any data that is of importance. To save data in the buffer, the user of the Vanman device needs to transfer important portions of the buffer wirelessly to a central office or physically to a DVD disc, or else risk having the interesting data be recorded over during loop recording. Such transfers are processor intensive and may not be possible when the central office is out of range or an empty DVD disc is unavailable.

Id. at 1:24-41. The ’034 patent specification alleges, however, that:

> Vanman does not distinguish or differentiate any data that is of importance. To save data in the buffer, the user of the Vanman device needs to transfer important portions of the buffer wirelessly to a central office or physically to a DVD disc, or else risk having the interesting data be recorded over during loop recording. Such transfers are processor intensive and may not be possible when the central office is out of range or an empty DVD disc is unavailable.

Id. at 1:41-49. The '034 patent specification further describes the admitted state of the prior art as follows:

> EP 1064783 to Mann describes a camera mountable to a pair of eyeglasses that continuously saves recorded images to a circular buffer in a computer on the user's waist. When a user wants to save a piece of recorded video, the user must stop recording and offload the data at another location before the user can record again. Mann also discusses streaming the images directly to a wireless memory that may have a larger capacity; however, this means that the camera does not work in the absence of a wireless connection.
>
> U.S. Pat. No. 5,523,799 to Hattori et al. also describes storing data in a memory having an archival portion. However, Hattori fails to address sending data to a remote memory.

Id. at 1:56-67.

40. The '034 patent specification alleges that "there is still a need for a recording camera that provides better recording and editing functions." *Id*. at 2:1-2.

2. Admissions In The Stellar Patents' File Histories

41. During the prosecution of the '034 patent, the Applicant made additional admissions regarding the state of the art and certain prior art references. In an Accelerated Examination Support Document submitted to the USPTO on November 10, 2008, the Applicant identified "the references most closely related" as WO 2006/044476 (Vanman), EP 1,064,783 (Mann), and US 5,523,799 (Hattori). EX1013,

84-93. The Applicant provided tables admitting that these prior art references disclosed many of the claim limitations (*id.*):

The Limitation that is disclosed	WO 6,044,476 to Vanman	EP 1,064,783 to Mann	US 5,523,799 to Hattori
1	x	x	x
2	x	x	x
3	x	x	X
4		x	x
5	x		
6	x	x	x
7			x
8	x	x	x
9			
10	x	x	
11	x	x	
12	x		
13	x		
14	x	x	
15	x		

Limitation 1 - a surveillance apparatus

Limitation 2 - a camera that has an image capturing component that captures images

Limitation 3 - a camera that has a converting component that converts the images into at least one data stream

Limitation 4 - a local memory functionally connected to the camera

Limitation 5 - a wireless transmitter functionally connected to the local memory

Limitation 6 - a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory

Limitation 7 - a protecting facility that responds to a signal to record by designating a segment of the circular buffer as a write-protected portion

Limitation 8 - a pre-recorded subset of the segment is recorded before the signal is received

Limitation 9 - a sending facility that uses the transmitter to wirelessly transmit the write-protected portion to a remote memory

Claim 2. The apparatus of claim 1, wherein the pre-recorded subset is at least 5 seconds long.

Limitation 10 - the pre-recorded subset is at least 5 seconds long

Claim 3. The apparatus of claim 1, wherein the recorded segment is at least 10 seconds long.

Limitation 11 - the recorded segment is at least 10 seconds long

	Claim 4. The apparatus of claim 1, further comprising a sensor that automatically initiates the signal to record, wherein the sensor operates upon content in at least one of the images captured from the camera. **Limitation 12 -** a sensor that automatically initiates the signal to record **Limitation 13 -** the sensor operates upon content in at least one of the images captured from the camera Claim 5. The apparatus of claim 1, further comprising an interface through which a human can initiate the signal. **Limitation 14 -** an interface through which a human can initiate the signal Claim 6. The apparatus of claim 1, further comprising an interface through which a human can designate a length of time of at least one of the pre-recorded subset and the post-recorded segment. **Limitation 15 -** an interface through which a human can designate a length of time of the pre-recorded subset

The Limitation that is disclosed	WO 6,044,476 to Vanman	EP 1,064,783 to Mann	US 5,523,799 to Hattori
16	x		
17			
18			
19			
20	x	x	
21		x	
22			
23	x	x	x
24	x	x	x
25	x	x	x
26			x
27	x	x	x
28			
29			
30			
31			
32	x		
33	x	x	
34			
35	x		x
36			
37			
38			
39			

Limitation 16 - an interface through which a human can designate a size of the post-recorded segment

Claim 7. The apparatus of claim 1, wherein the remote memory is located on a mobile phone.

Limitation 17 - the remote memory is located on a mobile phone

Claim 8. The apparatus of claim 1, wherein a mobile phone receives the recorded segment from the wireless transmitter and forwards the recorded segment to the remote memory.

Limitation 18 - a mobile phone receives the recorded segment from the wireless transmitter

Limitation 19 - a mobile phone forwards the recorded segment to the remote memory

Claim 9. The system of claim 1, further comprising a mount for the camera.

Limitation 20 - a mount for the camera

Claim 10. The system of claim 9, wherein the mount is a pair of wearable glasses.

Limitation 21 - the mount is a pair of wearable glasses

Claim 11. The system of claim 1, further comprising an electronic index that references addresses of the write-protected portion.

Limitation 22 - an electronic index that references addresses of the write-protected portion

Claim 12. A method of processing imaged data from a camera, comprising the following steps:

receiving a stream of the imaged data;

recording the stream into available portions of a circular buffer;

responding to a signal by write-protecting a newly recorded portion of the buffer, wherein a subset of the newly recorded portion is recorded before the signal is received

indexing write protected portions of the buffer during the step of recording; and

wirelessly transmitting at least one of the write-protected portions of the circular buffer to a remote memory.

Limitation 23 - a method of processing imaged data from a camera

Limitation 24 - receiving a stream of the imaged data

Limitation 25 - recording the stream into available portions of a circular buffer

Limitation 26 - responding to a signal by write-protecting a newly recorded portion of the buffer

Limitation 27 - a subset of the newly recorded portion is recorded before the signal is received

Limitation 28 - indexing write protected portions of the buffer during the step of recording

Limitation 29 - wirelessly transmitting at least one of the write-protected portions of the circular buffer to a remote memory

The Limitation that is disclosed	WO 6,044,476 to Vanman	EP 1,064,783 to Mann	US 5,523,799 to Hattori
16	x		
17			
18			
19			
20	x	x	
21		x	
22			
23	x	x	x
24	x	x	x
25	x	x	x
26			x
27	x	x	x
28			
29			
30			
31			
32	x		
33	x	x	
34			
35	x		x
36			
37			
38			
39			

Claim 13. The method of claim 12, further comprising storing the write-protected portions as separate files.

Limitation 30 - storing the write-protected portions as separate files

Claim 14. The method of claim 12, further comprising recording the stream into physically dis-contiguous parts of the circular buffer.

Limitation 31 - recording the stream into physically dis-contiguous parts of the circular buffer

Claim 15. The method of claim 12, wherein the signal to save a recording comprises a signal tc start recording and a signal to stop recording.

Limitation 32 - the signal to save a recording comprises a signal to start recording and a signal to stop recording

Claim 16. The method of claim 12, further comprising receiving the signal to save a recording through at least one of a manually operated switch and an audio signal.

Limitation 33 - receiving the signal to save a recording through a manually operated switch

Limitation 34 - receiving the signal to save a recording through an audio signal

Claim 17. The method of claim 12, further comprising configuring the size of the pre-recorded subset.

Limitation 35 - configuring the size of the pre-recorded subset

Claim 18. The method of claim 12, further comprising removing write-protection from a transmitted write-protected portion after transmission.

Limitation 36 - removing write-protection from a transmitted write-protected portion after transmission

Claim 19. The method of claim 12, further comprising sending a warning to a user before the newly recorded portion of the buffer is fully recorded.

Limitation 37 - sending a warning to a user before the newly recorded portion of the buffer is fully recorded

Claim 20. The method of claim 19, further comprising extending a length of the newly recorded portion in response to at least one of a manually operated switch and an audio signal.

Limitation 38 - extending a length of the newly recorded portion in response to a manually operated switch

Limitation 39 - extending a length of the newly recorded portion in response to an audio signal

a) Applicant's Admissions Regarding WO 2006/044476 (Vanman)

42. The Applicant described WO 2006/044476 (Vanman, EX1014) as follows (EX1013, 93-94):

> Vanman teaches a video camera mounted on a police car that continuously records data to a circular buffer on a hard drive, and that can then retroactively save video streams by writing those video streams from the hard drive to a DVD. Vanman also teaches attaching a wireless Ethernet device to the microcontroller to wirelessly transmit encoded audio and video to a central office. Vanman, however, does not teach designating a segment of the circular buffer as a write-protected portion. The entire hard drive is being written to at all times, segments of the circular buffer could be easily overwritten before a video stream is saved to a DVD or a central office.

43. The Applicant admitted that Vanman discloses many of the claim limitations (*id.*, 94-100):

Claim Limitation	**WO 2006/044476 (Vanman)**
Limitation 1 - a surveillance apparatus	**Satisfied.** Vanman teaches a system that records video and audio. (*See* para [0024])
Limitation 2 - a camera that has an image capturing component that captures images	**Satisfied.** Vanman teaches a system that captures images from a video camera and processes the signal to create a digital video signal. (*See* para [0024])
Limitation 3 - a camera that has a converting component that converts the images into at least one data stream	**Satisfied.** Vanman teaches a system that captures images from a video camera and processes the signal to create a digital video signal. (*See* para [0024])

Claim Limitation	WO 2006/044476 (Vanman)
Limitation 5 - a wireless transmitter functionally connected to the local memory	**Satisfied.** Vanman teaches a wireless Ethernet interface functionally connected to the hard drive. (*See* para [0034] and corresponding Figure 1, elements 80 and 145)
Limitation 6 - a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory	**Satisfied.** Vanman teaches a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory. The entire hard drive of Vanman is an "available portion" that is continuously overwritten. (*See* para [0058])
Limitation 8 - a pre-recorded subset of the segment is recorded before the signal is received	**Satisfied.** Vanman teaches responding to an event by selecting a data stream that was recorded ten minutes prior to the event start point. (*See* para [0040])
Limitation 10 - the pre-recorded subset is at least 5 seconds long	**Satisfied.** Vanman teaches responding to an event by selecting a data stream that was archived ten minutes prior to the event start point. (*See* para [0040])
Limitation 11 - the recorded segment is at least 10 seconds long	**Satisfied.** Vanman teaches responding to an event by selecting a data stream that was archived ten minutes prior to the event start point. (*See* para [0040])
Limitation 12 - a sensor that automatically initiates the signal to record	**Satisfied.** Vanman teaches automatically initiating the signal to record through an event trigger. (*See* para [0039], [0051])
Limitation 13 - the sensor operates upon content in at least one of the images captured from the camera	**Satisfied.** Vanman teaches automatically initiating the signal to record through external emergency lights that are probably captured by the video camera on the squad car. (*See* para [0024], [0051])
Limitation 14 - an interface through which a human can initiate the signal	**Satisfied.** Vanman teaches initiating the signal to record by an operator pressing a RECORD key on a control panel. (*See* para [0051])
Limitation 15 - an interface through which a human can designate a length of time of the pre-recorded subset	**Satisfied.** Vanman teaches a setting in a user-interface menu that can be used to determine how much of the video data stream to include

Claim Limitation	WO 2006/044476 (Vanman)
	before and after the event markers. (*See* para [0052])
Limitation 16 - an interface through which a human can designate a length of time of the post-recorded segment	**Satisfied.** Vanman teaches a setting in a user-interface menu that can be used to determine how much of the video data stream to include before and after the event markers. (*See* para [0052])
Limitation 20 - a mount for the camera	**Satisfied.** Vanman teaches that the camera is mounted on a vehicle. (*See* para [0002][0004], [0065])
Limitation 23 - a method of processing imaged data from a camera	**Satisfied.** Vanman teaches encoding and decoding imaged data from the camera. (*See* para [0024]-[0029])
Limitation 24 - receiving a stream of the imaged data	**Satisfied.** Vanman teaches receiving a data stream of the imaged data. (*See* para [0024] - [0029])
Limitation 25 - recording the stream into available portions of a circular buffer	**Satisfied.** Vanman teaches recording the stream into available portions of a circular buffer. The entire hard drive of Vanman is an "available portion" that is continuously overwritten. (*See* para [0058])
Limitation 27 - a subset of the newly recorded portion is recorded before the signal is received	**Satisfied.** Vanman teaches archiving a data stream that was recorded ten minutes prior to the event start point. (*See* para [0040])
Limitation 32 - the signal to save a recording comprises a signal to start recording and a signal to stop recording	**Satisfied.** Vanman teaches record triggers that act as signals to save a recording with an event to start recording an event to stop recording. (*See* para [0040], [0043], [0054])
Limitation 33 - receiving the signal to save a recording through a manually operated switch	**Satisfied.** Vanman teaches receiving a signal to save a recording through an operator pressing a RECORD key on a control panel. (*See* para [0052])
Limitation 35 - configuring the size of the pre-recorded subset	**Satisfied.** Vanman teaches configuring how much of the video data stream to include before and after the event markers. (*See* para [0052])

b) Applicant's Admissions Regarding EP 1,064,783 (Mann)

44. The Applicant described EP 1,064,783 (Mann, EX1015) as follows (EX1013, 100):

> Mann teaches a portable electronic camera system that is wearable on the body, specifically eyeglasses. The camera has a memory with a circular buffer that is constantly recording, and a user can record data recorded 5 minutes in the past by activating a chording keyboard on the user's belt. The camera can also wirelessly transmit data to a television or a computer device. Mann, however, fails to teach protecting segments of the circular buffer or overwriting only unprotected segments of the circular buffer. When the record function is activated, the camera must either wirelessly transmit the data, or the buffer will be overwritten. Additionally, it appears that the system of Mann has a memory that is wirelessly connected to the camera instead of locally attached to the camera.

45. The Applicant admitted that Mann discloses many of the claim limitations (*id.*, 100-106):

Claim Limitation	EP 1,064,783 (Mann)
Limitation 1 - a surveillance apparatus	**Satisfied.** Mann teaches a wearable camera. (*See* para [0015], [0017], [0049])
Limitation 2 - a camera that has an image capturing component that captures images	**Satisfied.** Mann teaches recording images and processing digital signals, which implicitly teaches capturing those images with an image capturing component. (*See* para [0015], [0017], [0051]-[0052])
Limitation 3 - a camera that captures images and converts the images into a data stream	**Satisfied.** Mann teaches recording images and processing digital signals, which implicitly teaches converting those images into a data

Claim Limitation	EP 1,064,783 (Mann)
	stream. (*See* para [0015], [0017], [0051]-[0052])
Limitation 4 - a local memory functionally connected to the camera	**Satisfied.** Mann teaches a storage device on a computer that is functionally connected to the camera. (*See* para [0058], [0065], [0077])
Limitation 6 - a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory	**Satisfied.** Mann teaches a recording facility that continuously records a data stream from the camera into available portions of a circular buffer in the storage device. (*See* para [0058], [0065])
Limitation 8 - a pre-recorded subset of the segment is recorded before the signal is received	**Satisfied.** Mann teaches that the recorded segment contains a recording starting from 5 minutes prior to the time the record button was pressed. (*See* para [0065])
Limitation 10 - the pre-recorded subset is at least 5 seconds long	**Satisfied.** Mann teaches that the pre-recorded subset is 5 minutes long. (*See* para [0065])
Limitation 11 - the recorded segment is at least 10 seconds long	**Satisfied.** Mann teaches Mann teaches that the pre-recorded subset is 5 minutes long. (*See* para [0065])
Limitation 14 - an interface through which a human can initiate the signal	**Satisfied.** Mann teaches an Emacs interface through which a human can initiate the signal to record. (*See* para [0063]-[0065])
Limitation 20 - a mount for the camera	**Satisfied.** Mann teaches that the camera could be mounted on a pair of eyeglasses. (*See* para [0007], [0039], [0047], [0056]-[0060], [0098] and corresponding Figures 1 and 6)
Limitation 21 - the mount is a pair of wearable glasses	**Satisfied.** Mann teaches that the camera could be mounted on a pair of eyeglasses. (*See* para [0007], [0039], [0047], [0056]-[0060], [0098] and corresponding Figures 1 and 6)
Limitation 23 - a method of processing imaged data from a camera	**Satisfied.** Mann teaches recording images and processing digital signals from a camera. (*See* para [0015], [0017], [0051]-[0052])
Limitation 24 - receiving a stream of the imaged data	**Satisfied.** Mann teaches recording images and processing digital signals, which implicitly teaches converting those images into a data stream. (*See* para [0015], [0017], [0051]-[0052])

Claim Limitation	EP 1,064,783 (Mann)
Limitation 25 - recording the stream into available portions of a circular buffer	**Satisfied.** Mann teaches recording the data stream into available portions of a circular buffer. The entire memory of Mann seems to be the circular buffer. (*See* para [0017], [0058], [0065])
Limitation 27 - a subset of the newly recorded portion is recorded before the signal is received	**Satisfied.** Mann teaches that the recorded portion was recorded 5 minutes before the signal to record is received. (*See* para [0065])
Limitation 33 - receiving the signal to save a recording through a manually operated switch	**Satisfied.** Mann teaches that the signal to save a recording is received through a chording keyboard worn on the wearer's waist. (*See* para [0064])

c) Applicant's Admissions Regarding US 5,523,799 (Hattori)

46. The Applicant described US 5,523,799 (Hattori, EX1016) as follows (EX1013, 106):

> Hattori teaches an image memory apparatus that continuously writes new images into a circular buffer. A user can write-protect parts of the circular buffer that has been previously recorded to prevent the device from overwriting those portions of the buffer. Hattori, however, does not teach that there is a wireless transmitter that transmits write-protected portions to a remote memory.

47. The Applicant admitted that Hattori discloses many of the claim limitations; in the Applicant's own words (*id.*, 106-112):

Claim Limitation	US 5,523,799 (Hattori)
Limitation 1 - a surveillance apparatus	**Satisfied.** Hattori teaches an apparatus that records images. (*See* C2/L8-50)

Claim Limitation	US 5,523,799 (Hattori)
Limitation 2 - a camera that has an image capturing component that captures images	**Satisfied.** Hattori teaches a camera that captures images and converts the analog stream into a digital stream. (*See* C3/L21-31)
Limitation 3 - a camera that has a converting component that converts the images into at least one data stream	**Satisfied.** Hattori teaches a camera that captures images and converts the analog stream into a digital stream. (*See* C3/L21-31)
Limitation 4 - a local memory functionally connected to the camera	**Satisfied.** Hattori teaches a multi-port random access memory functionally connected to the camera. (*See* C3/L26-28 and corresponding Figure 2, element 12)
Limitation 6 - a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory	**Satisfied.** Hattori teaches a recording facility that continuously records the data stream into available portions of a ring memory in the memory. (*See* C3/L57-C4/L11, and corresponding Figures 1 and 2)
Limitation 7 - a protecting facility that responds to a signal to record by designating a segment of the circular buffer as a write-protected portion	**Satisfied.** Hattori teaches a protecting facility that responds to a signal to record by designating a recorded segment of the ring memory as a write-protected portion. (*See* C3/L62-C4/L2)
Limitation 8 - a pre-recorded subset of the segment is recorded before the signal is received	**Satisfied.** Hattori teaches that the segment is recorded before the signal to record is received. (*See* C3/L62-C4/L2)
Limitation 23 - a method of processing imaged data from a camera	**Satisfied.** Hattori teaches a method of processing imaged data from a camera. (*See* C2/L8-50)
Limitation 24 - receiving a stream of the imaged data	**Satisfied.** Hattori teaches receiving a stream of the imaged data. (*See* C3/L21-31)
Limitation 25 - recording the stream into available portions of a circular buffer	**Satisfied.** Hattori teaches recording the data stream into available portions of a ring memory. (*See* C3/L57-C4/L11, and corresponding Figures 1 and 2)

Claim Limitation	US 5,523,799 (Hattori)
Limitation 26 - responding to a signal by write-protecting a newly recorded portion of the buffer	**Satisfied.** Hattori teaches responding to a signal to protect data by write-protecting a previously recorded portion of the ring memory. (*See* C3/L62-C4/L2)
Limitation 27 - a subset of the newly recorded portion is recorded before the signal is received	**Satisfied.** Hattori teaches that the protected segment is recorded before the signal to record is received. (*See* C3/L62-C4/L2)
Limitation 35 - configuring the size of the pre-recorded subset	**Satisfied.** Hattori teaches that the size of the memory address area for the ring memory can be arbitrarily set. (*See* C4/L1-2)

d) Other Admissions Made By The Inventors During Prosecution Of The Stellar Patents

48. During the prosecution of U.S. Patent Application No. 12/268,286, the Applicant further described the invention being claimed as follows (EX1013, 112):

> The current invention is directed to a method and apparatus for continuously recording image information so that a user can both save recorded segments in the circular buffer and also offload the recorded segments wirelessly to a second memory. This dual utility is very important because while it's preferable to wirelessly offload recorded segments to a second memory location, it's not always feasible to do so when wireless connections are sporadic and inconsistent in certain areas. Therefore, it is very important that when a wireless connection is unavailable that the user of the camera can prevent certain portions of the circular buffer from being overwritten.

49. The Applicant further admitted during the prosecution of the '034 patent that a host of claim features and limitations were "not separately patentable" (*id.*, 89-92):

> Claim 2 limits the surveillance apparatus of claim 1 to further comprise having a pre-recorded subset that is at least 5 seconds long. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.
>
> Claim 3 limits the surveillance apparatus of claim 1 to further comprise having a pre-recorded subset that is at least 10 seconds long. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.
>
> Claim 4 limits the surveillance apparatus of claim 1 to further comprise a sensor that automatically initiates the signal to record that triggers based upon content in one or more images captured from the camera. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.
>
> Claim 5 limits the surveillance apparatus of claim 1 to further comprise an interface through which a human can initiate the signal. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.
>
> Claim 6 limits the surveillance apparatus of claim 1 to further comprise an interface through which a person can designate how long either the pre-recorded section is, or the post-recorded segment is. This claim is

considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 9 limits the surveillance apparatus of claim 1 to further comprise a mount for the camera. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 10 limits the surveillance apparatus of claim 9 to further comprise that the mount is a pair of wearable glasses. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 15 limits the method of claim 12 to further comprise that the signal comprises a signal to start recording and a signal to stop recording. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 16 limits the method of claim 12 to further comprise receiving the signal to save a recording through at least one of a manually operated switch and an audio signal. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 17 limits the method of claim 12 to further comprise configuring the size of the pre-recorded subset. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

3. Pre-Event Recording Or Record-After-The-Fact Was Well Known In The Art

50. Prior to the alleged invention, it was known in the art to use a ring or circular buffer to record pre-event data such as shown in the following exemplary references:

U.S. 5,996,023 ("Winter") (EX1005), issued November 30, 1999:

> The parent patent application discloses an additional strategy, referred to as pre-alarm buffering, which also promotes efficient use of limited signal storage capacity. The basic concept is that the respective video streams generated by some or all of the cameras connected to the recorder are not usually selected for permanent storage. Instead, a ring buffer is provided to record the signal streams at a given (perhaps shared) field rate for a limited period of time, say one minute. If a significant event is detected, such as tripping of an alarm sensor, actuation of an alarm condition by a human operator, or detection of a predetermined characteristic of an incoming image stream by machine analysis of the image stream, then the video signal stream in the ring buffer, which would normally have been overwritten, is preserved for permanent storage. Pre-alarm buffering represents a desirable compromise which avoids devoting permanent storage capacity to large quantities of uninteresting information, while increasing the likelihood that significant information will be permanently recorded. The present application is concerned with techniques for efficiently managing pre-alarm buffering operations.

Winter at 1:50-2:4.

> According to a first aspect of the invention, there is provided a video data storage apparatus, including a plurality of video cameras, each generating a respective stream of video signals; conversion circuitry, connected to the plurality of video signals, for selectively converting the streams of video signals into respective streams of video data signals; a circular data buffer for selectively storing ones of the streams of video data signals subject to overwriting by more current video data signals; a main data store for selectively storing ones of the streams of video signals and for writing the video data signals in the main data store to a removable archive recording medium; a detection circuit for detecting an alarm condition; and a control circuit for selecting between a first process and a second process different from the first process, on the basis of the alarm condition detected by the detection circuit, the first and second processes both being processes for transferring a stream of video data signals from the circular data buffer to the main data store. According to this aspect of the invention, the circular data buffer and the main data store may respectively include first and second portions of a hard disk drive. Moreover, the first process may include reading the stream of video data signals to be transferred from the circular data buffer and rewriting that stream of video data signals to the main data store, and the second process may include designating the first portion of the hard disk to be a portion of the main data store.

Id. at 2:12-38.

51. U.S. 2003/0151663 ("Lorenzetti"), attached as Appendix B (included in EX1041), published August 14, 2003:

> An in-car video apparatus and method is provided where a real time (i.e., "live") continuous video stream supplied by a vehicle-mounted camera is processed for storage in a memory in a time-sequential manner for a pre-set time interval to create a time-delayed video stream. Upon activation by a law enforcement officer (which occurs at an arbitrary reference time), a vehicle-mounted recording device records the time-delayed video stream to create a video recording of the events captured by the video camera. Because the time-delayed video stream is recorded rather than the real time video stream, the start time of the video recording precedes the reference time by the pre-set time interval. The invention thus provides an ability to record an event after it has already occurred.

Lorenzetti at [0009].

> The invention provides many advantages. By buffering the real time video and audio streams to create the time-delayed video and audio stream, the officer has a period of time equal to the pre-set time interval to react to a witnessed event, such as a traffic infraction, and activate the video recorder. For example, if the time-delay is six seconds, then the officer is provided with up to six seconds in which to activate the video recorder and still be able to record the witnessed event on videotape. Accordingly, the invention provides a complete record of a police-citizen encounter, including the initial incident, event or behavior that captured the officer's attention in the first place. The odds that evidence supporting probable cause is contained in the videotaped record are thus greatly enhanced.

Lorenzetti at [0012].

52. Furthermore, "the big selling point for digital video is a feature with the mundane name of 'pre-event recording.'" Special Report: The Patrol Video Project, LAW and ORDER, July 2004 at 2 (EX1007).

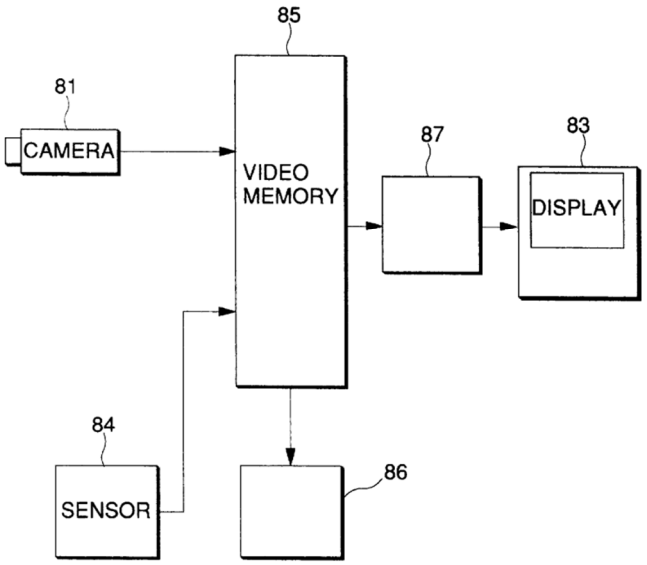
> Here's your scenario: you are sitting at a traffic light, car in drive and brain in neutral, when the light changes to green for traffic in your lane. You start to move forward when Maladroit Leadfoot blows through the intersection two seconds behind the red light, giving you the one finger salute as he passes by. You shift the lightbar into Christmas Time, go after and catch Maladroit, but wouldn't it be grand if his performance in the intersection was available for the traffic court judge to see? Well, on reviewing the recording that was initiated when you turned on the lightbar, for example, you find that it begins with 20 seconds or so of dull intersection-watching, when Mr. Leadfoot makes his breathtaking entrance, and your brief pursuit and stop follows. How can this be?
>
> Most of the new digital patrol video systems are in a passive recording mode whenever there is power to the system. The recording is captured by a solid-state memory chip with a capacity of anywhere from 10 seconds to five minutes, depending on the system setting and the manufacturer. This means the last 10 seconds to five minutes is always available to the system.
>
> When the officer puts the system into record mode, the contents of that memory device are dumped to the recording medium, and everything else that follows is appended to the end of that sequence. Thus, any recording made by the officer will actually start 10 to 600 seconds before he commands the system to record. The sudden lane change of the DUI, the

> suicidal pedestrian who walks out in front of you, the idiot who blows through the red light are all recorded for introduction in court. It's a beautiful thing.

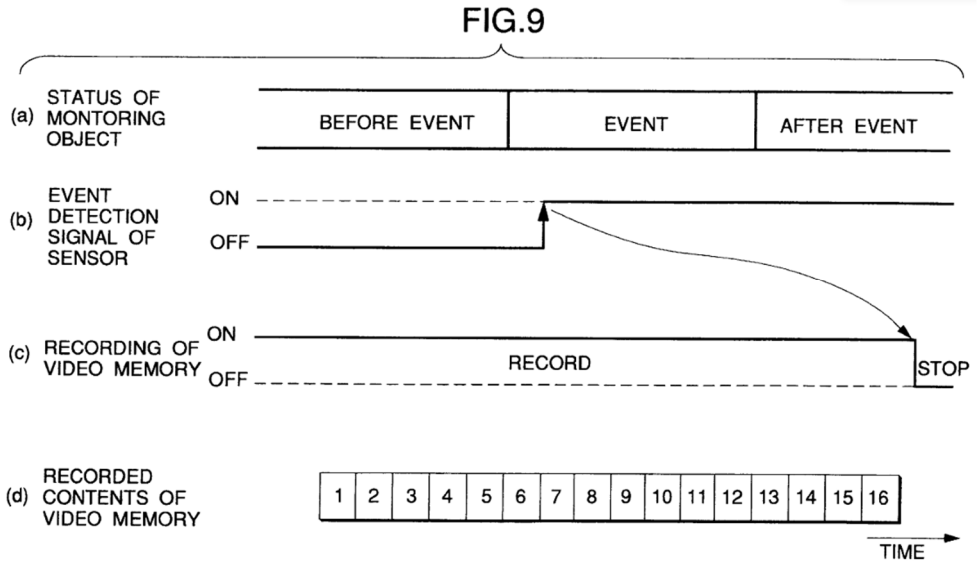
Id.

53. Further, U.S. 6,167,186 ("Kawasaki") (EX1008) explains that "FIG. 8 is a block diagram of a video recording device disclosed in JP-A-2-132599." Kawasaki at 1:29-30. "FIG. 9 is a timing chart of the operation of the device." Kawasaki at 1:30-31.

FIG.8



Id. at Fig. 8.



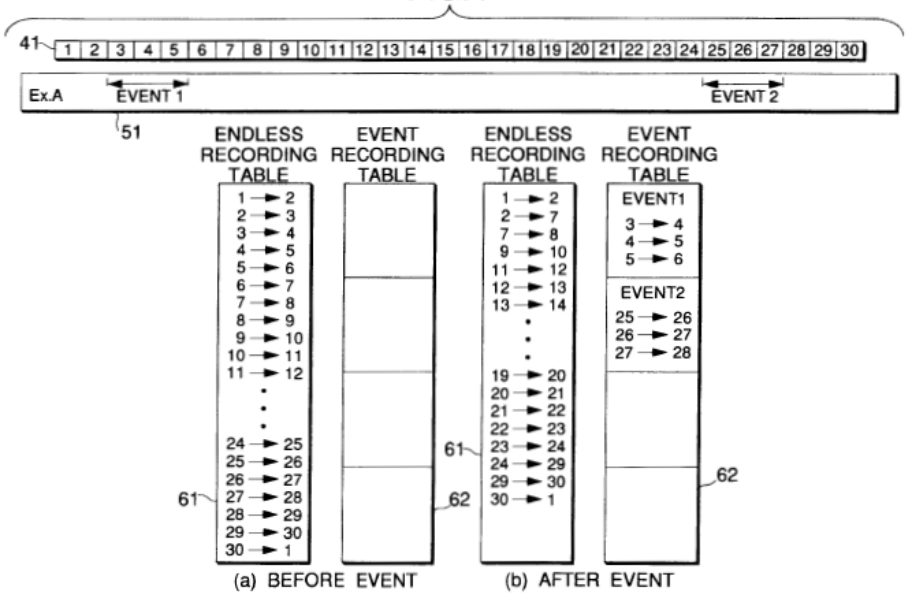
Id. at Fig. 9. "In this video recording device, a video image inputted from a camera is recorded in a video memory 85 and the recording of the video memory 85 is stopped at a timing responding to an input from a sensor 84, and the video image before and after the sensor 84 produces an event detecting signal that can be displayed." *Id*. at 1:31-36. "However, since the recording is stopped in response to the signal from the sensor, when the next events occur successively, the video image before and after the event cannot be stored." *Id*. at 36-39. "Although the device disclosed in JP-A-2-132599 can review the status before and after the event, it cannot deal with another subsequent event since it stops recording during the period." *Id*. at 1:59-62. "The [Kawasaki] invention has been accomplished to solve the above problem and intends to provide a device which can always record the video image inputted in real time and reproduce the image recorded last without stopping the recording." *Id*. at 1:65-2:2. It further discloses "a system which can preserve the video image (recorded event image) before and after the

event recorded in the video recording device has occurred, as historical record of video information for a long time." *Id*. at 2:6. Specifically, "[i]n the video recording device, the successive recording control unit records the video data from the temporary memory unit in endless recording mode and in accordance with an external event signal, it excludes a recording area correlated with the event signal from the area subjected to the endless recording so that it is managed as an event recording area." *Id*. at 2:15-21.

> Now referring to FIG. 4. an explanation will be given of a method of the processes of recording and reproducing in the successive recording control unit 6. Reference numeral 41 shows the state where the successive recording unit 5 is divided into a plurality of blocks (30 blocks in this example) labeled block numbers (pointers), respectively. Reference numeral 51 denotes a time zone of events which have occurred during the successive recording. The successive recording control unit 6 includes an endless recording table 61 and an event recording table 62, and manages the numbers of the blocks on which the digital video image is to be recorded as shown in part (a) of FIG. 4. The notation "1-2" in the part (a) represents that the recording block successive to block No. 1 is block No. 2. By provision of such a recording table, the blocks are overwritten in order from the block with an older record.

Id. at 4:30-45.

FIG.4



Id. at Fig. 4. "Next, an explanation will be given of the operation when the successive recording control unit 6 receives an event signal from the event signal inputting unit 7." *Id*. at 4:39-48. "Now it is assumed that the event signal is inputted while the recording is made at the position of block No. 4." *Id*. at 4:48- 50. "In this case, the video image from block No. 3 with a previously recorded image to block No. 6 with a video image after the event will be managed as an event video image." *Id*. at 4:50-53.

> Since the present invention always executes the recording in a manner of endless recording, the video image inclusive of the video image prior to inputting of the event signal can be managed as an event video image. Thus, event No. 1 will be managed on the event recording table as shown in part (b) of FIG. 4. Event No. 2 will be managed similarly. Now if only the event recording table is updated as it is, the event video images are overwritten to disappear at a period of endless recording. For this reason, the endless recording table must be also modified. As shown in the part (b), notation "2-7" represents that the block Nos. 3, 4, 5 and 6 are

> excluded from the loop of the endless recording. Likewise, notation "24-29" saves the event video image of event No. 2 from the endless recording. In this way, in the endless recording area, the recording area correlated with the event signal will not be thereafter used as an endless recording and not overwritten so that the event video image will be held for a longer period than the endless recording period.

Id. at 4:53-5:4. "Since the event video image when an event occurs needs not to be transferred to a separate area, the access time in the successive recording unit can be efficiently used so that the event video image can be reproduced with a sufficient allowance." *Id*. at 7:4-9. "Moreover, in the video recording device according to the present invention, the successive recording control unit monitors the recording capacity of the endless recording area from which the event recording area is excluded, and when the recording capacity is short for the recording period of the endless recording, it restores the event recording areas as endless recording areas successively in order of older setting or lower priority." *Id.* at 2:32-39. Therefore, it was known to contiguously continue to record the sensor data while excluding portions of the data from overwriting, and automatically overwriting the data if not designated for saving.

54. Additionally, U.S. 7,804,426 ("Etcheson"), attached as Appendix C (included in EX1041), disclosed a "System and method for selective review of event data" including "pre-event data":

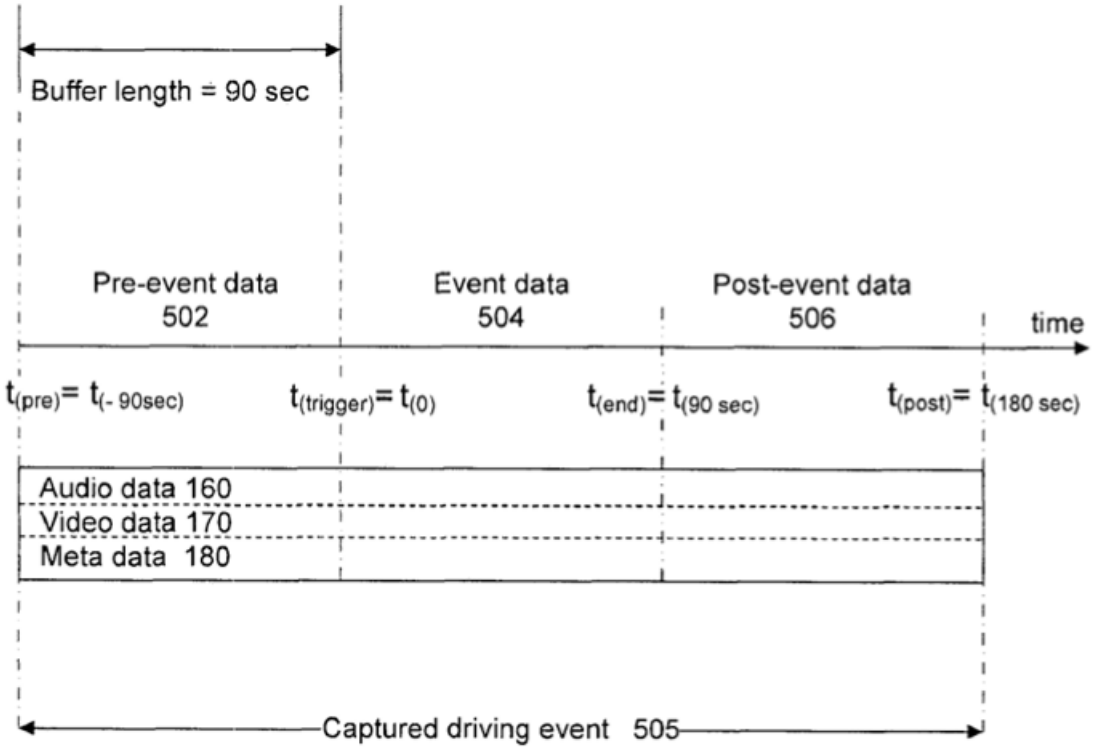
> Systems and methods for computer assisted cueing and selective reviewing of driving data in order to save time in the data review process

are provided. The method allows identifying essential portions of the data, selecting the essential portions, reviewing the selected data and retrieving additional data leading to the event if necessary. At least one event capture device continuously captures data into a buffer. The data are sent to an event detector communicatively coupled to the event capture device only when the event detector requests them. After receiving the data, the event detector selects and indexes a pre-event portion, during-event portion and post-event portion, combines the portions of captured data into a single driving event record and sends the driving event record to the evaluation server. From the server, the driving event record is sent to the analysis station for review and analysis.

Abstract.

In one embodiment, the event detector is configured to create metadata tags, and use those tags to index the beginning and the end of the pre-event data, event data and post-event data. For example, the beginning of the pre-event data can be indexed with a pre-event time tag set to the beginning of the pre-event data, whereas the end of the pre-event data can be indexed with a trigger time tag set to the end of the pre-event data. Similarly, the beginning of the event data can be indexed with the trigger time tag set to the beginning of the event data, whereas the end of the event data can be indexed with an end time tag set to the end of the event data. Correspondingly, the beginning of a post-event data can be indexed with the end time tag set to the beginning of the event data, whereas the end of the post-event data can be indexed with a post-event time tag set to the end of the post-event data.

Id. at 5:49-63.



In the embodiment illustrated in FIG. 4, a captured driving event or driving event record 505 comprises three consecutive buffers of collected data. Each buffer is indexed using metadata tags and then concatenated to form the event 505. More specifically, the pre-event data 502 was collected during a period of time which started at a "pre time" (indicated as $t_{(pre)}$) and ended at the trigger time (indicated as $t_{(trigger)}$). Similarly, the event data 504 was collected during a period of time which started at the trigger time (indicated as $t_{(trigger)}$) and ended at an "end time" (indicated as $t_{(end)}$). Correspondingly, the post-event data 506 was collected during a period of time which started at the end time (indicated as $t_{(end)}$) of the event data and ended at a "post time" (indicated as $t_{(post)}$). Then, the pre-event data 502 was concatenated with the event data 504 and with the event data 506.

Id. at 6:1-15.

55. As another example, U.S. 2006/0077256 to Silvemail ("Silvemail '256), attached as Appendix QQ (included in EX1063), discloses a "High Resolution Pre-Event Record System" that uses a circular buffer to record pre-event data:

> The High Resolution Pre-Event Record system is an innovative means for collecting audio, video, and meta-data in a mobile vehicle platform and continuously recording this information stream to a high-capacity storage device at different levels of data resolution based upon the status of a trigger event. The occurrence of a trigger event will cause the system to store higher resolution data to an on-board high-capacity storage device prepended by a configurable amount of high resolution data previously recorded into a pre-event data buffer. The data stream may later be downloaded to an external storage device for future review and analysis.

Silvemail '256 at Abstract.

> Simultaneously, a high-resolution data information stream is being recorded from Camera 1 201 through data encoding means within a DSP 100 and into a circular buffer of configurable length, called the Pre-event buffer 310. The length of the buffer may be set to store between 1 and n number of seconds (n is typically between 30 and 180) of data information stream files based upon the needs of the user. This guarantees that only a fixed amount of storage in the HCS 300 will be consumed by the larger data information stream files generated by high-resolution recording. When the end of the data buffer 310 is reached, the data information stream files are written to the beginning of the buffer 310 once again, overwriting the previous data information stream files and progressing through the buffer 310 once again in circular fashion.

Id. at [0024].

56. U.S. 2007/0035632 to Silvemail ("Silvemail '632), attached as Appendix RR (included in EX1063), is entitled "Mobile Digital Video Recording System" and likewise discloses a circular buffer for recording pre-event data:

> In normal mode, the low-resolution integrated data stream is saved to the on-board high-capacity storage device in non-erasable data files, and the high-resolution integrated data stream is saved to a portion of the high-capacity storage device that has been constructed as a ring buffer with a configurable storage limit. The storage limit may be set to hold between 1 and 180 seconds of continuous recording of the high-resolution integrated data stream. At the end of the configurable storage limit, the data stored at the beginning of the buffer is overwritten with the most current data from the integrated data stream. This process continues with the most current data overwriting the next position in the buffer such that the buffer always contains the most recent recording of the integrated data stream. This circular buffer therefore contains the most recent 1 to 180 seconds of the high-resolution integrated data stream.

Silvemail '632 at [0010].

57. Prior to the alleged invention, it was known in the art to use a record after-the-fact feature such as disclosed in the following exemplary references:

U.S. 2002/0131768, published September 19, 2002 ("Gammenthaler 1"), attached as Appendix D, and U.S. 2004/0201765 ("Gammenthaler 2"), attached as Appendix E (both included in EX1041), published October 14, 2004:

> However, the embodiment of FIG. 2 has the additional capability to record after-the-fact events which the officer may have missed because the record mode was not on when the event occurred. This is provided by the use of a hard disk 60 which stores all compressed video and audio data output by the compression process or the optional anti-tampering circuit at all times regardless of whether tape recording mode is on or off. This system also has the ability to record data from either of two-different video cameras, one of which may be wireless, and either of which may be selected and the ability to record audio from either of two different microphones, one of which may be wireless, and either of which may be selected.

Gammenthaler 1 at [0046]; *see also* Gammenthaler 2 at [0045]; U.S. 7,190,882, filed March 19, 2001.

> All the data on line 100 is continuously recorded on a 15 gigabyte hard drive 60 which is used as a FIFO memory. Data can be archived off the hard disk 60 to the digital video tape recorder 52 via bus 102. After the fact recording to tape can be accomplished using the system controller. If an officer wants to record to tape all the events that happened in the last 10 minutes or starting from some particular time of day he remembers to be before a significant event, he can give a command via control panel 20 to the system controller 54. Part of the data continuously recorded on hard disk 60 is time of day data supplied by clock 104 and/or a frame count signal.

Gammenthaler 1 at [0055]; *see also* Gammenthaler 2 at [0054].

> The system controller 55 can be controlled in this embodiment by the officer via control panel 20 to send a command to the hard disk 51 to cause it to playback all recorded data starting from a specific frame number or a specific time of day or going back from the present time by a specified number of minutes on output 57 to be archived by tape recorder 52. The hard disk then finds the appropriate data in any way and outputs it on line 57. In some embodiments, the hard disk has a cache memory in which frame number and time of data data are recorded along with the track and sector or block number on the hard disk where the corresponding video, audio and status data for that frame number and/or time of day were recorded. This provides an after-the-fact recording capability in case the officer did not have the in-car video system in record mode when some significant event happened. In alternative embodiments, since the hard disk 51 is used as a FIFO and will be overwritten when it reaches its capacity, the system controller can be programmed to automatically cause the digital video tape recorder to record all data on line 53 when the hard disk reaches capacity.

Gammenthaler 1 at [0060]; *see also* Gammenthaler 2 at [0059].

58. Additionally, U.S. 6,389,340 ("Rayner"), attached as Appendix I (included in EX1041), issued May 14, 2002 discloses using a loop buffer to capture pre-event data:

> Under control of CPU 34, digital signals representing the video imagery are stored in dynamic random-access memory (DRAM) 38 that is configured as a continuous-loop buffer. CPU 34 or associated address counter circuitry defines the continuous-loop scheme by employing wrap

around memory addressing, in which the highest memory location in a predetermined addressing sequence is adjacent or next to the lowest. Incoming digitized data signals are written to memory locations in DRAM 38 in accordance with the addressing sequence until all allocated locations have been written to, at which time the data signals stored at the next location in the sequence are overwritten with further incoming data signals.

Rayner at 4:9-21.

CPU 34 monitors the digitized signals representing the acceleration data to which G-force sensors 40 and 42 are responsive. If CPU 34 determines that the acceleration data exceed a predetermined threshold that is believed to be indicative of a collision or other event that would warrant investigation, it copies data from the buffer memory to a more permanent non-volatile memory 56, such as Flash memory. Memories 38 and 56 thus together define a two-tier system, in which the first tier records data in a continuous-loop fashion, and the second tier provides more permanent storage for data in the first tier in response to a triggering event. Data stored in memory 56 in accordance with this scheme are not overwritten unless the entire system is reset by an operator. Preferably, device 10 includes security measures to prevent inadvertent or unauthorized resetting, such as placing the button (not shown) or other sole means for resetting device 10 inside enclosure 18 or in another relatively inaccessible location.

Although in the illustrated embodiment a change in acceleration data that exceeds a predetermined threshold is defined as the triggering event that causes CPU 34 to terminate data acquisition and copy the contents of

> DRAM 38 to memory 56, in other embodiments a change in any other monitored sensor signal can similarly be defined as the triggering event. Also, although data acquisition can be terminated upon occurrence of the triggering event, in other embodiments data acquisition may continue after occurrence of the triggering event for some predetermined time interval. Thus, so long as a sufficient amount of pre-event data are retained and not overwritten, additional frames of video data or other sensor data can be gathered during and after the collision and stored in memory 56 following the pre-event data.

Id. at 4:57-5:22.

59. U.S. 6,421,080 ("Lambert"), attached as Appendix J (included in EX1041), issued July 16, 2002, discloses reusing cache memory to capture pre-event data and marking data for preservation:

> The image data stored in the temporary memory just prior to detection of a triggering event qualifies as pre-event activity, and will be copied to the long-term memory along with contemporaneously or post-event image data to advantageously provide an image record of events occurring just prior to a triggering event in combination with those generated after the triggering event. This allows the image recording arrangement of the present invention to reduce the amount of image data which needs to be stored without compromising the potential usefulness of the stored image record.

Lambert at 4:41-51.

> Referring now to FIG. 3, as indicated at block 202, system 12 automatically reuses the cache memory when storing data into the cache

if the list of dynamic frames has become full. More specifically, system 12 is programmed to reuse the cache by overwriting the oldest dynamic frame with a new image file when the cache is full. As shown in block 204, the last image stored in the cache is tagged to indicate that the image has not yet been copied to disk, and has not yet been marked for storage. Then, at block 206, a determination is made as to whether any ongoing enabled or triggering events use the camera that the generated the latest image. If so, the image is tagged "marked for storage" at block 208. Otherwise, the process proceeds to block 210 and determines on an image by image basis whether there are currently any images stored in the cache that have been "marked for storage" but not yet stored to disk. If such an image is found, the image is then copied or written to disk, and the image file in the cache is tagged as "stored" as denoted at block 212.

Id. at 5:18-36.

60. U.S. 6,088,635 ("Cox"), attached as Appendix K (included in EX1041), issued July 11, 2000, discloses using RAM memory to capture pre- and post-event data:

The operation of the monitoring unit 400 is similar to the monitoring unit 100 with a few exceptions. The video information obtained by the camera 420 is digitized and continuously stored in RAM of the PC 410. A certain portion of the PC's RAM will be allocated to continuous video storage and information will be continuously stored (and written over previously stored video information). The PC 410 will detect activity from the horn and brake sensor 440 and 442 and lock down (terminate) the storage of incoming video information after a predetermined period of time set by a timer in the PC 410. This is similar to the VCR lock down operation described above, except that the PC can do this digitally in order to

capture video information for a predetermined period of time associated with a railroad crossing (potential accident) event. Consequently, the RAM of the PC 410 will contain the video information of the scene for a period of time before, during and after the activity which necessitated the blowing of the horn and application of the railroad vehicle brakes.

Cox at 5:4-22.

61. U.S. 2004/0252193 ("Higgins"), attached as Appendix L (included in EX1041), published December 16, 2004, discloses a video capture buffer (e.g., RAM, RAM-disk, tape, and so on) used to record data before and after events occur:

> A system for monitoring and reporting incidences of traffic violations at a traffic location is disclosed. The system comprises one or more digital still cameras and one or more digital video cameras system deployed at a traffic location. The camera system is coupled to a data processing system, which comprises an image processor for compiling vehicle and scene images produced by the digital camera system, a verification process for verifying the validity of the vehicle images, an image processing system for identifying driver information from the vehicle images, and a notification process for transmitting potential violation information to one or more law enforcement agencies. The video camera system is configured to record footage both before and after the offense is detected. The video camera system includes a non-stop video capture buffer that records the preceding few seconds of violation. The buffer holds a number of seconds of video data in memory. When an offense is detected, a timer is started. At the end of the timer period a video clip of the current buffer contents is recorded. The resulting video clip is

incorporated with the conventional evidence set comprising the digital still images of the offense with the identifying data of the car and driver.

Higgins at Abstract.

FIG. 14 is a block diagram that illustrates the main components of video camera system 122. In system 1400, video camera 1402 is a digital video camera that produces video data in PAL, NTSC or other format, which can then be processed to produce streaming video in compressed form such as MPEG, MPEG2, Quicktime, AVI, or similar formats. In one embodiment, the video camera shoots non-stop video footage of the location. The digital video data is stored in a buffer 1404, which can be any type of memory (e.g., RAM, RAM-disk, tape, and so on) that is sufficient to hold at least a portion of the video footage shot by the camera. A detection system 1406 is coupled to the video camera 1402. Upon detection of an offense, a timer 1408 is started. The timer is programmed to stop after a predetermined period of time. At the end of the timer period a clip or "snapshot" of the buffer contents is taken by video clip recorder 1410. The video clip recorder takes the video clip recorded by the video camera for the time period of the timer plus a period of time prior to detection of the offense. The buffer and video clip recorder are used to provide a clip of the offense plus moments immediately before and after the offense. Thus, in order to catch, for example, six seconds prior and six seconds after an offense is detected, the buffer 1404 holds at least twelve seconds of footage in memory. When an offense is detected, the system starts a six second timer, at the end of which it takes a video clip of the current buffer contents and stores it to a persistent memory, such as hard drive 1412. This storage (hard

drive) can also be used to store the still images of the offense. Thus, the resulting video record can be incorporated with the conventional evidence set provided by the still cameras.

Id. at [0090].

FIG. 15 is a flowchart illustrating the steps of capturing a video clip of a detected offense, according to one embodiment of the present invention. In step 1502, the video camera 1402 records a non-stop loop of video of the monitored location. This video data is buffered in buffer 1404, step 1504. The detection system 1406 detects a traffic offense, step 1506. The detection of an offense triggers a timer 1408 to start for a set period of time, step 1508. After the timer period, the timer stops, step 1510. In step 1512, the video clip recorder 1410 captures and clips from the buffer a video clip running from a set time prior to the offense to the end of the timer period. The video clip is then stored in a memory, such as hard drive 1412, and associated with the still camera data of the offense, step 1514.

Id. at [0091].

62. US 2004/0150717 ("Page"), attached as Appendix M (included in EX1041), published August 5, 2004, discloses a memory buffer that is used to record pre-event data:

A digital video surveillance system for a law enforcement vehicle comprises a video camera mounted on the law enforcement vehicle and positioned to view an incident. A memory buffer records video signals from the video camera. A controller generates record and playback signals to record and to display the video signals. A digital video recorder

> is responsive to the record signal to record the video signals from the memory buffer on an optical medium and to the playback signal to reproduce video signals recorded on the optical medium. A vault encloses the digital video recorder. A battery provides backup power to the digital video surveillance system. The optical medium may be a DVD disk. A watermark may be included with the digital recording.

Page at Abstract.

> The digital video surveillance system of the present invention includes a video server in a law enforcement vehicle which allows recording to various digital optical media including DVD RAM disks. Recording to these media in a moving vehicle and in all-weather conditions is possible by shock-mounting the drives and providing environmental assistance for heating and cooling a lockable protective enclosure in which the drives are encased. This system includes a memory buffer that is recording at all times. When the recorder is activated, the memory buffer contents, including video and audio, will be recorded onto the DVD RAM disk. This ensures that the activity occurring just prior to the activation of the system is recorded as well. The system further provides a method to capture or receive snapshots and output them to or receive them from a wireless transmitter such as a cellular modem for missing persons or suspect identification, for example. Forward-facing and interior cameras are mounted inside an overhead console to reduce the obstruction to the driver and to eliminate the chance of interfering with a passenger side air bag.

Id. at [0005].

> The video server board 46 includes from 4 to 512 megabytes of RAM, which is used as a history buffer. The system constantly stores information from the cameras and audio input in the RAM on the video server board 46 which stores seventeen to thirty seconds of video history for a 4 Mb history buffer and up to three minutes or more for a 512 Mb history buffer depending on the resolution of the video recorded, for example. The history buffer is a circular FIFO buffer which allows events to be recorded that occurred prior to the system receiving the record command. When the record function is activated, the history buffer prior to activation is transferred to the DVD RAM drive to record the incident up to the point when the record signal was received. Data in the history buffer is transferred to the DVD RAM disk at a data rate of approximately 2.7 Mb per second. If the history buffer is full when recording starts, this transfer occurs in approximately three minutes, for a 512 Mb history buffer. Thereafter, video and audio data is collected in the history buffer before being transferred to the DVD RAM disk in packets. When the stop recording command is received, the final five to six seconds of data in the history buffer is transferred to the DVD disk and recording on the disk is stopped. Data continues to accumulate in the history buffer after recording stops.

Id. at [0046].

4. Various Memory Options For Storing Events Were Known In The Art

63. Various memory options for storing event data were known in the art. For example, US 2005/0088521 ("Blanco 2"), attached as Appendix Q (included in EX1041), published April 28, 2005, discloses that prior systems included:

> Vehicle-mounted surveillance systems, also termed in-car video systems, are seeing increased use in the security industry and law enforcement community as an effective means to provide an indisputable video and audio record of encounters involving officers and citizens. In these systems, a video camera is typically mounted on the police car's dashboard or windshield and is generally arranged to have a field of view of the area to the immediate front of the car. The field of view approximately corresponds to what an officer would see when seated in the car's front seat.
>
> The video camera is operably coupled to a video recorder, such as a video cassette recorder ("VCR") or digital video recorder ("DVR"), mounted in the police car, often in the trunk. A video recording may be started manually by the officer, or in some systems, the video recording is started automatically when, for example, the officer activates the police car's emergency systems (such as overhead lights and/or sirens), or when a vehicle speed-measuring radar unit is operated.

Blanco 2 at [0002]-[0003].

> While current in-car video systems perform very well in many applications, recording media currently used with in-car video systems, including analog video tape and digital storage media like hard disk drives, are bulky and may present storage and other logistical issues in managing the recording media. The size of recording media and associated video recorders can present space utilization issues in some vehicle models as well.

Id. at [0007]. The video resolution contributes to the file size as "[l]arge resolutions greatly inflate the size of the file that contains their information." Special Report: The Patrol Video Project, LAW and ORDER, July 2004 (EX1007) at 22. Video resolutions of 320x240 pixels and 640x480 pixels were known in art in the context of in-car mobile video recorders. *Id.* at 5, 17. "A 640x480 image contains four times as many pixels as a 320x240 image." *Id.* at 22.

64. Blanco 2 described the benefit of using solid state memory devices such as Flash:

> An inventive system and method is provided by an in-car video system that uses a type of electrically erasable programmable read-only memory known as flash memory to store video of an incident or event. In an illustrative embodiment of the invention, a digital video recorder and video camera are fixably mounted in a vehicle such as a police cruiser. An event of interest is captured by a camera and the resulting video stream is converted into a form that writable to a flash memory. The video recorder writes the video to flash memory to thereby store a record of the event on the flash memory as a storage medium.

Id. at Abstract. "The type of flash memory preferentially used in the illustrative embodiment of the invention is known as a CompactFlash card." *Id.* at [0011].

> Advantageously, the invention creates a robust in-car video system having a large amount of video storage combined with enhanced system packaging that is enabled through the very small form factor of the flash memory. Since flash memory is a solid state device using no moving

parts, (i.e., the memory relies on the use of electronics instead of mechanical systems) it is inherently reliable.

Id. at [0012].

Flash memory may endure extreme temperatures and retains data even without a continuously applied power source. Users may easily insert and remove flash memory from the video recorder and store additional flash memory card in the vehicle in a small amount of space. Because of its extremely small size, flash memory provides efficient and dense storage and is ideal as a removable media for archiving video recordings in a storage area away from the vehicle. The use of flash memory as the recording media may also help to reduce the costs of maintaining in-car video systems because relatively fragile and complex VCRs and DVRs are eliminated from the inventive in-car video system.

Id. at [0013].

Particular advantage may be realized in many applications of the invention by using "flash memory" which is a special type of EEPROM that can be erased and reprogrammed in blocks instead of one byte at a time. This feature makes flash memory generally "faster" than other types of non-volatile memories. In accordance with the invention, flash memory is well suited to in-car video system applications as a result of this fast speed at which data can be stored and accessed.

Id. at [0021].

5. Wireless Transmission Of Files To A Remote Memory Was Known In The Art

65. Prior to the alleged invention, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory. As an example, the '034 patent characterizes WO 2006/044476 to Vanman as disclosing that in order to "save data in the buffer, the user of the Vanman device needs to transfer important portions of the buffer wirelessly to a central office or physically to a DVD disc." '034 patent at 1:35-45. Additionally, a person of ordinary skill in the art would have known, for example, that wireless transmission of important data allows for preservation of the data while freeing up memory on the device for subsequent recordings. It also allows for summoning immediate assistance to the scene of an incident. Furthermore, particularly in law enforcement applications, it is desirable for evidence preservation to remove human interaction from the transfer of data from a recorder to a central evidence repository.

66. U.S. Pat. No. 8,350,907 ("Blanco"), attached as Appendix R (included in EX1041), "is related generally to surveillance systems, and more particularly to a method of storing digital video captured by an in-car video system." Blanco at 1:6-8. "Referring to FIG. 1, which provides a simplified block diagram of a first method of long term video storage, a large digital storage medium 110 (for example, a hard disk drive having storage capacity of greater than 50 gigabytes) is utilized in a vehicle 120, such as a police cruiser, to record and store many hours of video." *Id*. at 3:45-50. "The

occurrence of external triggers or incidents markers such as the emergency Lights, Siren, Car door opening, etc., that may be part of the video record, may also be searched in some applications of the invention." *Id*. at 4:37-40.

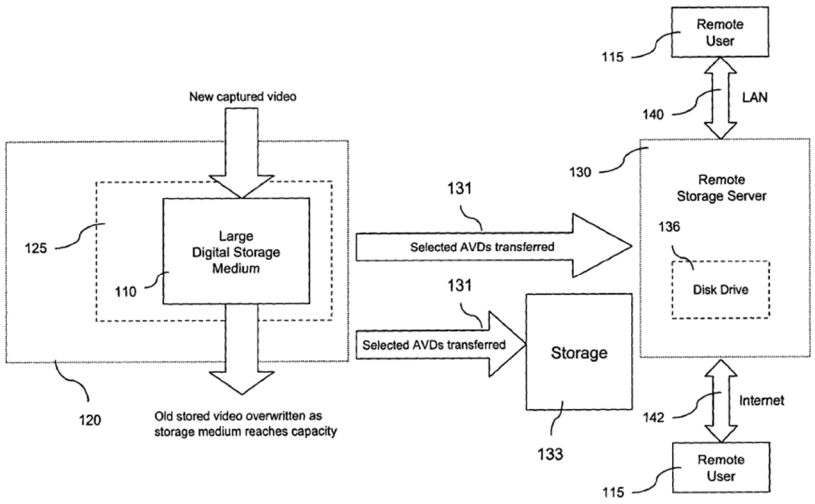


FIG 1

Id. at Fig. 1. "Typically, the large digital storage medium 110 would be incorporated into an in-car video system, designated by reference number 125 in FIG. 1 which typically includes a DVR, camera, microphone, control unit and monitor (not shown in FIG. 1)." *Id*. at 3:50-54. "Once the large digital storage medium 110 reaches its maximum capacity, the oldest video is erased (i.e., overwritten) and its space is taken by the newest video as shown in FIG. 1." *Id*. at 3:57-60. "[S]elected video recordings, for example those designated as being of interest or of other importance, may be transferred to conventional storage media…(collectively designated by reference numeral 131 in FIG. 1)." *Id*. at 3:62-64. Figure 3 depicts that "the removable media may be replaced with a wireless link, enabled for example, through the use of a wireless transmitter 310 as shown." *Id*. at 4:41-44.

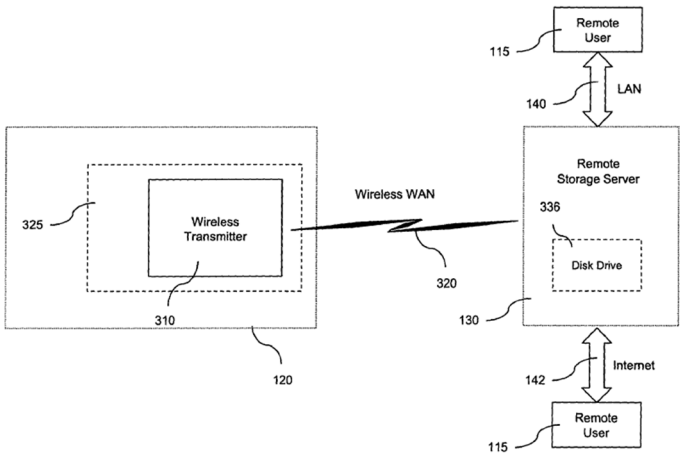


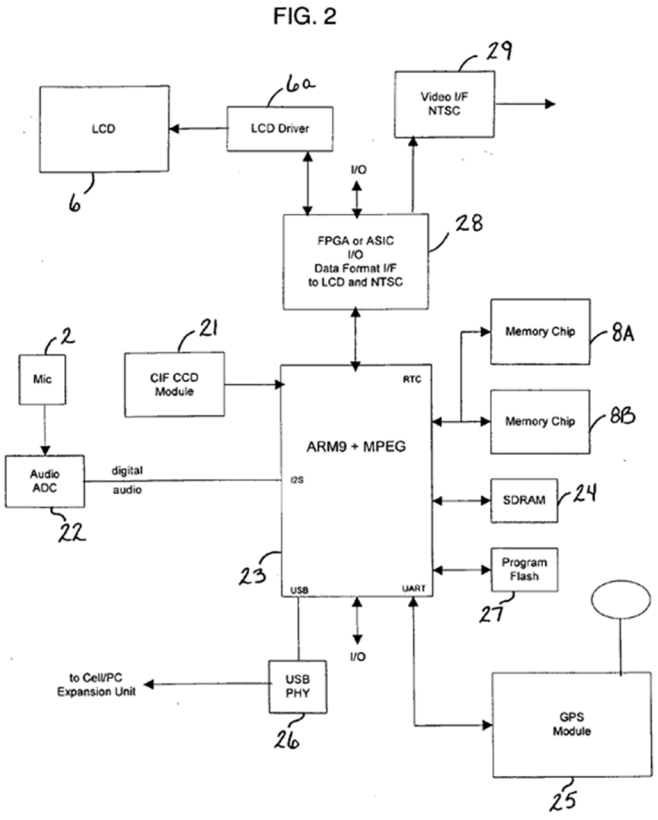
FIG 3

Id. at Fig. 3. "The video data is transferred to a storage server 130 coupled to the WAN." *Id*. at 4:46-47. "The third method [Fig. 3] described above is often the most advantageous in many applications." *Id*. at 4:50-51. "It often requires the least amount of interaction from the officer which can be desirable from the viewpoint of training reduction and enhanced evidence preservation." *Id*. at 4:51-54. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

67. U.S. Pub. No. 2004/0008255 ("Lewellen") (EX1019) is another example of wireless transmission of files to a remote memory. I discuss Lewellen's disclosure in further detail below with respect to the obviousness of the claims of the '901 and '910 patents.

68. U.S. Pub. No. 2005/0078195 ("Van Wagner"), attached as Appendix U (included in EX1041), discloses "a mobile recording device including: a flexible camera head for capturing video stream data in real time, a microphone for capturing

audio data in real time, a circular buffer for continuously storing the video stream data and the audio data; and a wireless transceiver for transmitting the video and audio data in real time to a remote location." Van Wagner at [0009]; Figs. 2, 4B.



Van Wagner at Fig. 2. "The wireless card slot utilizes existing wireless technologies, like PCcard cellular modems and 802.11 cards, to transmit video and audio as a data stream to a remote monitoring facility." *Id*. at [0092]. "In one embodiment, the cellular capability is provided via an expansion module pluggable to the main unit." *Id*. at [0071]; Fig. 3. "In this embodiment, the MPEG stream is received from the main unit via a USB interface 31 (or other interface) by the expansion module, as shown in FIG.

3." *Id*. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

69. U.S. Pat. No. 6,995,668 ("Junqua"), attached as Appendix V (included in EX1041), discloses "a wearable, computerized apparatus for use with law enforcement has an evidence collector adapted to collect evidentiary information of a type collected according to law enforcement procedures and useful for identification of a suspect." 1:36-40. "A wireless communications link communicates the evidentiary information and the safety information to a centralized component of a distributed communications system to assist in identifying suspects and dispatching assistance." *Id*. at 1:42-46. "A vehicular component having an on-site camera can receive data from the wearable, computerized component via a wireless connection, automatically activate the camera at times of stress and/or distress, and forward collected information off-site to a centralized, dispatch facility via a wireless connection. *Id*. at 1:42-52-58.

> Another way that apparatus 10 can communicate with other components of the system is by using a mid-range wireless link, such as radio wave. This mid-range wireless link can be used to communicate with a vehicular component of the system, such as a police car 40 or motorcycle 42. Thus, suspect biometric data, sensed officer reactions, stimuli, scanned input, text input, voice input and/or sounds and images from various on-site cameras 44A–C can be communicated to and from various on-site components of the distributed communications system.

Junqua at 3:12-21; Fig. 2.

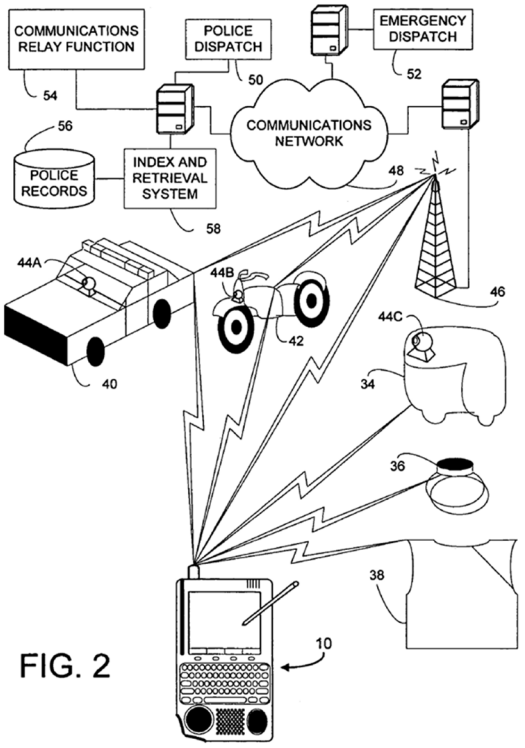


FIG. 2

Junqua at Fig. 2. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

70. U.S. Pub. No. 2001/0005217 ("Hamilton"), attached as Appendix W (included in EX1041), discloses a "device for remote information download and transfer for downloading a secure, permanent record of criminal activity and/or accident evidence relating to a vehicle for evidentiary purposes which may be … saved directly onto the downloading device. Hamilton at Abstract. Hamilton "contemplates an off-board downloading device for accessing information on a Recording System and for viewing and/or transferring that information to an off site location." Hamilton at [0101]. Hamilton further discloses "the information recorded from certain monitors and transducers located on the Recording System can be downloaded by the interface

18 from hard drive 34 located on the Recording System and superimposed on recorded video information also downloaded from hard drive 34 located on the Recording System." Hamilton at [0030]. "In a preferred aspect, the remote downloading device has at least one transceiver for accessing, downloading, and remotely transmitting information to an off site location, such as a base station, a hospital, an insurance company, law enforcement, a rescue vehicle, or the like." Hamilton at [0015]. "The transceiver receives signals from a remote unit, such as a Recording System, which allows the device to transmit recorded and/or stored information directly from the safe box or hard drive located on the Recording System to an off site location and/or instantaneously as it is generated." *Id*. Hamilton further discloses that the "transceiver 40 can comprise a direct satellite uplink, RF radio, modem, cell phone, or the like." Hamilton at [0026].

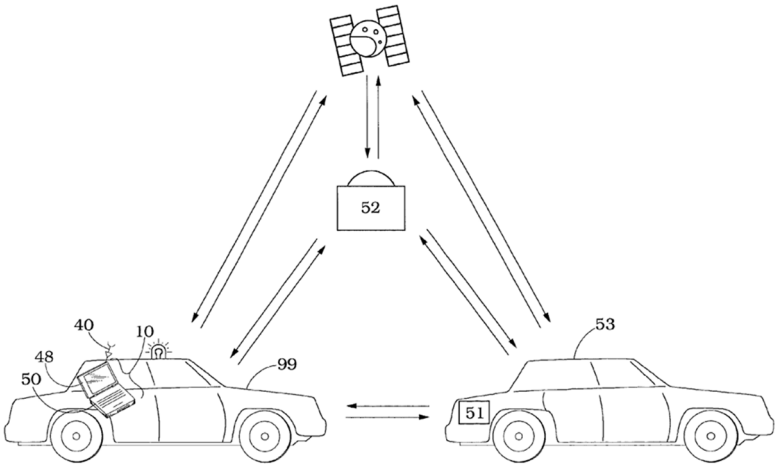


FIG. 2

Hamilton at Fig. 2. In Fig. 2, "the download device 10 is implemented in a form that is similar to that of a laptop computer with a visual display monitor 48 and keyboard 50."

Hamilton at [0031]. "The download device 10 may be self-contained with, for example, a phone jack and/or a modem hooked to a mobile phone or SET for direct satellite transmission via transceiver 40." *Id*. "In the depicted embodiment, the Recording System 51 is located in a vehicle 53, and the download device 10 is located remotely from the Recording Systems 51 such as, for example, in a police cruiser 99." *Id*. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

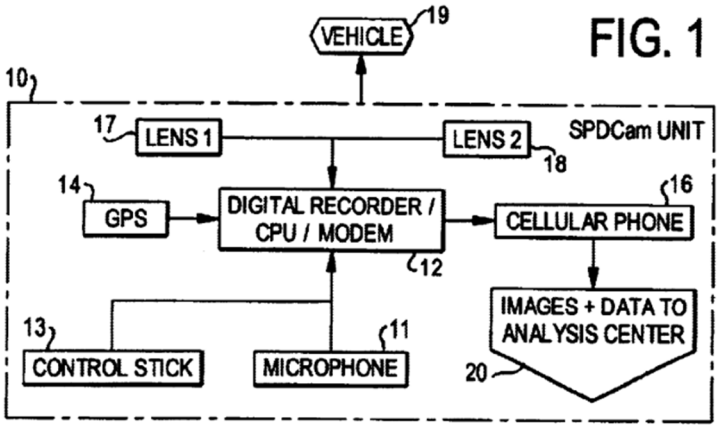
71. PCT Pub. No. WO2004/036926 ("Pearlson"), attached as Appendix X (included in EX1041), discloses "methods and systems for acquiring, storing, and distributing video and telemetry." Pearlson at 1:28-29. "One embodiment is a recording and transmission system comprising: a recorder mountable in a police vehicle configured to record video and meta-data synchronized with the video, wherein the recorded video includes a plurality of segments having fixed lengths, the recorder including a wireless transmitter configured to wirelessly transmit the recorded video segments and meta-data, wherein the meta-data includes: data related to vehicle status; subjective time information; objective time information; serial data." Pearlson at 2:1-6. "One embodiment of the recorder 100 provides event-based recording that enables users to activate a recording session by either pressing a button or activating another device used as an event trigger such as a vehicle light bar, or an alarm contact or other sensor." Pearlson at 10:3-9. "In one example embodiment, a ring buffer in a recorder,

such as recorder 100, captures video, audio and data until an instruction or trigger to start the recording process occurs." Pearlson at 8:18-21.

72. "The system includes a mobile video/audio data recorder 100 which records high quality video/audio and serial data telemetry while simultaneously transmitting specially formatted live video/audio and information to personnel using a variety of reception devices or terminals." Pearlson at 7:3-7; Fig. 1. For example, access to and display of videos and meta-data can be provided using a standard browser…and a standard media player…executing on a personal or server computer, personal digital assistant, cell phone, and the like, thereby lowering the client cost and easing maintenance. Pearlson at 5:14-18. Pearlson further discloses that "the frame rate, bit rate and resolution for transmission can be selected based on the wired or wireless network and the receiving terminal." Pearlson at 7:23-24. "For example, some devices, such as palm-held personal digital assistants (PDAs) and hybrid cell phones may have limited display resolution and processor power." Pearlson at 7:24-26. "In applications where such devices are used to view the video, such as by remote field personnel performing surveillance, the recorder l00 maintains compatibility with the target device by optionally formatting video specifically for the target device." Pearlson at 7:26-29. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

73. U.S. Pat. No. 6,690,294 ("Zierden"), attached as Appendix Y (included in EX1041), discloses "a method for capturing images of a vehicle and/or vehicle operator

suspected of a traffic violation, determining the time and geographic location of the suspected violation, transmitting the images and other data to an analysis center, issuing citations to violators and deriving revenue therefrom." Zierden at 1:17-23. "The SPDCam system comprises a color digital imaging device (SPDCam device) connected to a global positioning satellite (GPS) system and a cellular telephone network." *Id*. at 3:31-33. "Referring now to the detail in the drawings, FIG. 1 is a block diagram of a digital imaging device (SPDCam device) 10 for capturing the image of a target vehicle 19 that is suspected of violating a traffic law." *Id*. at 4:11-15.



Id. at Fig. 1. "The SPDCam device 10 comprises two cameras, identified as lenses 17 and 18…." *Id*. at 4:15-16.

> In operation, the lenses 17 and 18 constantly record images, with the most recent time period, e.g., 120 seconds, of images being retained in the computer memory at any given time. As new images are acquired, older ones are erased. When a target vehicle is identified, the system operator activates an 'Event' on the SPDCam device 10 to begin collecting data for the target vehicle. When the 'Event' is initiated, the

> prior 120 seconds of images are permanently stored, and subsequent images of the target vehicle are continuously captured and stored in the computer memory until the operator 'Ends' the event. GPS data and the entirety of the audio recording is retained from the start of the event to the end thereof, and stored with the images.

Id. at 5:8-20. "[S]witches may be provided for selecting between the video mode and the photographic mode of operation." *Id*. at 5:24-25.

74. "The computer 12 processes, stores, and transmits the images and the geographic and audio data to an analysis center 20 via a cellular telephone 16." *Id*. at 4:24-26. For example, "[a]n 'Event' key permanently stores the most recent 120 seconds of images while continuing to record until an 'End/Store' key is pressed to stop the recording of the images." *Id* at 5:30-33. "All the images are stored in the memory of the computer 12." *Id*. at 5:33-34. "A 'Submit' key activates the cellular telephone 16 connected to the computer 12 which transmits the images and other collected data to the analysis center 20." *Id*. at 5:39-42. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

75. U.S. Pat. No. 6,831,556 ("Boykin"), attached as Appendix Z (included in EX1041), discloses "[a] surveillance system includes a device for capturing video, audio, and data information." Boykin at Abstract. "The device is provided in a first location, such as a vehicle." *Id*. "A server is provided for integrating and storing the

captured information in the vehicle." *Id*. "The captured data is stored in onboard hard drives, or other storage facilities, such as flash memory, solid state memory, etc." *Id*. at 1:50-53. "The server may be a mobile server which is capable of transmitting the captured information from the vehicle to a second location, such as a building." *Id*. at Abstract. Boykin discloses that "data is digitally captured and processed from any one or all of the cameras for integration and storage in the mobile server 200 (see FIG. 2) of the CMDIS unit 150." *Id*. at 3:14-17.

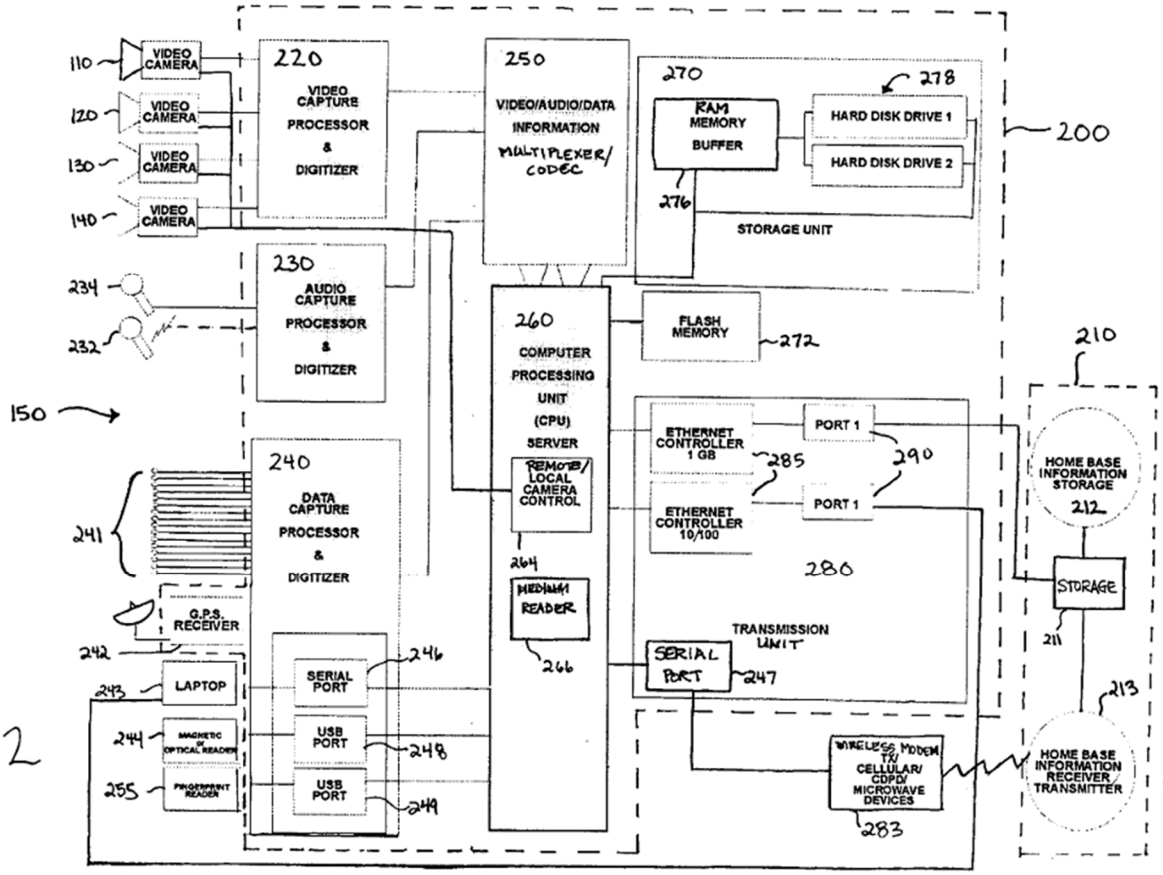


FIG. 2

Id. at Fig. 2.

76. "More specifically, the processor CPU 260 commands the RAM memory buffer 276 to transmit the stored information to the permanent storage memory, e.g.,

the hard drive 278, upon the triggering of a particular event." *Id*. at 5:15-18. "Such an event may include, but is not limited to, the activation of a siren on the police car 100, the removal of a gun from its gun rack, sudden acceleration of the vehicle, etc." *Id*. at 5:18-21. "All of the information which was recorded during the specified time and saved to the RAM memory buffer 276 is then digitally saved to the permanent storage memory, e.g., one of the two onboard hard disk drives 278." *Id*. at 5:21-25. "Thus, the surveillance system records an event, as well as a specified time before the event." *Id*. at 5:25-26. "The present invention is not limited to the use of hard disk drives." *Id*. at 5:38-39. "Solid state memory or other types of non-volatile, non-rotating memory devices may be substituted for the hard disk drives, e.g., flash, etc." *Id*. at 5:39-41. "The invention may utilize any type of memory buffer, or may be a flash memory, etc." *Id*. at 5:43-44.

77. "During recording and playback of the recorded data, digital coding provides tags for future search parameters." *Id*. at 3:7-8. "For instance, searchable identification code may be embedded in the data which is associated with a particular event." *Id*. at 3:9-10. "Thus, the data can be easily retrieved for evidentiary purposes at a later time without necessitating labor intensive searches of the recorded material." *Id*. at 3:11-13.

78. Boykin further discloses that a "serial port 247 can be connected to receiving/transmitting device 283 (one of a variety of wireless modem, cellular, satellite, and microwave devices) that sends radio signals back to the home base or

precinct 210." *Id*. at 4:13-17. For example, "[w]hen the vehicle 100 returns to the home base 210, it is connected via a high-speed, high-capacity Ethernet controller 285 (such as a 3COM 1 GB controller) to the home base server 211 via port 290 and the digitally stored video/audio/ related information (i.e., data stream) is data dumped to a home base master storage repository 212." *Id*. at 6:4-9. "The data can be dumped through copper wire, wireless transmission, fiber optics, laser or other means." *Id*. at 6:9-11. "With current systems, at the end of a shift the officer is required to remove all videotapes and turn them into a storage facility." *Id*. at 8:5-7. "However, with the present invention, the digitally stored material is data dumped via various download devices including wireless transfer, without human contact." *Id* at 8:7-10. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

79. "The Patrol Video Project," LAW and ORDER, July 2004 article (EX1007) describes the Ranger digital video recorder for patrol cars from Sequent. Special Report: The Patrol Video Project at 10-12. "Sequent's system records digital video data onto a dedicated computer and hard drive located in the vehicle's trunk." *Id*. at 10.



Id. at 11.

> They park the cars in their motor pool lot, and a 2.4 GHz Wi-Fi access point (one of three at Riverside PD) senses the presence of the car. The system queries the car's server to see if there is video data to offload, and if the data is present, the files are downloaded wirelessly to an assembly server located in a room adjacent to the motor pool. If the download is interrupted by the car moving out of range again, it just resumes when the car comes back again.
>
> Once the video files have been transferred and verified, the assembly server tells the mobile unit to delete the files from its hard drive.
>
> ---
>
> Sgt. Jim Walters at Riverside PD maintains that the process is smooth and requires no intervention by the officer, and that it has yet to lose any video.

Id. "Sequent is routinely transferring an hour of video from cars to the server, wirelessly, in under five minutes." *Id*. at 12. Therefore, as of at least July 2004, it was

known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

80. Silvemail ’256 and Silvemail ’632, attached as Appendices QQ and RR, respectively (both included in EX1063), likewise disclose wireless transmission of files to a remote memory:

> Moving saved data files from the on-board HCS 300 to an exterior High-capacity storage 970 is accomplished when the mass transit vehicle stops at a facility equipped with a Transitcam Video Management Server (TVMS) and high-capacity storage equipment. This transfer is accomplished in one of two methods; (1) physically removing the on-board HCS 300 from the mass transit vehicle or (2) transmitting the saved data files from the on-board HCS 300 to the TVMS over wired or wireless data communication means.

Silvemail ’256 at [0029]; *see also id.* at [0031].

> The IMVDR communicates stored data files to an external high-capacity storage and retrieval server through wired or wireless communication channels. In wired mode, a user may attach an Ethernet cable to an Ethernet port integrated into the front or rear panel of the IMVDR or, optionally, retrieve the removable on-board high-capacity storage device. If an Ethernet connection is established, data files are transmitted from the on-board high-capacity storage device to the external server, which then saves the files to the high-capacity storage device on the external server. If the removable on-board high-capacity storage device is removed it is then docked with the external server and the files downloaded into the high-capacity storage device on the external server.

> In wireless mode, the IMDVR establishes a network communication path with an external server through the use of an integral wireless modem. Once the wireless communication path is established, data files are transmitted from the on-board high-capacity storage device to the external server, which then saves the files to the high-capacity storage device on the external server.

Silvemail '632 at [0013]. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

6. Contiguously Continuing to Record, Excluding From Overwriting, and Automatically Overwriting If Not Designated For Saving Was Known In The Art

81. Prior to the alleged invention, it was known to contiguously continue to record the sensor data while excluding portions of the data from overwriting, and automatically overwriting the data if not designated for saving. For example, as the patents of the Stellar patent family recognize, it was known to continuously store images in a looping (circular) memory, and upon receiving a trigger signal, protect a portion of the memory. *See e.g.*, '752 patent at 1:35-46. During prosecution of the '034 patent, the application admitted that having "a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory" was known and disclosed by Vanman (WO 6,044,476). '034 File History, Accelerated Examination Support Document at 11-12. Specifically, the Applicant stated that "Vanman teaches a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory." *Id*. at 12.

82. Fiore, U.S. Pub. No. 2002/0191952 (EX1009), discloses that using a single file format has been found to be well-suited for implementing a circular storage buffer and for storing video data. Fiore, [0064]. For example, a single "memory mapped file…has a memory mapped architecture that combines the access speed of the RAM memory with large storage capacity of a disk file." *Id.*, [0065]. "The memory mapped architecture allows the playback from the circular storage buffer to be independent from recording into the buffer so that such recording is uninterrupted by the playback." *Id.* "Because the circular storage buffer is implemented via a memory mapped file 110 which is preferably a single contiguous disk file, reads and writes to adjacent virtual memory locations are insured to be physically adjacent on the disk drive. In this manner, the circular storage buffer cannot become fragmented on the disk drive" *Id.* at [0071].

83. U.S. Pat. No. 6,578,070 ("Weaver"), attached as Appendix DD (included in EX1041), discloses "[a] method and system for storing a continuous feed of video." Weaver at Abstract. "According to one aspect of the invention, the continuous feed is encoded in a digital video format to produce a digital data stream." *Id.* "A series of content files is created by repeatedly performing the steps of (1) storing the digital data stream in a current file, and (2) establishing a new file as the current file when the current file satisfies a predetermined condition." *Id.* "If the series of content files satisfy a particular deletion criteria, then a particular content file that satisfies a particular deletion criteria is deleted." *Id.* "In certain aspects, tag information that indicates information about frames contained in the digital data stream is generated." *Id.* "The

tag information is used to identify a location in the digital data stream that corresponds to the relative time." *Id*. "The digital data stream is then transmitted to the client beginning at the location in the digital data stream that corresponds to the relative time." *Id*.

> In order to have continuous buffer of data, for instance the last 24 hours of Lifetime, Television for Women, older content needs to be deleted along with the corresponding tags. Various approaches may be used to implement such a continuous buffer. With respect to the content data, the simplest approach to implement a continuous buffer is to create a single file large enough to hold 24 hours of footage. The file is then treated as a circular buffer. Specifically, after the creation of the initial 24 hour file, the MDS server 110 would establish the beginning of the file as the current "insertion point". The MDS server 110 would then store new content data over the old data at the insertion point, and move the insertion point to the end of the new data. When the insertion point hits the end of the file, it wraps around again to the beginning of the file.

Id. at 17:9-25.

> FIG. 4 illustrates an alternative, more flexible approach to buffering a predetermined amount of an infinite video feed. Referring to FIG. 4, the content data is stored in a group of smaller files 402-414. Each of the smaller files stores a subset of the buffered content data. In the illustrated embodiment, each of files 402-412 store two hours worth of content. File 414 currently stores one hour of content. The current insertion point is at the end of file 414. When file 414 reaches two hours of content, file 414 will be closed and a new content file will be created. As content files

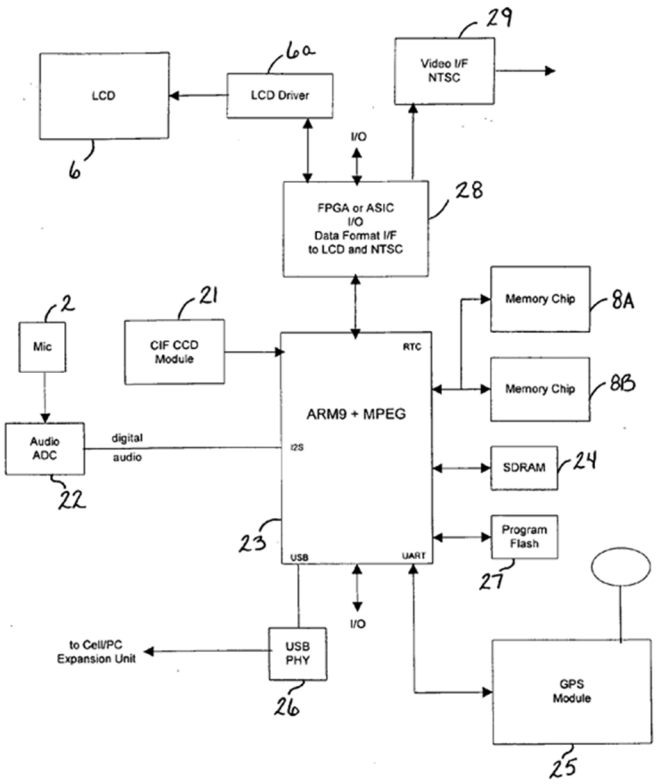
> age, the older content files are deleted to free up disk space for new files. During playback, files are joined together seamlessly by the video pump as the content data is sent to the client.

Id. at 17:37-49. "According to another feature of the invention, a series of content files is created by repeatedly performing the steps of (1) storing the digital data stream in a current file; (2) generating and storing tag information separate from the digital video stream that indicates information about frames contained in the digital data stream; and (3) establishing a new file as the current file when the current file satisfies a predetermined condition. If the series of content files satisfy a particular deletion condition, then a particular content file that satisfies a particular deletion criteria is deleted. *Id*. at 3:40-50. Therefore, it was known to contiguously continue to record the sensor data while excluding portions of the data from overwriting, and automatically overwriting the data if not designated for saving.

84. U.S. Pub. No. 2005/0078195 ("Van Wagner"), attached as Appendix U (included in EX1041), states "[t]he present invention provides an improved method and system for a personal mobile digital recording system (MDRS) to capture activities of, for example, a law enforcement officer." Van Wagner at [0005]. Specifically, "a mobile recording device including: a flexible camera head for capturing video stream data in real time, a microphone for capturing audio data in real time, a circular buffer for continuously storing the video stream data and the audio data; and a wireless

transceiver for transmitting the video and audio data in real time to a remote location." Van Wagner at [0009]; Figs. 2, 4B.

FIG. 2

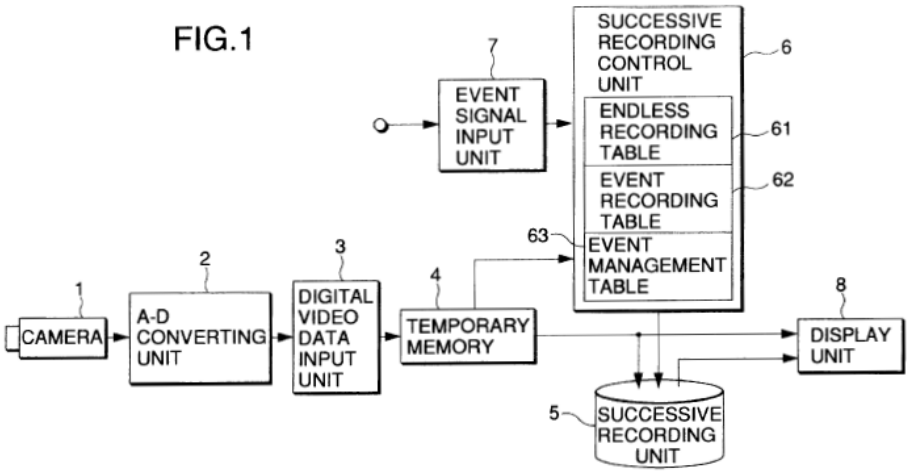


Van Wagner at Fig. 2. "In one embodiment, the single replaceable memory module includes a single image file configured as a circular buffer." *Id*. at [0084]. "The single replaceable memory module is then operated as a circular buffer, in which the video, audio, and other data is being continuously recorded in the single replaceable memory module in a circular manner." *Id*. "In one embodiment, video, audio, date and time, GPS overlay channel, electronic compass bearing channel, and biometric data overlay channel are encoded in an MPEG data stream." *Id*. at [0035]. "The MPEG data stream is written and saved on replaceable memory modules." *Id*. "In one embodiment, the

image files created on the SD memory card are named according to the following format: YYMMDDHHMI.mp4 (YY=Year, MM=Month, DD=Day, HH=Hour, MI=Minute)." *Id*. at [0084]. Therefore, it was known to contiguously continue to record the sensor data, exclude the data from overwriting, and automatically overwriting the data if not designated for saving.

85. U.S. Patent No. 7,158,167 ("Yerazunis") (EX1017) is another example of contiguously continue to record the sensor data while excluding portions of the data from overwriting, and automatically overwriting the data if not designated for saving. I discuss Yerazunis's disclosure in further detail below with respect to the obviousness of the claims of the '901 and '910 patents.

86. U.S. Patent No. 6,167,186 ("Kawasaki") (EX1008) discloses "a video recording device for recording a digitized video image inputted from a camera into a digital storage memory, and more particularly to a video recording device which is capable of retroactively reproducing a video image (event video image) generated when any event occurs while it records a video image monitored in real time." Kawasaki at 1:8-14.



Id. at Fig. 1. Kawasaki's disclosure is further summarized above in Section IV.B.3 above.

87. U.S. Pat. No. US 2007/0071395 A1 ("Boone"), attached as Appendix GG (included in EX1041), discloses a "method for video recording includes producing a first video data by an image sensor in a video recording device, storing the first video data in a temporary memory buffer in the video recording device, selecting at least a portion of the first video data in a semi-permanent data storage, and copying the selected portion of the first video data from the temporary memory buffer to the semi-permanent data storage in the video recording device." Boone at Abstract. "The temporary memory buffer can include a circular buffer that allows the recording system to write the most recent portion of the first video data over the oldest portion of the first video data in the temporary memory buffer. The video recording device can further include a user interface that allows a user to select at least a portion of the first video data to be copied to the semi-permanent data storage. The temporary memory buffer can include

a data pointer configured to indicate the current recording location in which the next video data is to be written in the temporary memory buffer." *Id.* at [007]. "The disclosed system and methods include the following advantages. The disclosed system and methods allow a photographer to not miss scenes or moments worth recording. The disclosed system and methods provide a video camcorder a novel 'temporary recording mode' in addition to the conventional 'idle mode' and 'record mode.' The 'temporary recording mode' allows scenes to be continually recorded in a temporary memory buffer without storing the video data in semi-permanent data storage on the camcorder. The disclosed system and methods allow historical scenes captured in the 'temporary recording mode' to be reviewed by the photographer. The photographer can make decision after the recording of the scenes whether the recorded video data is worth storing on the semi-permanent data storage such as a magnetic tape, DVD-R, CD-R. Only noteworthy scenes can be selectively recorded in the semi-permanent data storage while uninteresting scenes can be discarded. The disclosed system and methods allow interesting scenes to be recorded without filling up the memories in the video recording system with uninteresting video data. The disclosed system and methods are compatible with a variety of digital camcorders including those that use the MiniDV format as well as HD." *Id.* at [0008]. Therefore, it was known to contiguously continue to record the sensor data while excluding portions of the data from overwriting, and automatically overwriting the data if not designated for saving.

88. U.S. Pat. No. US 6,421,080 ("Lambert"), attached as Appendix J (included in EX1041), discloses an "image recording System and method for use with a surveillance system having at least two cameras provides true pre-event recording for multiple input sources to improve video on demand storage control. More specifically, an image recording subsystem is connected to the cameras for receiving generated video images, and storing the received images in a temporary Storage device having a Storage capacity large enough to store video images generated over a predetermined period of time. The image recording subsystem is arranged to continuously record video images into the temporary storage device such as a cache memory, and in response to the occurrence of a triggering event, subsequently record the temporarily stored video images into a long-term storage device for later retrieval. The image recording system is arranged to determine the occurrence of overlapping triggering events, and automatically "rewind" the sequential long term storage process so that any images associated with an earlier triggering event but occurring in time after a later triggering event that have already been stored to long term storage are properly reordered to occur after any earlier occurring images associated with the later triggering event." Lambert at ABSTRACT. Therefore, it was known to contiguously continue to record the sensor data while excluding portions of the data from overwriting, and automatically overwriting the data if not designated for saving.

89. US Pub. No. US 2007/0132773 A1 ("Plante 2"), attached as Appendix HH (included in EX1041), discloses "vehicle event recorder systems are arranged with three

stage memories and special mechanism to manage those memories including transfer of data there between. Namely, a managed loop memory receives data from a video camera in real-time and continuously overwrites expired data implicitly determined no longer useful. Data in a managed loop memory is only passed to a more stable memory, a high capacity buffer memory, in response to an event having occurred. An event trigger produces a signal, which causes data transfer between the managed loop memory and an on-board, high-capacity buffer memory. The high-capacity buffer memory is suitable for storing video series associated with a plurality of events. Finally, a permanent data store is arranged to receive data from the high-capacity buffer memory whenever the system returns and falls within a predetermined proximity of a download station." Plante 2 at Abstract.

90. "Unlike common video systems arranged to capture continuous video, vehicle recorder systems are primarily designed to capture certain particular events occurring over very short time periods. For example, in vehicle recorder systems, it is not useful to produce a continuous video record of scenes and events around the vehicle throughout its service day. Rather, only particular events associated with certain vehicle use are of interest. For example, those events associated with vehicle abuse. Further, traffic accidents and other forms of vehicle misuse yield occasions where it is desirable to have a brief video record of the circumstance(s) which led to and resulted from such misuse or accident. Thus the video recorder systems of this disclosure are characterized in that they are intended to capture short video sequences rather than video sequences

over extended period of time. This detail has direct implications with regard to choice of memory arrangements. In this case, it is useful to arrange a first memory in a managed loop configuration whereby video is collected in real-time but constantly overwritten with later captured video data. Only when an important event occurs is data preserved by transfer to a high capacity buffer memory." *Id*. at [0039].

91. "As it is desirable in a vehicle recorder system that devices be very small and compact in size, certain memories which cannot be easily implemented as compact systems are not appropriate for vehicle event recorders. In example, large disk drive arrays, which have huge capacity and great redundancy, are memory systems not appropriate for these vehicle event recorder systems. However, memory systems commonly know as 'flash' type memory are highly useful. A flash type memory can be useful to hold video data associated with a plurality of discrete video events. Thus in preferred versions, a flash type memory buffer is coupled to managed loop memory such that each time an event occurs, data in managed loop memory is transferred to the flash memory. Flash memory having a high-capacity is operable for storing video data associated with many events." *Id.* at [0040]. "Finally, attention is directed to the nature of communications connectivity associated with a vehicle which includes computing systems. Since vehicles are not readily suited to be plugged into wired computer network systems, it is useful to implement special consideration when configuring a memory strategy for vehicle event recorders. Thus, an on-board memory may have a special relationship with a remote network memory. These two memories may be

coupled to each other only at specific times, for example, when a vehicle has returned to a download station." *Id.* at [0041]. "With reference to FIG. 2, a traffic accident between two automobiles car 21 and car 22 equipped with a vehicle event recorder system 24 having accelerometers 25 arranged as an event trigger. When a collision 23 occurs, the accelerometer initiates a data transfer between managed loop memory and a buffer memory to preserve video data collected immediately before and after the traffic accident. In similar fashion, car 26 equipped with a vehicle event recorder and accelerometer type event trigger illustrates that video of single vehicle accidents are captured as well." *Id.* at [0049]. Therefore, it was known to contiguously continue to record the sensor data while excluding portions of the data from overwriting, and automatically overwriting the data if not designated for saving.

7. A Pair of Eyeglasses Having a Sensor that Captures Senor Data Was Known in the Art

92. Cameras mounted on eyeglasses were known in the art as of the claimed priority date of the '901 and '910 patents. A POSITA at that time understood that mounting a camera to eyeglasses provided a recording of the field of view of the wearer while allowing hands-free operation. *See*, *e.g.*, EP 1064783 (EX1015) at [0014]. As another example, U.S. 4,516,157 ("Campbell") (EX1059), issued on May 7, 1985, disclosed a camera mounted on a pair of spectacles for video recording, including "in the security and military fields where concealment is sometimes desirable":

> A video recording device is arranged to be worn by the user like a pair of spectacles. In the recording mode, the scene in front of the user is recorded on a miniature television camera mounted on the spectacle frame (or two cameras if the recording is to be used for 3-D viewing). The miniature camera or cameras may be concealed within the spectacle frame, and allows the user to view the scene normally, and also to examine a view finder showing the portion of the scene available to the television camera. This enables the user to perform hands free photography and provides almost instantaneous recording of a scene as the act of looking at the scene points the camera and the view finder towards that portion of the scene to be captured. The device can be used to record moving pictures or still pictures as in an electronic still camera.

Campbell at Abstract; *see also id.*, 2:47-51, 3:49-59, 4:42-55, 5:1-55, 6:3-20, Figs. 1, 2, 6. I discuss Campbell's disclosure in further detail below with respect to the obviousness of the claims of the '901 patent.

93. Also in the security or law enforcement context, U.S. Patent No. 6,624,611 ("Kirmuss"), attached as Appendix PP (included in EX1052), disclosed a "wireless camera" that could be "patently or covertly mounted on the officer" in a law enforcement situation:

> A second microphone 340 is carried by the patrolman 302 in FIG. 3B to receive, transmit 342, and record any conversations that the officer has outside a vehicle. Optionally, a wireless camera 350 is patently or covertly mounted on the officer or carried as a hand-held unit designed

to document a crime scene. The wireless unit transmits two or more real-time video signals 352 back to system 200 located in the patrol car.

Id. at 23:9-17.

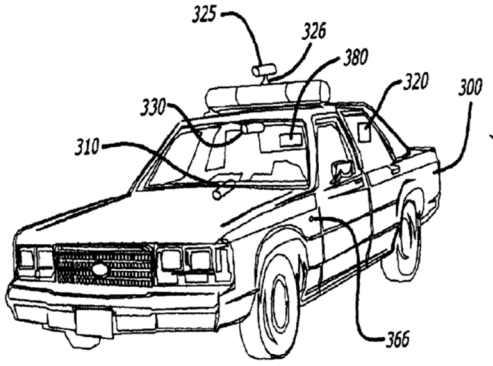


FIG. 3A

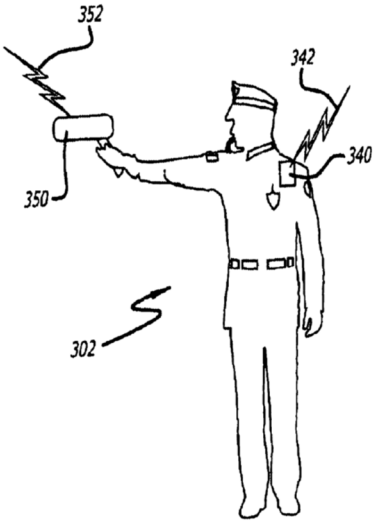


FIG. 3B

Id. at Figs. 3A, 3B.

Mobile Scene "Photography". To aid the scene investigations of accidents, hazardous materials spills, and the like, an embodiment of the present invention is used to replace unauthenticated JPEG still digital video cameras, allowing the device to act as a remote authenticated digital video storage device. To accomplish this, a wireless video transmitter is connected to a portable DC camera. Whether connected with or without a small LCD monitor, this embodiment links a wireless camera with optional audio to transmit video and/or audio signals up to 800 feet or more back to the housing installed in a vehicle or base station. Recorded live video scenes may be played back, and authenticated video

> stills may be then reproduced for distribution, whether in the field or at a main data collection station. To ensure that the video and/or audio data has been successfully received at the recorder location, the received video/audio data (or a hash thereof) may be sent back to the remote transmission device.

Id. at 27:21-38. Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

94. The '901 patent specification admits that eyeglasses cameras were already known in the art: "EP 1064783 to Mann describes a camera mountable to a pair of eyeglasses that continuously saves recorded images to a circular buffer in a computer on the user's waist. Mann also discusses streaming the images directly to a wireless memory that may have a larger capacity; however, this means that the camera does not work in the absence of a wireless connection." '901 patent at 2:1-9. Indeed, Mann (EX1015) discloses the following:

> It is an object of this invention to provide a method of positioning a camera in which both hands may be left free.
>
> It is a further object of this invention to provide a means of exposing a film or acquiring a picture electronically where the spatial extent (field of view) of the image may be ascertained without having to hold any device up to the eye.
>
> What is described is a wearable camera and viewfinder for capturing video of exceptionally high compositional and artistic caliber. In addition to the fact that covert versions of the apparatus can be used to

create investigative documentary videos having very good composition, for everyday usage the device need not necessarily be covert. In fact, it may be manufactured as a fashionable device that serves as both a visible crime deterrent, as well as a self-explanatory (through its overt obviousness) tool for documentary videomakers and photojournalists.

Another feature of the invention is that the wearable camera has a viewfinder such that the image may be presented in a natural manner suitable for long-term usage patterns.

There are several reasons why it might be desired to wear the camera over a sustained period of time:

1. There is the notion of a personal visual diary of sorts.

2. There is the idea of being always ready. By constantly recording into a circular buffer, a retroactive record function, such as a button that instructs the device to "begin recording from five minutes ago" may be useful in personal safety (crime reduction) as well as in ordinary everyday usage, such as capturing a baby's first steps on video. With the prior art in photography and video, we spend so much time preparing the camera and searching for film, batteries, etc., or at the very least, just getting the camera out of its carrying case, that we often miss important moments like a baby's first steps, or a spontaneous facial expression during the opening of a gift.

3. There is the fact that the wearable camera system, after being worn for a long period of time, begins to behave as a true extension of the wearer's mind and body. As a result, the composition of video shot with the device is often impeccable without even the need for conscious

> thought or effort on the part of the user. Also, one can engage in other activities, and one is able to record the experience without the need to be encumbered by a camera, or even the need to remain aware, at a conscious level, of the camera's (*sic*)existance. This lack of the need for conscious thought or effort suggests a new genre of documentary video characterized by long-term psychophysical adaptation to the device. The result is a very natural first-person perspective documentary, whose artistic style is very much as if a recording could be made from a video tap of the optic nerve of the eye itself. Events that may be so recorded include involvement in activities such as horseback riding, climbing up a rope, or the like, that cannot normally be well recorded from a first-person perspective using cameras of the prior art. Moreover, a very natural first-person perspective genre of video results. For example, while wearing an embodiment of the invention, it is possible to look through the eyepiece of a telescope or microscope and record this experience, including the approach toward the eyepiece. The experience is recorded, from the perspective of the participant.

Id. at 4:7-5:21.

> One aspect of the invention allows a photographer or videographer to wear the apparatus continuously and therefore always end up with the ability to produce a picture from something that was seen a couple of minutes ago. This may be useful to everyone in the sense that we may not want to miss a great photo opportunity, and often great photo opportunities only become known to us after we have had time to think about something we previously saw.

Id. at 9:23-31.

FIG. 1 is a diagram of a simple embodiment of the invention in which there are two cameras, a wide-angle camera concealed in the nose bridge of a pair of sunglasses, a tele-camera concealed in the top part of the frame of the sunglasses, and combined by way of a beamsplitter with the wide-camera, as well as a viewfinder means concealed in the left temple side-piece of the glasses with optics concealed in or behind the glass of the left lens.

Id. at 11:28-36.

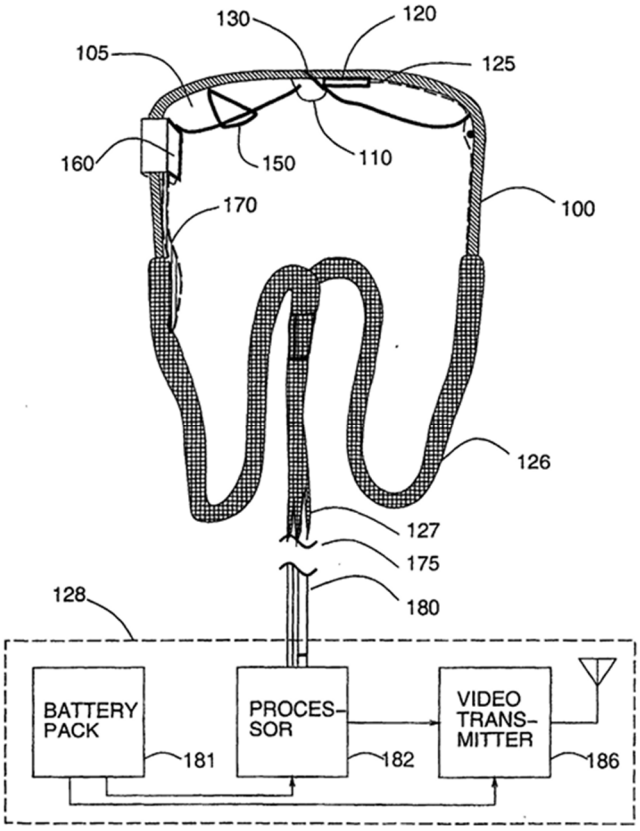


FIG. 1 – FOVEATED EMBODIMENT OF WEARABLE CAMERA SYSTEM

Id. at Fig. 1.

The term "headgear" shall include helmets, baseball caps, eyeglasses, and any other means of affixing an object to the head, and shall also

include implants, whether these implants be apparatus imbedded inside the skull, inserted into the back of the brain, or simply attached to the outside of the head by way of registration pins implanted into the skull. Thus "headgear" refers to any object on, around, upon, or in the head, in whole or in part.

Id. at 13:43-51.

FIG. 1 shows an embodiment of the invention built into eyeglass frames 100, typically containing two eyeglass lenses 105. An electronic wide-angle camera 110 is typically concealed within the nose bridge of the eyeglass frames 100. In what follows, the wide-angle camera 110 may be simply referred to as the "wide-camera". or as "wide-angle camera". In this embodiment of the wearable camera, a second camera, 120, is also concealed in the eyeglass frames 100. This second camera is one which has been fitted with a lens of longer focal length, and will be referred to as a "narrow-angle camera", or simply a "narrow-camera" in what follows. The wide-camera 110 faces forward looking through a beamsplitter 130. The narrow-camera 120 faces sideways looking through the beamsplitter. For clarity, the beamsplitter 130 and camera 110 are shown separated in FIG. 1a, while in actual construction, the beamsplitter is cemented between the two cameras as shown in FIG. 1. The beamsplitter 130 is typically mounted at a 45 degree angle, and the optical axes of the two cameras are typically at 90 degree angles to each other. The optical axes of the two cameras should intersect and thus share a common viewpoint. Thus the narrow camera 120 may have exactly the same field of view as the wide-camera 110. Typically eyeglasses with black frames are selected, and a CCI) sensor array for wide-camera 110

is concealed in a cavity which is also used as a nose bridge support, so that the eyeglasses have a normal appearance. Typically, the body of the wide-camera is formed from epoxy, which sets it permanently in good register with the beamsplitter and the narrow-camera 120. During setting of the epoxy, the cameras are manipulated into an exact position, to ensure exact collinearity of the two effective optical axes. The wide-camera 110 is typically fitted with a lens having a diameter of approximately {fraction (1/32)} inch (less than one millimeter) —small enough that it cannot be easily seen by someone at close conversational distance to the person wearing the eyeglasses. The narrow-camera 120 is typically concealed in the upper portion of the eyeglass frames. The narrow-camera 120 is preferably custom-made, like the wide-camera, by encapsulating a CCD sensor array, or the like, in an epoxy housing together with the appropriate lens, so that cameras 110 and 120 are both bonded to beamsplitter 130, and all three are in turn bonded to the eyeglass frame. A satisfactory narrow-camera, for use in small-production runs of the invention (where it is difficult to construct the housing from epoxy) is an Elmo QN42H camera, owing to its long and very slender (7 mm diameter) construction. In mass-production, a custom-made narrow-camera could be built directly into the eyeglass frames. Since the narrow-camera 120 is typically built into the top of the eyeglass frames, the wide-camera 110 should also be mounted near the top of the frames, so the two optical axes can be made to intersect at right angles, making the effective optical axes (e.g. that of camera 120 as reflected in beamsplitter 130) collinear.

Id. at 13:56-14:55.

Preferably, a complete camera system providing NTSC video is not installed directly in the eyeglasses. Instead, wires 125 from the camera sensor arrays are concealed inside the eyeglass frames and run inside a hollow eyeglass safety strap 126, such as the safety strap that is sold under the traders "Croakies". Eyeglass safety strap 126 typically extends to a long cloth-wrapped cable harness 180 and, when worn inside a shirt, has the appearance of an ordinary eyeglass safety strap, which ordinarily would hang down into the back of the wearer's shirt. Wires 125 are run down to a belt pack or to a body-worn pack 128, often comprising a computer as part of processor 182, powered by battery pack 181 which also powers the portions of the camera and display system located in the headgear. The processor 182, if it includes a computer, preferably contains also a nonvolatile storage device or network connection. Alternatively, or in addition to the connection to processor 182, there is often another kind of recording device, or connection to a transmitting device 186. The transmitter 186, if present, is typically powered by the same battery pack 181 that powers the processor. In some embodiments, a minimal amount of circuitry may be concealed in the eyeglass frames so that the wires 125 may be driven with a buffered signal in order to reduce signal loss.

Id. at 14:56-15:34.

Suppose the wearer is in a department store and, after picking up a $7 item for purchase, the wearer approaches the cashier, hands the cashier a $20 dollar bill, but only receives change for a $10 bill (e.g. only receives $3 change from $20). Upon realizing this fact a minute or so later, the wearer locates a fresh available, (e.g. one that has no programs running

in it so that it can accept commands) xterm 196…. Recording is typically retroactive, in the sense that the wearable camera system, by default, always records into a 5 minute circular buffer, so that pressing "d" begins recording starting from 5 minutes ago, e.g. starting from 5 minutes before "d" is pressed. This means that if the wearer presses "d" within a couple of minutes of realizing that the cashier short-changed the wearer, then the transaction will have been (*sic*)sucessfully recorded. The customer can then see hack into the past 5 minutes, and can assert with confidence (through perfect photogiaphic/videographic memory Recall, e.g. by pressing "r") to the cashier that a $20 bill was given. The extra degree of personal confidence afforded by the invention typically makes it unnecessary to actually present the video record (e.g. to a supervisor) in order to correct the situation. Of course. if there was a belief that the cashier was dishonest, the customer could file a report or notify authorities while at the same time submitting the recording as evidence. Typically the recording is also transmitted by way of transmitter 186 so that the cashier or other representatives of the department store (such as a department store security guard who might be a close personal friend of the cashier) cannot (*sic*)sieze and destroy the storage medium upon which the recording was made.

Id. at 18:5-19:17.

The apparatus of this invention allows the wearer to experience the camera over a long period of time. For example, after wearing the apparatus sixteen hours per day for several weeks, it begins to function as a true extension of the mind and body. In this way, photographic composition is much more optimal, because the act of taking pictures or

> shooting video no longer requires conscious thought or effort. Moreover, the intentionally of the picture-taking process is not evident to others, because picture-taking is not (*sic*)preceeded by a gesture such as holding a viewfinder object up to the eye. The wearable viewfinder is an important element of the wearable camera invention allowing the wearer to experience everyday life through a screen, and therefore be always ready to capture anything that might happen, or even anything that might have happened previously by virtue of the retroactive record capability of the invention. Moreover, additional information beyond just exposure and shutter speed may be displayed in the camera viewfinder. For example., the camera allows the wearer to augment, diminish, or otherwise alter his or her perception of visual reality. This mediated-reality experience may be shared. The wearer may allow others to alter his or her perception of reality. In this way the invention is useful as a new communications medium, in the context of collaborative photography, collaborative videography, and telepresence. Moreover, the invention may perform other useful tasks such as functioning as a personal safety device arid crime deterrent by virtue of its ability to maintain a video dairy transmitted and recorded at multiple remote locations. As a tool for photojournalists and reporters, the invention has clear advantages over other competing technologies.

Id. at 32:49-33:23. Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

95. U.S. Patent No. 6,614,408 ("Mann '408"), attached as Appendix SS (included in EX1063), further disclosed: "Typically embodiments of the invention

allow a photojournalist to wear the apparatus continuously and therefore always end up with the ability to produce a picture from something that was seen a couple of minutes ago, through a retroactive record function into a circular buffer." Mann '408 at 5:56-61. "For example, a 'begin recording from 5 minutes ago' button works well if the apparatus is always worn and always ready." *Id*. at 5:61-63.

> The acquisition, storage, or transmission of images may also be governed by attributes of eye 200. For example, when the pupil of eye 200 is dilated more than it would normally be for a given light level, pictures can be taken more rapidly, or picture capture can be initiated when none would normally be initiated, or a circular buffer can be stopped, dumped to storage, or transmitted.

Id. at 12:50-56. Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

96. Additionally, a published article in 1998 by Steve Mann, "'WearCam' (The wearable camera): personal imaging systems for long-term use in wearable tetherless computer-mediated reality and personal photo/videographic memory prosthesis," from the Digest of Papers, Second International Symposium on Wearable Computers (Cat. No. 98EX215) IEEE, attached as Appendix TT (included in EX1063), disclosed:

> 1.1 Always ready. There are various reasons why it might be desired to wear a personal imaging system over a sustained period of time:
>
> ***

2. There is the very simple capability of being always ready to take a picture. By constantly recording into a circular buffer, a retroactive record function, such as a button that instructs the device to "begin recording from five minutes ago" may be useful in personal safety (crime reduction) as well as in ordinary everyday usage, such as capturing a baby's first steps on video. With other prior methods in photography and video, we spend so much time preparing the camera and searching for film, batteries, etc., or at the very least, just getting the camera out of its carrying case, that we often miss important moments like a baby's first steps, or a spontaneous facial expression during the opening of a gift.

***

It is the author's view that such an apparatus is of most benefit when it is worn over a long period of time, so that, as a computational framework, it leads to a constancy of user–interface. In order for there to be widespread acceptance of this apparatus, it should have the appearance of ordinary eyewear. Thus the components of the system should be concealed within ordinary eyewear, or concealable by the clothing and hair of a typical user. Thus the apparatus may take the form of ordinary eyeglasses or ordinary sunglasses. Dark or mirrored sunglasses may also help conceal intricate and sophisticated imaging and display systems.

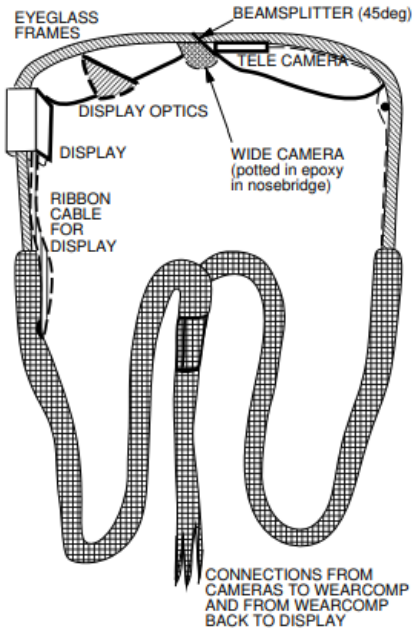


Figure 1: Early covert personal imaging system with foveated camera comprising a wide–camera potted in epoxy, concealed in the nosebridge of the glasses, and a tele–camera aimed at right angles to the optical axis of the wide–camera. A beam splitter provided a unified center of projection. The wide–camera was in landscape orientation and used by the wearable computer for head–tracking, while the tele–camera was in portrait orientation, and presented on the viewfinder visible to the left eye.

Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

97. Additionally, U.S. 2004/0033058 ("Reich") (EX1029) disclosed a video camera to be attached to a pair of glasses, including for law enforcement or security applications:

> [0003] Today's society has become increasingly video-oriented. Video equipment finds numerous applications in security, law enforcement, legal proceedings, news reporting, scientific studies, entertainment, family videos and the like. Despite the ubiquity of video equipment, there are often instances when an event occurs that is not captured by video simply because the equipment was not set up in the right position, was not ready to record or simply was not present. Many priceless

opportunities to record important or interesting events are thus missed and never to be seen on video.

[0007] The above and other problems of the prior art are overcome in accordance with the present invention which relates to a device, system and method that monitors images and sounds and permits capture of unrecorded events for a particular period of time, such as the last 0-30 seconds or more “seen” by the camera, and is able to record that video to a removable media.

[0008] In one embodiment the device automatically switches from a monitoring mode, wherein the last 30 seconds or so “seen” by the camera can be and is captured to memory, to a direct real time record mode if no further action is taken by the user, e.g., the “stop” button is pressed. In a preferred embodiment the device is adaptable to be attached to headgear such as but not limited to a pair of glasses or the bill of a cap and transmits the video to a remote device such as a hip pack where the video is recorded. In a preferred embodiment an LCD screen is incorporated in the remote device and continuous recording capability to a compact flash card is provided.

[0009] In a preferred embodiment a digital camera is employed and a wireless connection is provided.

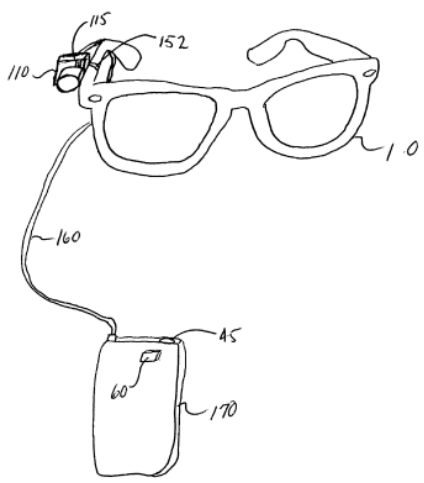


FIG. 5

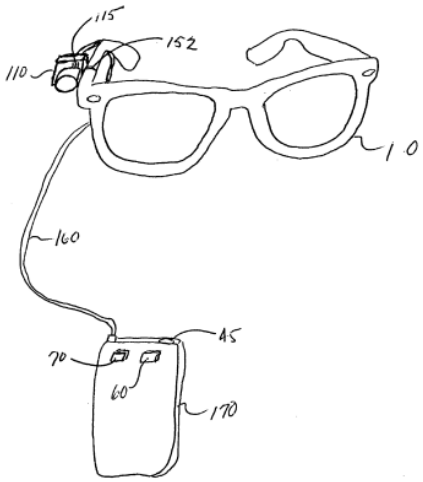


FIG. 6

[0025] In a most preferred embodiment a device according to the present invention is provided that automatically switches from a monitoring mode wherein the last 30 seconds or so "seen" or monitored by the camera can be and is captured to memory, to a direct real time record mode if no further action is taken by the user, e.g., a "stop" button is pressed. When activated, the proprietary software enables the camera to continuously monitor what the camera wearer is seeing. In order to permanently record audio and video, the user presses a record button and triggers the software to save the previous 30 seconds of monitored video and audio to flash memory. If no stop command is given the camera can continue recording in real time.

[0026] Now referring to FIG. 4, an algorithm performed in accordance with this embodiment is preferably as follows:

[0027] The device is turned on in block 281 and the record count is read from flash memory. The logic then determines in block 282 whether

mode=100 30 second clips; if yes, then the frame count is set to zero in block 271 and the logic proceeds accordingly as Set forth hereinabove with respect to FIG. 3 until block 279 is reached, after which the logic set forth in FIG. 4 applies as set forth below. If not, the logic determines whether the record button is pushed in block 283; if the record button is not pushed the logic continues to examine whether the record button is pushed. If the record button is pushed, a frame is obtained from the camera in block 284. The frame is compressed in block 285 and in block 286 the steps of incrementing the frame counter and writing the frame to flash memory at frame counter +1 are carried out. The logic then determines whether the stop button is set in block 287. If the stop button is set, the logic then determines in block 282 whether mode=100 30 second clips and the algorithm proceeds accordingly. If the stop button is not set, the logic proceeds to block 284 and proceeds accordingly.

[0028] If the record count in block 279 equals 900 the logic determines in block 287 whether the stop button is set. If not, a frame is obtained from the camera in bock 284, the frame is compressed in block 285 and in block 286 the steps of incrementing the frame counter and writing the frame to flash memory at frame counter +1 are carried out. The logic then determines whether the stop button is set in block 287.

[0029] Now referring to FIG. 5 in a preferred embodiment device 2 comprises camera 110 mounted on glasses 150 by attachment means such as but not limited to clip 152 (or to other means such as a cap, hap, hair clip, comb or the like, to be near the eyes of a user to most advantageously permit the device to “see” what it is the user sees) connected via cable 160 to remote unit 170. Camera 110 further

comprises microphone 115. Remote unit 170 may comprise an attachment means (not shown) such as a clip for attachment to a belt loop, shirt pocket, backpack or the like. In a preferred embodiment device 2 captures the last 0-30-second or more of what the user of the device 2 just viewed and heard when user presses the appropriate button 60 on the remote unit 170. Device 2 can record multiple 30 second captures based upon the size of the external flash memory 120. In a preferred embodiment the video stored on the removable media is in a format that can be viewed and heard via media players such as Windows Media Player or Real One Media Player. The device in a preferred embodiment provides video quality minimum of 30 frames per second; video quality meets CIF standards with frames at 320×240 pixels. Audio is preferably mono. In a further embodiment device 2 further comprises an indicator light 45 to inform the user when there is insufficient storage left on the compact flash card to store another 0-30-second or more image.

[0030] Camera 110 may take any form and may be adapted to be permanently attached to headgear. In addition, camera 110 and remote device may comprise a unitary device 170 that may be attached to any headgear including but not limited to glasses 150.

[0031] Now referring to FIG. 6 in a most preferred embodiment device 2 comprises camera 110 mounted on glasses 150 connected to remote unit 170 via cable 160. Device 2 comprises record button 60 that when activated causes device 2 to capture the last 0-30-second or more of what the user of the device 2 just viewed and heard. Device 2 further comprises mode button 70. Device 2 is adapted to automatically switch from a monitoring mode wherein the last 30 seconds or so monitored by the

> camera can be and is captured to memory, to a direct real time record mode if no further action is taken by the user, e.g., mode button 70 is activated. When activated, the proprietary software according to FIG. 4 hereinabove enables the camera to continuously monitor what the camera wearer is seeing. In order to permanently record audio and video, the user activates record button 60 and triggers the software to save the previous 30 seconds of monitored video and audio to flash memory. If mode button 70 is not activated, no stop command is given and the camera continues recording in real time. The invention is preferably adapted to store at least 100 clips of video and audio. In a most preferred embodiment the recording function of the camera is disabled while the camera is capturing and compressing the previous 30 seconds.

Id.; *see also* U.S. Provisional Application Nos. 60/403,553; 60/409,236; 60/461,674; and 60/474,269, attached as Appendices VV-YY, respectively, all of which are included in EX1063. Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

98. An article published in October 2004 described another camera wearable on eyeglasses, referred to as the Deja View Camwear 100. CARPE '04: Proceedings of the 1st ACM Workshop on Continuous Archival and Retrieval of Personal Experiences, pages 110-111, published October 15, 2004, New York, New York, ACM Press, attached as Appendix ZZ (included in EX1063). The article described:

5. Product Audience

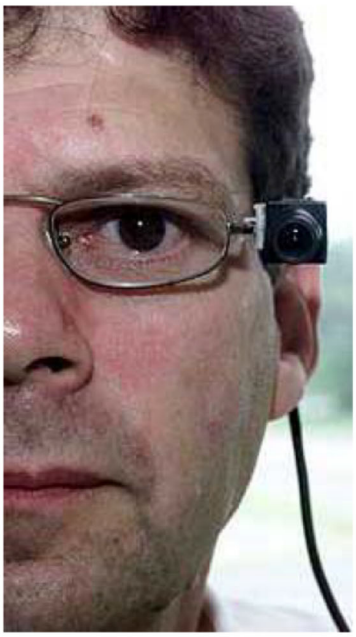
The Camwear 100 with its "after-the-fact" technology is ideally suited to a variety of applications, including recreation and leisure, travel and tourism, business, education, government, military, law enforcement, medical research and many others where it is important to keep visual documentation of activity. Aimed primarily at the consumer, the product's typical usage would be by parents attempting to capture the precious moments of their son or daughter at such milestone events as school promotions and graduations, Little League or other sports action, weddings, etc.

6. Pricing

The Camwear Model 100 is priced at $399.99 MSRP

7. Distribution

The Camwear 100 will be available through the Deja View website at www.mydejaview.com , and through a network of consumer electronics chain stores, camera stores and major online resellers.







Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

99. Another published article from the same CARPE proceedings published in October 2004 described a personal video recording system mounted on a pair of glasses called "ECSGlasses." Augmenting and Sharing Memory with eyeBlog, CARPE '04: Proceedings of the 1st ACM Workshop on Continuous Archival and Retrieval of Personal Experiences, pages 105-109, published October 15, 2004, New

York, New York, ACM Press ("ESCGlasses"), attached as Appendix AAA (included in EX1063). The article describes:

> eyeBlog is an automatic personal video recording and publishing system. It consists of ECSGlasses [1], which are a pair of glasses augmented with a wireless eye contact and glyph sensing camera, and a web application that visualizes the video from the ECSGlasses camera as chronologically delineated blog entries. The blog format allows for easy annotation, grading, cataloging and searching of video segments by the wearer or anyone else with internet access. eyeBlog reduces the editing effort of video bloggers by recording video only when something of interest is registered by the camera. Interest is determined by a combination of independent methods. For example, recording can automatically be triggered upon detection of eye contact towards the wearer of the glasses, allowing all face-to-face interactions to be recorded. Recording can also be triggered by the detection of image patterns such as glyphs in the frame of the camera. This allows the wearer to record their interactions with any object that has an associated unique marker. Finally, by pressing a button the user can manually initiate recording.

ESCGlasses at pg. 105.

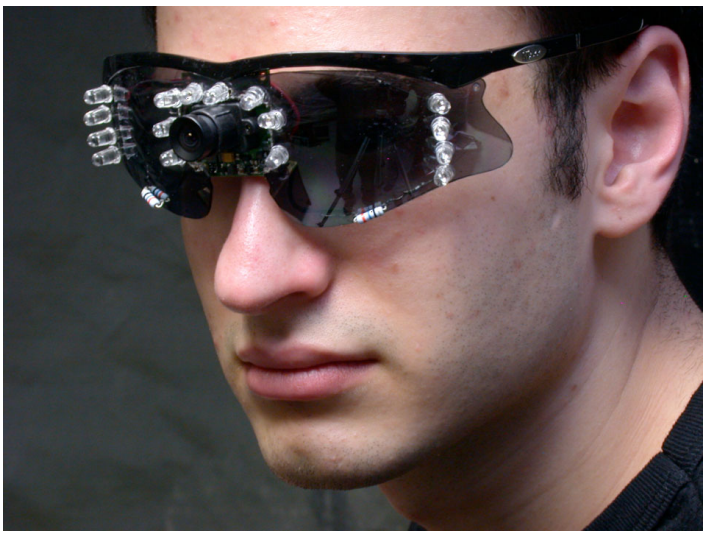


Figure 2. ECSGlasses: camera with LED illuminators.

EyeTap [6] is an illustration of a device that satisfies these properties. EyeTap are a pair of glasses that allow the user to continuously capture and record information. To record, the device employs a circular buffer system such that the last 10 minutes of video is retained. This enables the user to review the last 10 minutes of their life, allowing them to manually save the most memorable moments throughout the day.

By mounting the camera on a glasses-like headset Mann's EyeTap avoids visible parallax. This allows video to be recorded from a first-person perspective while an associated wearable computer streams video content to the web.

ECSGlasses are a novel wearable camera system that allows a user to record video from a first person perspective upon detection of eye contact at the wearer. This allows the wearer to pay attention to the event at hand, rather than the device being used to record it. The associated recording software, running on a remote computer, uses the information from the ECSGlasses to start and stop recording. Recorded video segments are

> then appropriately compressed and filed for web publishing. Publishing is handled by an Apache web server and a modified installation of the Moveable Type blogging software and a proprietary Perl script called eyeBlogScript. This allows anyone with Internet access to annotate, grade, catalogue and search the video blog archive.
>
> ECSGlasses
>
> Eye-Contact Sensing (ECS) Glasses are a novel type of wearable input device for detecting the looking behavior of other people without any discernible parallax [1]. They are also capable of recognizing other image patterns such as glyphs. ECSGlasses consist of a standard pair of sunglasses, augmented with an eye-contact sensing camera[1]. We have developed both clear and dark glass versions, the latter is shown in figure 2.

Id. at pg. 106. Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

100. U.S. Patent No. 8,482,488 ("Jannard"), attached as Appendix BBB (included in EX1063), filed December 22, 2004, published June 22, 2006, and assigned to Oakley, disclosed "electronically enabled eyeglasses" including " a camera for recording video for playback:

> In general, the data input management system in accordance with the present invention enables the user to select one or more data sources to be placed either simultaneously or one at a time into electrical communication with a single user interface. The interface may comprise

any of a variety of physical forms, including electronically enabled eyeglasses.

Jannard at 1:65-2:3.

In further embodiments, the source electronics may include a video source, or an audio/video source. For example, in one embodiment, the source includes a camera for real time viewing of a remote location or viewing direction, or a video playback device such as a DVD or VCR or solid state video storage device.

Id. at 24:63-25:1.

In one embodiment, the wearable electronic interface 601 is electronically enabled eyewear including audio, video or audio-video interface capabilities such as described in greater detail elsewhere herein. However, wearable electronic interface 601 may be any wearable device, and may be in the form of any wearable support structure, including a wristwatch, armband, jewelry, headwear and clothing. Examples of such wearable electronic interface 601 clothing include head phones, earphones, a hat, helmet, goggles, mask, visor, head band, hair band, shirt, scarf, sweater, jacket, belt, pants, vest, etc.

Id. at 25:38-48.

The video input 618 of the wearable electronic interface 601 includes any device suitable for converting an image, or visual information into an electronic signal that can be processed or carried by the wearable electronic interface 601. For example, in one embodiment, the video input 618 includes a camera, a still camera, or a video camera. See generally U.S. Pat. No. 6,349,001 to Spitzer, entitled Eyeglass Interface

System, the disclosure of which is incorporated in its entirety herein by reference.

Id. at 26:62-27:3. Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

101. U.S. Patent No. 6,563,532 ("Strub") (EX1046) disclosed a camera located "on the side of a pair of eyeglasses":

> The invention enables "low attention recording," i.e., recording that need not appreciably affect interaction of a recorder (i.e., a person in control of a recording unit according to the invention) or others with the environment in which the recording is taking place. The low attention recording enabled by the invention can be particularly advantageously employed in "social recording," i.e., recording in which multiple participants in an event are recording the event. As described in more detail below, advantageous aspects of the invention can be provided by a small, lightweight, wearable recording unit. In particular, a recording unit according to the invention is particularly adapted to enable use of the recording unit to record an event during which the recorder engages in vigorous physical activity (e.g., an athletic activity, such as hiking, snow skiing or ping pong). The recording unit is constructed with a particular emphasis on the wearability characteristics of the recording unit, in order to facilitate freedom of movement by the recorder and minimize distraction to, or encumbrance of, the recorder's participation in the activity.

Strub at Abstract.

The location on the recorder at which the visual data acquisition device is mounted can also be affected by consideration of the desired characteristics of the point of view of the visual recording. In this vein, the height of the visual data acquisition device and the direction in which the visual data acquisition device records must be considered. For example, it is anticipated that it will often be desirable to record from a height at or above chest level. It is also anticipated that, typically, it will be desirable to position the visual data acquisition device on a front part of the recorder's body, so that the visual data acquisition device records activity that occurs in front of the recorder, the assumption being that the recorder will usually position his body so that it faces the activity of interest to the recorder. Further, it may be desirable to mount the visual data acquisition device on the front of the recorder's head (e.g., on the forehead), since it is even more likely that the recorder will position his head to look in the direction of activity of interest to the recorder. Mounting the visual data acquisition device on the head also enables the point of view of the visual recording to be changed without interaction by the recorder, and enables changes in point of view that are expected, for the reason given above, to increase the likelihood of obtaining content of interest. FIG. 4 is a perspective view of a visual data acquisition device 401 attached to a head harness 402 that is worn by a recorder 403, illustrating one way of mounting a visual data acquisition device on the front of the recorder's head. However, mounting the visual data acquisition device on the recorder's head can make the visual data acquisition device more visible (and thus, perhaps, more distracting or disconcerting) to others. Since one goal of the invention is to enable unobtrusive recording, this can be undesirable, as discussed elsewhere

herein. The visibility of the visual data acquisition device can be reduced (and the associated (*sic*)distractiveness mitigated) by mounting the visual data acquisition device on the side of the recorder's head (by, for example, mounting the visual data acquisition device on a headband near the recorder's ear, or on the side of a pair of eyeglasses worn by the recorder), rather than on the recorder's forehead.

Id. at 15:12-51.

It may also be desirable to mount the visual recording display device in the vicinity of the eyes of the recorder (e.g., on the head, neck or shoulders) in a manner that enables the recorder to readily move the visual recording display into and out of the recorder's field of view. Though mounting a visual recording display device in this manner may be more obtrusive than mounting the visual recording display device on another part of the body, such mounting may be desirable—as compared to, for example, mounting the visual recording display device on the hand or wrist, or implementing the visual recording display device as an apparatus to be carried in the recorder's pocket—since the recorder can view a display of a visual recording without occupying a hand, thus leaving the hand free, either to effect control of the recording unit or to enable the recorder to participate in the event being recorded. For example, the visual recording display device can be mounted (e.g., with a hinge or a sliding mechanism) on glasses worn by the recorder so that the visual recording display device can be moved back and forth between positions in front of and away from one (preferable, so that the other eye is free for other viewing) or both eyes of the recorder. Alternatively, a display has recently been developed that can be embedded in eyeglasses

(in a manner that is almost completely invisible to others), such that the wearer of the eyeglasses can control whether the display is visible or not (in the latter case, the wearer of the eyeglasses can see normally through the eyeglasses).

Id. at 43:12-39.

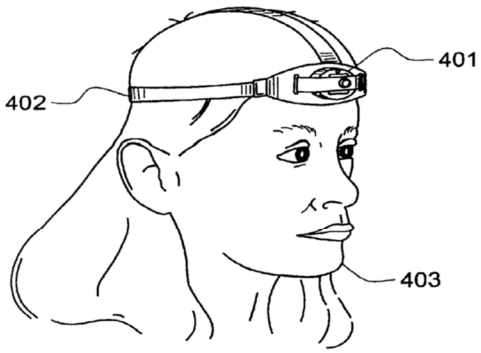


Figure 4

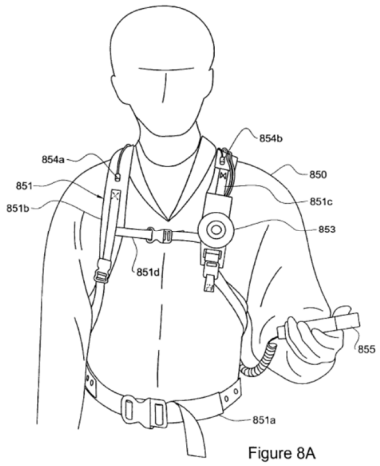


Figure 8A

The visual data acquisition device can also be mounted on or near the recorder's head. For example, the visual data acquisition device can be attached to a head harness that is worn by a recorder, as illustrated in FIG. 4, discussed above. The visual data acquisition device can also be mounted, for example, on a headband near the recorder's ear or on the side of a pair of eyeglasses worn by the recorder, as also discussed above.

Id. at 69:8-15. Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

102. U.S. Patent No. 9,124,796 ("Blum") (EX1049), assigned to e-Vision Smart Optics, Inc., disclosed eyewear that includes "a camera connected with the frame,

in which the camera is configured to be controlled by a remote controller." Blum at Abstract.

> FIG. 39 illustrates an inventive embodiment where the electronic device 3910 attached to the back of the electronic frame tether may be controlled with a handheld remote controller 3950 that can be held in the wearers hand. This would allow the user to control the electronic device without having to reach behind his or her head. This device may communicate via any number of known short range wireless technologies including, but not limited to, blue tooth, WiFi, or 802.11 protocol. The hand-held remote controller 3950 may include a small display 3960 to provide information regarding the status of the electronic device on the electronic frame tether. The communication between the handheld remote controller and the electronic device may be one-way or two-way depending upon the nature of the electronic device. In the case of one-way communication, it is most likely that the hand held controller would contain a transmitter and the electronic device would contain only a receiver. In the case of two-way communication, both devices would have either a transceiver or a transmitter and a receiver.

Blum at 26:10-27.

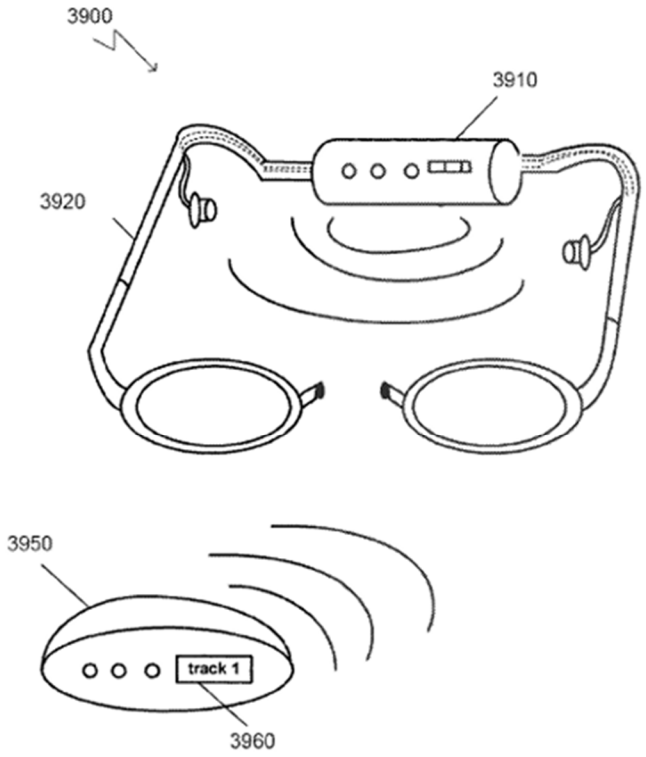


Figure 39

Id. at Fig. 39.

FIG. 40 illustrates another inventive embodiment for remote control and/or communication with the electronic device 3910 placed on the back of the electronic frame tether 3920. In this case, the remote control device is that of an electronic wristwatch 4050 that not only acts as time-piece, but also functions as an effective means of controlling the electronic device 3910. It would work in a similar fashion as described above, except it would have the added advantage of being worn on the wrist. This would be particularly important for sports goggle applications where the wearer is likely to be a runner or a jogger. Once again, it should be pointed out that the device 3910 can be by way of example only, any audio and or video device such as an Apple I iPodR), MP3 player,

cassette, satellite radio, conventional radio, pager, cell phone transceiver, micro-DVD player, etc.

Id. at 26:29-43.

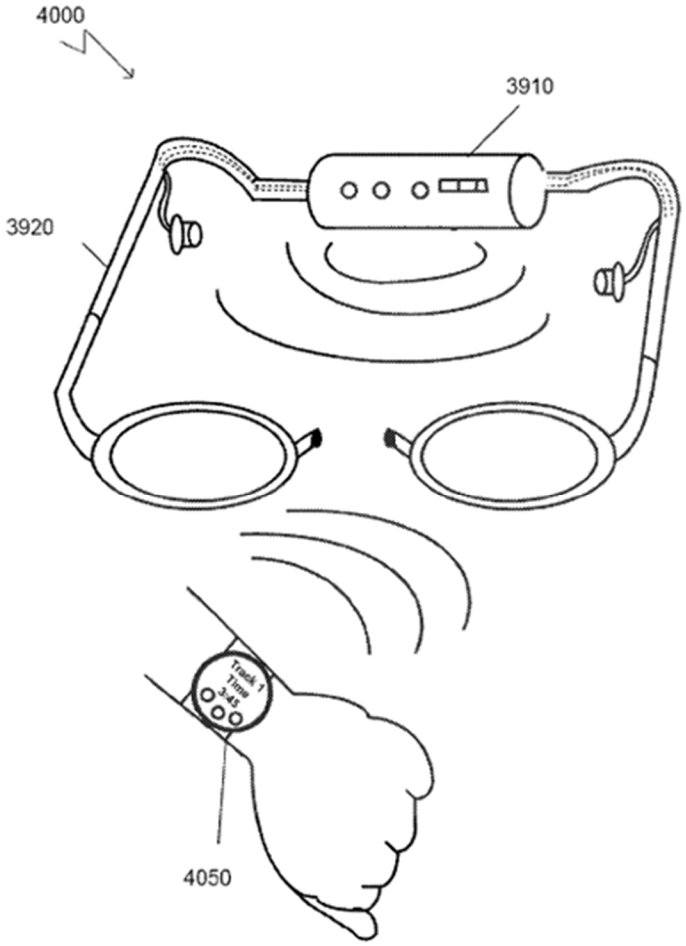


Figure 40

Id. at Fig. 40.

FIG. 41A illustrates another embodiment for remote control and/or communication with the electronic camera or video camera 4110 placed on the back of the frame tether. This case the remote control device is a wristwatch 4150 that allows the wearer to Snap photographs or to take videos of whatever he or she is looking at. A fiber optic bundle 4120 in the frame stem 4130 would pipe an image to the camera 4110 that was

focused into the bundle by an external camera lens 4140. In this manner, a person could walk about and never need to reach into their pocket or pocket book to find their camera. It should be pointed out that the camera lens 4140 can be located anywhere on the electronic eyewear including the electronic tether. Also, multiple camera lenses could be used with a still camera or a video camera. Finally, the electronic camera or video could be utilized within the electronic clip on described earlier in this disclosure.

Id. at 26:44-59.

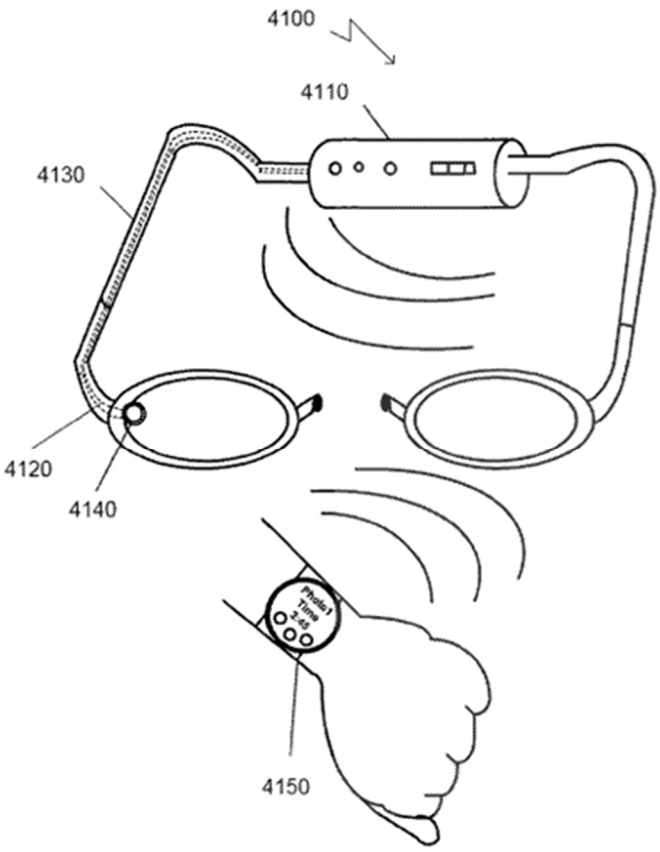


Figure 41A

Id. at Fig. 41A.

FIG. 41B illustrates an embodiment whereby the video or still camera 4160 is located directly on the front of the frame or lens, and the video signal travels down a video cable or a data bus 4170 back to the controller for storage.

Id. at 26:60-63.

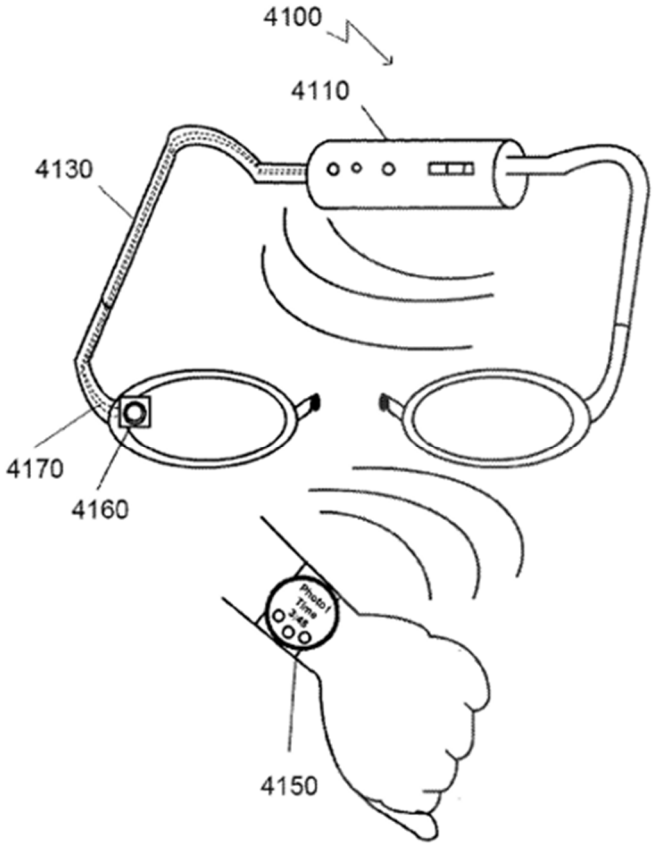


Figure 41B

Id. at Fig. 41B. Blum traces traces priority to provisional application 60/669,403 filed April 18, 2005. Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

103. U.S. Patent No. 6,349,001 ("Spitzer"), attached as Appendix CCC (included in EX1063), assigned to Google, disclosed a system with "complete

integration of the camera assembly within the eyeglass frame and lens system of the eyeglasses":

> An eyeglass interface system is provided which integrates interface systems within eyewear. The system includes a display assembly and one or more audio and/or video assemblies mounted to an eyeglass frame. The display assembly is mounted to one temple and provides an image which can be viewed by the user. The audio or video assembly is mounted to the other temple and is in communication with the display assembly. The audio or video assembly may comprise a camera assembly and/or an audio input or output assembly, such as a microphone and/or speakers. The camera assembly is placed on the temple to record the visual field observed by the user. A head-tracking assembly may be provided to track the position of the user's head. A number of applications can be provided with the present system, such as a telephone system, pager system, or surveillance system. The present eyeglass interface system is compact, offers the user hands-free operation, and provides an attractive appearance due to concealment of the assemblies within the eyeglass frame and lenses.

Spitzer at Abstract.

> The eyeglass interface system uses an eyeglass optical system or display assembly such as that in accordance with U.S. patent application Ser. No. 08/844,098, filed on Apr. 18, 1997, now U.S. Pat. No. 5,886,822, the disclosure of which is incorporated by reference herein. More particularly, the eyeglass interface system of the present invention comprises an eyeglass frame having first and second lens holders and first and second temples configured to be supported on a user's head. The

display assembly used in the eyeglass interface system comprises an image source supported by the first temple, an optical pathway disposed internally within the first lens to receive light from the image source, and an insert in the first lens to redirect light on the optical pathway to the user's eye, as described more particularly in U.S. patent application Ser. No. 08/844,098. An audio and/or video assembly is mounted to the second temple, preferably in communication with the display assembly. The audio and/or video assembly is operative to receive or transmit audio and/or video signals. Interface circuitry is provided in communication with the display assembly and the audio and/or video assembly.

In a typical configuration according to the present invention, the display assembly is mounted within one half of the eyeglasses. The audio and/or video assembly comprises a camera assembly mounted within the other half. The system may also include audio transducers (microphone and/or speakers) which provide audio data and/or which collect sound for recording, digital signal processing and analysis. In this way, the microphone may also provide voice activated commands to the system. Additionally, the eyeglass system may include batteries and an RF or infrared communication system to eliminate the need for a cable to the glasses. Various types of systems may be formed using one or more of the subsystems. In its most complete form, the present eyeglass interface system includes the following subsystems or assemblies: an audio input assembly for collecting speech input from the user, a display assembly, an audio output assembly, a camera assembly, and a head-tracking assembly to provide a computer with the position of the user's head. Thus, the eyeglass interface system includes audio, video, tracking and power modules.

The eyeglass interface system of the present invention provides computer input and output in highly compact forms, preferably entirely within eyeglasses, which look to the casual observer like ordinary eyewear. In some embodiments of the invention, the subsystems or assemblies are entirely concealed within the eyeglass frame and lenses. The invention comprises not only the integration of the hardware subsystems within an eyeglass frame, but also the integration of the subsystems with hardware and software intended for specific functions.

The present invention is an improvement over devices in the prior art owing to the complete integration of the camera assembly within the eyeglass frame and lens system of the eyeglasses. The mechanical aspects of the camera, including focusing mechanisms, are integrated within the eyeglass temple, as are the electronics in the form of a multi-chip module integrated in the temple. Additionally, lenses and optical surfaces of the camera assembly are integrated in the temple and even in the eyeglass lens itself. In this way, the camera assembly may attain its most compact form, may be made light in weight, and may attain a greater degree of concealment and functionality than prior art devices. In addition, the present invention places the field of view of the camera in proximity to or convergent with the operator's field of view, so that the camera records the visual field observed by the user. The present invention allows the camera to have the same line of sight as the user's eye, without parallax error.

Id. at 1:65-2:65.

The integration of a camera assembly within eyewear is important for a number of applications, including image acquisition, data input by

character recognition, bar code scanning, face recognition, and the like. The key factors which must be addressed in order to integrate a camera within eyewear are (i) portability, and (ii) making the camera adjustable so that it is aimed precisely where the user is looking with his or her eyes.

Id. at 4:24-31.

FIG. 2 illustrates a design based on concealment of the camera 210 within the temple 205 of eyeglasses 250. The camera may comprise, for example, ELMO Model QN42H, which includes optional focusing lenses within the camera. The camera is mounted within a plurality of supports 220 and adjusted in angle 221 so that the field viewed by the camera overlaps the field viewed by the user.

Id. at 4:46-52.

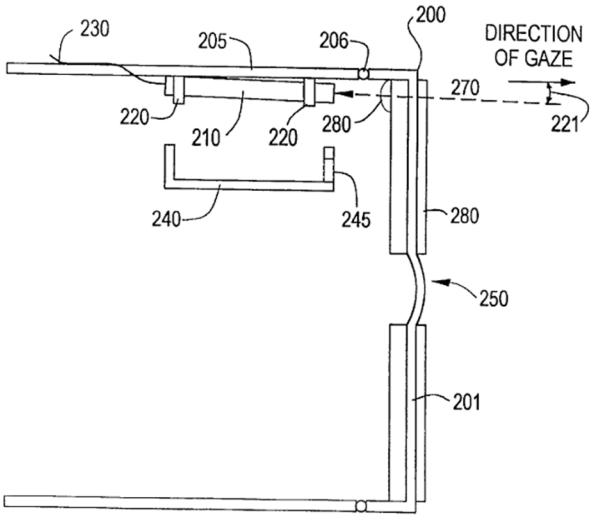


FIG. 2

A camera system may be integrated within the eyeglass temple in a further manner, as shown in FIG. 5. A charge coupled device (CCD) or complementary metal oxide semiconductor (CMOS) image sensor 510 is

mounted to a sliding base 520 in contact, or partially within, or even fully within, eyeglass temple 205.

Id. at 5:30-35.

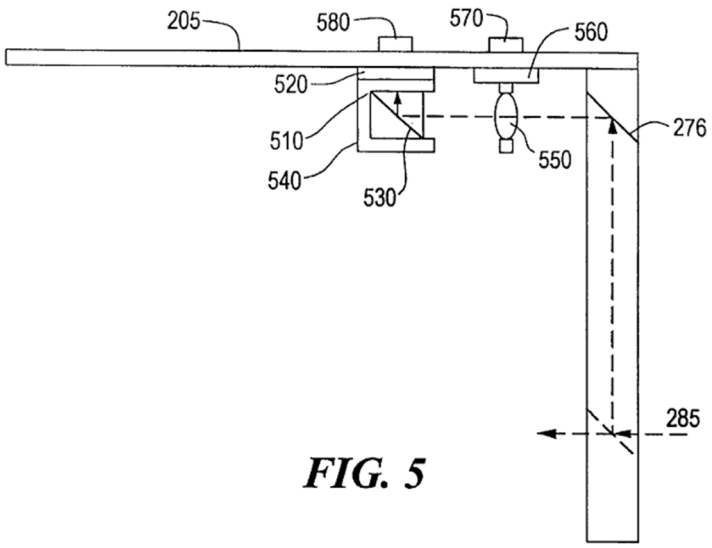


FIG. 5

The eyeglass embodiment of the various camera systems comprises an improvement over the prior art alternatives owing to its light weight and compact nature, as well as owing to the automatic aiming of the camera by virtue of its mounting within eyewear, and its use of the eyeglass lens to align the camera to the user's pupil. Additionally, such systems can be used without employing the hands, making it possible to conduct other tasks while using the device.

Id. at 7:19-27.

The camera system comprises standard CCD or CMOS image Sensors that are commercially available from Texas Instruments, Kodak, and other sources. These sensors are used in camcorders and electronic cameras. The image sensors are combined with the eyeglass optics so that the camera has a view of the world as seen by the user's eye. The

camera may be mounted in the same optical system as the display, or as shown in FIG. 1, the camera system optics may be mounted for use in the right eye, and the display system optics for use in the left eye.

Id. at 11:1-10.

The camera and microphone within the glasses allow the system to perform many of the functions of a camcorder or still camera. Audio and video may be recorded in electronic memory and then may be transmitted to tape or disk storage media. The advantages over current camcorders are that the interface system, including the camera, is largely hands-free. The only requirement is that the user activate the recorder either by spoken command or by the use of buttons on the recording device. A head tracking position sensor can be used to stabilize the image. In such a device, the recording device (for example, tape recorder, recordable digital video disk system, recordable compact disk System) are located in module 1001.

Id. at 10:55-67.

Many Surveillance Systems are possible using the interface System, including Systems in which the Surveillance is concealed by the eyeglass frame. The System may be used by law enforcement personnel to transmit audio and video between agents, in a manner similar to the video conferencing application. For example, an agent on the street may see an image collected by an agent on a roof top. Another application involves patient monitoring in hospital intensive care units. A third surveillance application comprises a baby monitor. The glasses may receive images and audio from a camera located in a nursery so that the parent may see and hear the baby from anywhere in the house.

Id. at 11:58-12:2. Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

104. U.S. Patent No. 7,806,525 ("Howell"), attached as Appendix DDD (included in EX1063), disclosed "a pair of glasses with a camera" wherein the "camera can be partially or fully embedded in the glasses" or "the camera can be removably attached to the glasses, such as removably attached to a temple of the glasses":

> One embodiment pertains to a pair of glasses with a camera. For example, the camera can be partially or fully embedded in the glasses. In another embodiment, the camera can be removably attached to the glasses, such as removably attached to a temple of the glasses. The glasses can also include one or more various other electrical components. These other electrical components can work separately or in conjunction with the camera.

Howell at Abstract.

> BACKGROUND OF THE INVENTION. Cameras are popular consumer electronic devices that allow users to capture images, i.e., taking pictures. For many years cameras have recorded their images on special film and then subsequently developed into physical pictures. More recently, digital cameras and digital photography have become popular. With digital cameras, the images can be recorded as digital data. The stored digital images can thereafter be printed, stored, or transmitted electronically. Cameras are special purpose devices, separately toted by users if they wish to have picture-taking capabilities. Unfortunately, this means that users often are without their cameras when they have a desire

to take pictures. Though mobile telephones have been including cameras for taking pictures, there remains a need for improved ways for cameras to be toted by users.

SUMMARY OF THE INVENTION. The invention pertains to a pair of glasses with one or more attached, embedded or partially embedded electrical components. In a number of the embodiments of the invention, with one or more electrical components in the glasses, the electrical components are much easier to operate.

One aspect of the invention pertains to a pair of glasses having a camera. In one embodiment, the camera can be partially or fully embedded in the glasses. For example, the camera can be embedded in a temple of the glasses. In another embodiment, the camera can be removably attached to the glasses. For example, the camera can be removably attached to a temple of the glasses. The glasses can also include one or more various other electrical components. These other electrical components can work separately or in conjunction with the camera.

The invention can be implemented in numerous ways, including as a system, device, apparatus, and method. Several embodiments of the invention are discussed below.

One embodiment of the invention pertains to a pair of glasses for a user that includes at least an eyeglass frame having at least first and second lens holders and first and second temples, and a camera partially or fully embedded in the first temple. Another embodiment of the invention pertains to a pair of glasses for a user that includes at least an eyeglass

frame having at least first and second lens holders and first and second temples, and a camera mechanically connectable to the first temple.

Id. at 2:53-3:29.

FIG. 10 shows an embodiment of the invention where a user is wearing a pair of glasses with electrical components, tethered to a base, which is connected to a portable device.

Id. at 4:5-7.

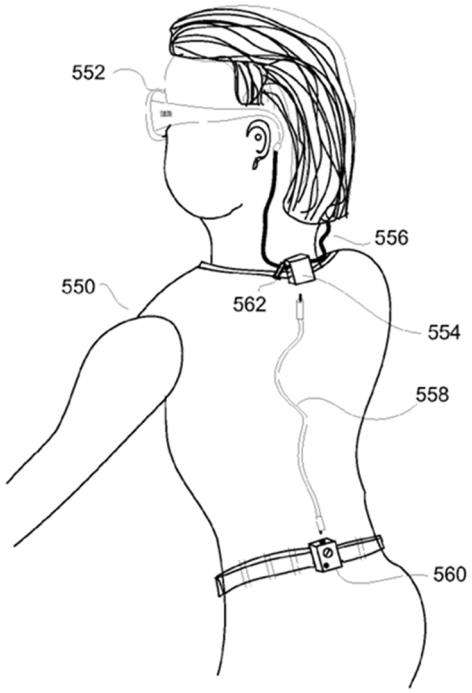


FIG. 10

Id. at Fig. 10.

FIGS. 21A and 21B are diagrams illustrating a pair of glasses having a camera coupled thereto, according to one embodiment.

FIG. 22 is a diagram of a pair of glasses having a camera according to one embodiment of the invention.

FIG. 23A is a diagram of a pair of glasses having a camera according to one embodiment of the invention.

Id. at 4:49-56.

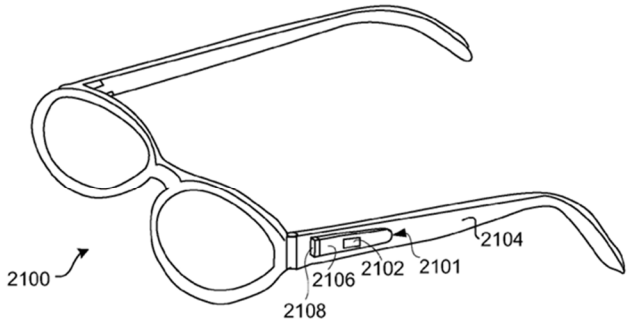


FIG. 21A

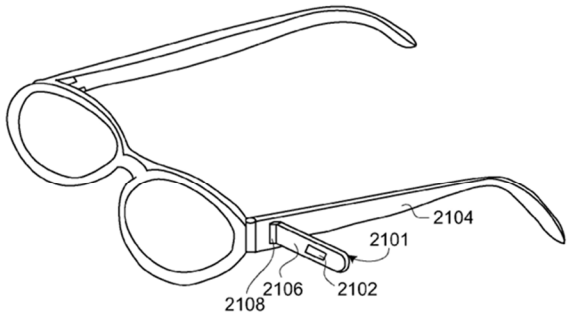


FIG. 21B

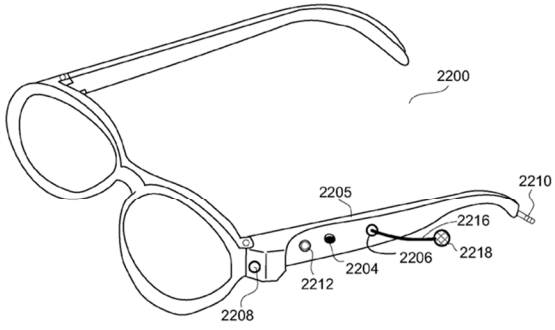


FIG. 22

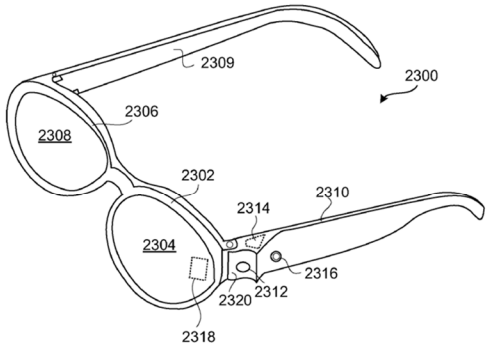


FIG. 23A

Id. at Figs. 21A, 21B, 22, 23A.

FIGS. 21A and 21B are diagrams illustrating a pair of glasses 2100 having a camera 2101 coupled thereto, according to one embodiment. The camera includes an image sensor 2102 and a camera housing 2106 (also referred to as a camera support arm). In this embodiment, the camera 2101 is rotatably coupled to an exterior surface of a temple 2104

of the pair of glasses 2100. The camera support arm 2106 is attached to the temple 2104. The camera support arm 2106 can couple to the temple 2104 using a hinge 2108. In one implementation, the hinge 2108 can use a spring or cam mechanism so that the camera support arm 2106 is held either against the temple 2104 when not in use or held in an open or extended position when in use. FIG. 21A illustrates one position of the camera support arm 2106 when the camera 2101 is not in use. FIG. 21B illustrates one position of the camera support arm 2106 when the camera 2101 is in use. The presence of the camera 2101 with the pair of eyeglasses 2100 enables a wearer of the pair of eyeglasses 2100 to take pictures of what the wearer is looking at. It should be noted that other supporting circuitry such as data storage for pictures, switches, battery, and electronics for the camera 2101 can be in the temple 2104, in the camera support arm 2106, elsewhere in the pair of glasses 2100, or even tethered thereto. However, in one implementation, the camera 2101 is completely self-contained in the camera housing 2106. In one embodiment, the hinge 2108 can also serve as a switch to turn the image sensor 2102 on or off. … In one embodiment, the camera support arm (camera housing) 2106 is removably coupled to the hinge 2108. As such, the camera 2101 can be removed from or attached to the pair of glasses 2100. Indeed, the camera support arm (camera housing) 2106 can be a camera body that houses electronics for the camera 2101. In such case, the camera 2101 can operate as a camera apart from the pair of glasses 2100.

Id. at 24:63-25:53.

Depending on the embodiment, electrical components of a camera can be in a pair of glasses, and/or a base tethered to the glasses, and/or a portable device tethered to the glasses or to the base. For example, the memory 753 can be in the base tethered to the glasses.

The location of the lens 758 can vary depending on the embodiment. In one embodiment, referring to FIG. 1, one location is at the bridge of the glasses, with the lens of the camera facing forward. In this situation, what the user sees is substantially what the captured image would be. In other words, in a general sense, what the user sees is what the user gets. With such an embodiment, it is relatively easy for a user to take pictures, hands-free. In another embodiment, another location for the lens 758 are at a side portion adjacent to a lens holder, before the joint of the corresponding temple, such as at 116 in FIG. 1. Again, the lens of the camera faces forward. Some of the electrical components of the camera can be in that location, and other components in the temple 104. These components are electrically connected through one of the joints, such as with a flexible pc board. In yet another embodiment, the lens 758 can face sideways and outwards in a temple of a pair of glasses, towards the left or right side of the user.

Id. at 17:63-18:17.

Regarding storing the images, in one embodiment, the images are stored locally. One approach to determine which image to store is the first-in-first-out approach. Once the camera is turned on, the camera takes pictures continually in an automatic mode, such as once every few seconds. When the memory becomes full or under other pre-set or pre-programmed condition, the first picture stored will be deleted when the

next picture comes in. In another embodiment, the digital content in one picture is compared to the digital content in, for example, the fifth picture further down. If the difference between the two is not more than a pre-set threshold, the four pictures in between will be deleted. One approach to determine the difference is by comparing the total charges collected by the CCD chip for the two images. If the two sets of charges do not differ by more than a certain threshold, the images in between would be deleted.

The images captured can also be stored at a remote site. For example, the glasses can upload the images to a computer, wirelessly or through a wired connection from a connector at the glasses.

Id. at 18:18-37.

FIG. 15 shows an operation 800 of taking certain actions based on images captured by a pair of glasses with a wireless transceiver, according to one embodiment of the invention. This operation can be used by a police officer on patrol. Before the officer gets out of his patrol vehicle to confront a suspect, the officer can inform the station. At that point, the camera is turned on 802.

There can be different approaches to turn on the camera. In one embodiment, an operator at the station can remind the officer to turn on the camera. Or, the operator can remotely turn on the camera. In yet another embodiment, the camera can be automatically turned on under certain condition. One such condition is that if the camera is out of the patrol vehicle, the camera is automatically turned on. With the glasses having the capability to wirelessly communicate with the patrol vehicle,

one method to detect if the glasses are out of the patrol vehicle is based on the wireless signal strength of the glasses. The patrol vehicle can detect the signal strength of the wireless signals, which depends on the distance between glasses and the vehicle. A threshold can be set. If the signal strength is below the preset threshold, the glasses would be assumed to be out of the car, and the camera would be automatically turned on.

After the camera is turned on 802, the glasses start to continually take 804 pictures, such as once every few seconds. The pictures taken are automatically transmitted back 806 to the patrol vehicle in a wireless manner. In this situation, the patrol vehicle serves as a hub, which stores the pictures. Then, the hub re-transmits 808 the pictures back to the station. Note that the pictures can be compressed by standard algorithms before they are transmitted. This compression mechanism can be performed by a computer in the patrol vehicle. When the station gets the pictures, they are de-compressed before being viewed, such as by the operator. The pictures enable the operator at the station to see what the officer is confronting. This effectively allows the operator at the station to perform real-time monitoring of or for the officer. If it is a high risk situation, the operator can quickly react 810, such as by dispatching additional support for the officer. In one embodiment, the glasses can include not only a camera but also a microphone for audio pickup, such as sounds from the officer, suspect, witness or environmental sounds (such as door opening, gun shot, etc.).

Id. at 18:38-19:13.

> In one embodiment, the camera utilized in the various embodiments is a digital camera, namely, a digital image capture device. The camera can be a still camera or a motion camera (i.e., video camera). The camera can be designed for manual focusing, auto-focusing, or predetermined fixed focusing. The camera can also support a wide angle or panoramic view.

Id. at 29:64- 30:3. Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

105. U.S. Patent Publication 2005/0174470 ("Yamasaki"), attached as Appendix EEE (included in EX1063), published Aug 11, 2005, filed Feb 7, 2005, and issued as U.S. 7,573,525, disclosed a head-mounted camera "formed substantially in the shape of a pair of spectacles":

> [0071] The head-mounted camera (hereinafter simply referred to as the "camera") 1 includes, as shown in FIG. 1, a head-mounted unit 2 formed substantially in the shape of a pair of spectacles, a controller/recorder 4, which serves as the main body of the camera 1, connected to the head-mounted unit 2 via connecting means, such as a cable 3, and a remote controller 5 for remotely performing input operations for the camera 1.
>
> [0072] The head-mounted unit 2 allows a user to observe a subject substantially directly in a see-through display mode and also to pick up an image of the subject. The head-mounted unit 2 can be worn on the head in a manner similar to ordinary eyesight-correcting spectacles, as is seen from the shape of the head-mounted unit 2. The head-mounted unit 2 is light and small so that the weight and the size thereof can be as close as possible to those of actual spectacles.

[0073] A connecting terminal 3 a provided at one end of the cable 3 is connected to a cable connecting terminal 21 (see FIG. 2) of the head-mounted unit 2, and a connecting terminal 3 b provided at the other end of the cable 3 is connected to a cable connecting terminal 49 (see FIG. 7) of the controller/recorder 4, thereby connecting the head-mounted unit 2 with the controller/recorder 4. As means for electrically connecting the head-mounted unit 2 with the controller/recorder 4, although wired means such as the cable 3 is used, wireless means for wirelessly connecting the two elements may be used.

FIG. 1

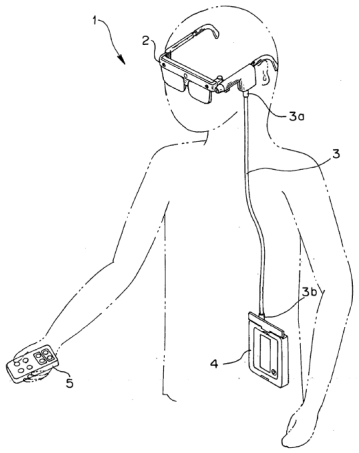


FIG.2

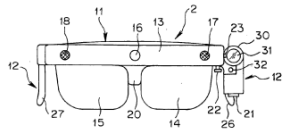


FIG.3

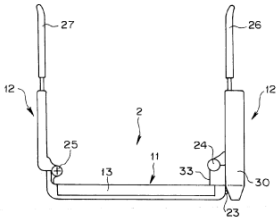


FIG.4

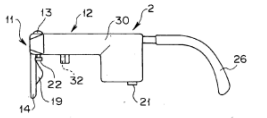
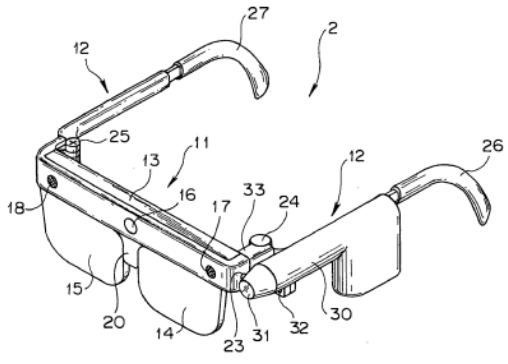


FIG. 5

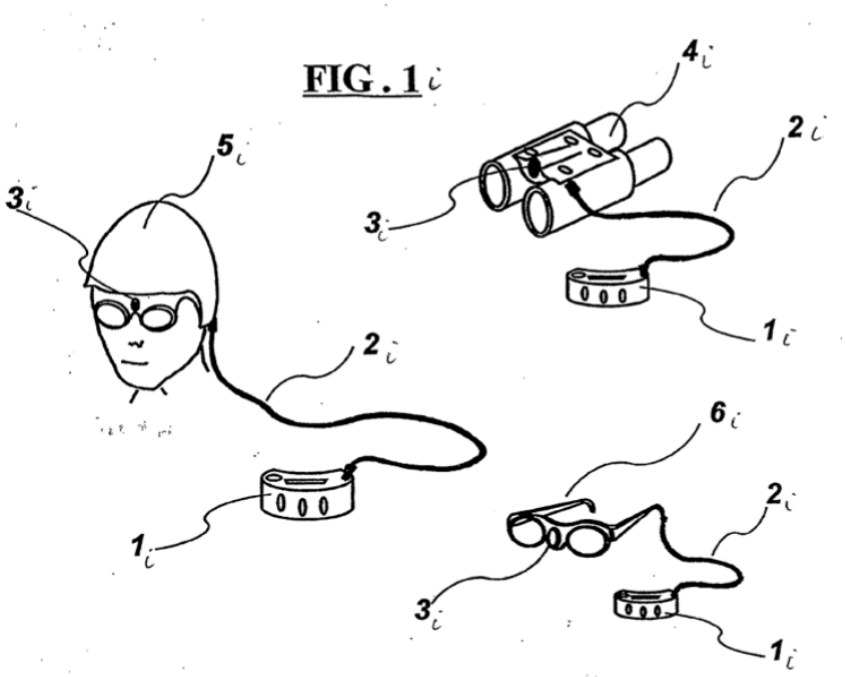


[0074] The controller/recorder 4 controls the entire camera 1 and also records images picked up by the head-mounted unit 2. The controller/recorder 4 is also formed to be as light and small as possible so that it can be used under various conditions. For example, it can be attached to a belt at the user's waist or it can be stored in an inner pocket of a jacket. The controller/recorder 4 can also be stored in a bag by using a long cable 3.

[0078] The head-mounted unit 2 includes a front portion 11 corresponding to lens, rims, a bridge, and joint portions of regular spectacles and temples 12 extended from the left and right sides of the front portion 11 in the backward direction (opposite to the subject) and foldable with respect to the front portion 11.

Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

106. WO2004114654A2 ("Armand"), attached as Appendix FFF (included in EX1063), published December 29, 2004, disclosed "the storage of incoming images by means of a vision device":

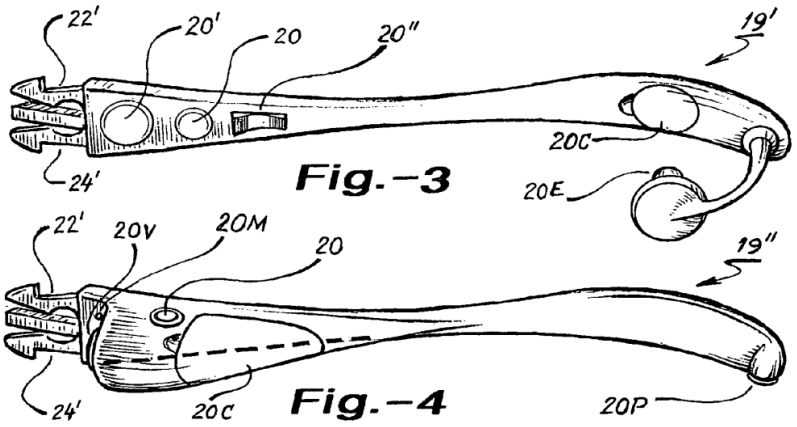


It was thus known to have a pair of eyeglasses having a sensor that captures sensor data.

107. U.S. Patent Publication No. 2005/0036103 ("Bloch"), attached as Appendix GGG (included in EX1063), filed August 10, 2004, published February 17, 2005, and issued as U.S. 7,059,717 on June 13, 2006, disclosed eyeglasses with "an integral conventional videocam":

> FIG. 4, is a pictorial view showing an exemplified optional video-camera integrated within the left temple/support-arm.

Bloch at [0024].



Id. at Figs. 3, 4.

The embodiment of FIG. 4 features an integral conventional videocam (ie: digital-camera) 20V with conventional On/Off-button 20, a conventional mini-microphone 20M, and optional conventional button-battery (unshown) power-supply 20C in the form of a female-receptacle 20P which function is akin to that of a conventional computer USB-port for subsequent downloading of pictures from a conventional internal microprocessor (unshown) to a conventional computer. This aggregation thus defining a digital-camera which can compile a series of individual snap-shot pictures, or process rapid-frame sequences tantamount to a video. Although the objective-lens is exemplified as situated at 20V, it can be arranged further forward if wide-angle images are desired. Therefore, while the basic objective is to provide the user of my EQS™-eyeglasses (ref. FIG. 1) with the convenience of readily interchanging between traditional appearing temple/support- arms 19 and 21, to a more sport-activity type of eyeglasses by readily substituting the temple/strap-assembly 32;—a further object of my versatile eyeglasses is to explore the full potential of interchangability as is set forth in the interchangeable electronics-equipped temple/support-arms of FIGS. 3 and 4.

Id. at [0055]. Therefore, it was known to have a pair of eyeglasses having a sensor that captures sensor data.

108. In addition to cameras mounted on eyeglasses, other wearable camera systems were known in the art. For example, at least as early as March 2000, Semco Corporation had made and sold a body-worn camera for police and law enforcement called "CopCam." *See, e.g.*, "Police Video: Up Close and Personal," Law and Order Magazine, August 1999, attached as Appendix N (included in EX1041).

V. The Alleged Inventions Of The '901 and '910 Patents

109. In the discussion that follows, I cite to portions of the '901 patent's specification in explaining the alleged invention of the '901 and '910 patents. I note that these patents share a common disclosure, so my discussion applies equally to both of them.

110. The '901 and '910 patents are directed to an "apparatus, systems, and methods in which a surveillance apparats processes images by (1) continuously recording a stream of imaged data, (2) write protecting segments of the recorded stream, and (3) sending write protected segments from a local memory to a remote memory using a wireless transmitter." EX1048, 2:18-23. Figure 1 illustrates one exemplary "surveillance apparatus 100 generally comprising eyeglasses 110 having a camera 120." *Id.*, 3:64-67.

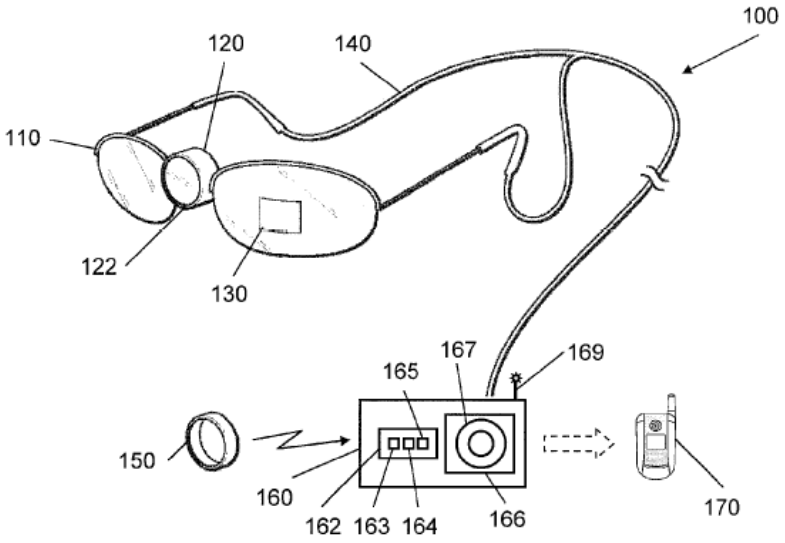


FIG. 1

111. All of the ’901 patent claims require “a pair of eyeglasses having a sensor that captures sensor data.” The ’901 patent discloses that “[t]he eyeglasses 110 are used here euphemistically to represent any type of camera mount.” *Id*., 4:9-10. While “[i]n a preferred embodiment, the camera mount is disguised to be a common object worn by a person or lying around a house,” it “could also be shaped and sized to look like a camera” and “[c]ontemplated mounts include lapel pins, hair clips, shirt buttons, purses, staplers, desk clocks, tripods, head gear, hand grips, or security camera mounts.” *Id.*, 4:10-16.

112. Figure 1 of the ’901 and ’910 patents shows camera 120 coupled to belt-worn recorder 160 via data and power cord 140. *Id.*, 3:64-4:3. Also depicted in Figure 1 is remote memory 170 and ring-shaped signaling device 150, both of which “cooperate” with recorder 160. *Id.* Recorder 160 is “any recording device that records video and/or audio/video data, including conventional recorders,” and “preferably includes a

processor 162 with software or hardware that accomplishes the functions described herein, or one or more physical memories that are collectively referred to herein as memory 166." *Id.*, 4:65-5:3.

113. "In preferred embodiments, image data received by recorder 160 is stored in a circular buffer 167 on memory 166." *Id.*, 6:4-6. Figure 3 shows a "diagram representation of circular buffer 167 [mislabeled in Figure 3 with reference numeral 169] in memory 166, with unprotected segment 320 and write-protected segment 330." *Id.*, 7:48-50. "The recording facility 163 continuously records [a] data stream 310 [from the recorder 160] into circular buffer 167." *Id.*, 7:52-53. "The recording facility 163 records over unprotected segment 320 of circular buffer 167, while skipping over protected segments 330 of circular buffer 167." *Id.*, 7:53-56. "It is contemplated that the portion of the circular buffer that is marked as write-protected data cannot be overwritten once the recorder loops back to the beginning of the media." *Id.*, 7:56-59.

114. "The circular buffer is preferably organized into a series of memory segments that loops back on itself," and receipt of a "record signal" causes "a segment of the circular buffer to be write-protected to prevent that segment from being overwritten during the next recording loop." *Id.*, Abstract, 2:34-36, 2:46-50. Figure 3 shows an example of a circular buffer with write-protected segment 330:

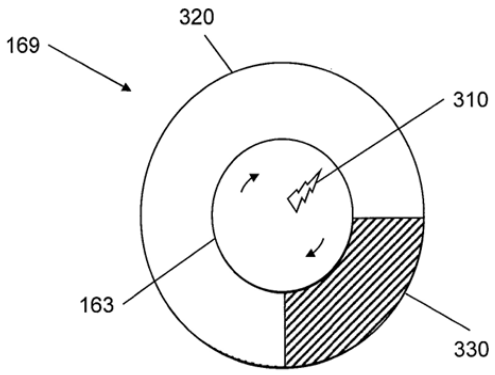


FIG. 3

The write-protected segment includes video data from both before and after the record signal. *Id*., 2:46-54.

VI. Claim Construction

115. It is my understanding that in determining whether a patent claim is anticipated or obvious in view of the prior art, the Patent Office must construe the claim by giving the claim its plain and ordinary meaning, consistent with the specification and prosecution history. For the purposes of this declaration, I have construed each claim term in accordance with its plain and ordinary meaning except where particular constructions are discussed.

A. "file"

116. Claims 17 and 18 of the '901 patent recite the term "file":

> **17.** The recording system of claim 1, wherein the first memory is configured to record the first designated portion of the sensor data in a *file*.
>
> **18.** The recording system of claim 1, wherein the first memory is configured to record the first designated portion of the sensor data in a single *file*.

117. Claim 13 of the ’910 patent recites the term “file”:

> **13.** The recording system of claim 1, wherein the at least one memory is configured to record the first portion of the sensor data in a *file*.

118. For these claims of the ’901 and ’901 patents, the term “file” should be given its plain and ordinary meaning as of June 2007, which was “an identifiable collection of data.”

119. The ’901 and ’910 patents describe embodiments of their purported invention as utilizing a file-based approach for the circular buffer. The patents state the entire circular buffer can be treated as a file. EX1048, 6:22-31. The patents further state write-protected portions of the circular buffer can be stored as files within the circular buffer. *Id.*, 2:41-64, 9:53-61. Thus, in Figure 3, the entire circular buffer 167 (mislabeled with reference numeral 169) is treated as a file, and write-protected segment 330 is also treated as a file stored in the circular buffer:

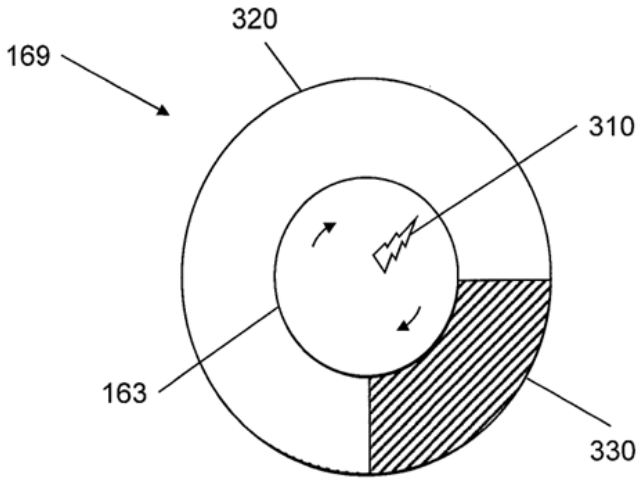


FIG. 3

Id., Fig. 3. In this example, circular buffer 167 and write-protected portion 330 are "files" inasmuch as they comprise identifiable collections of data, although the patent does not describe any particular file type or structure for these files.

120. Figure 4H depicts a "C data stream … saved as a physically dis-contiguous file" (*id.*, 9:55-61):

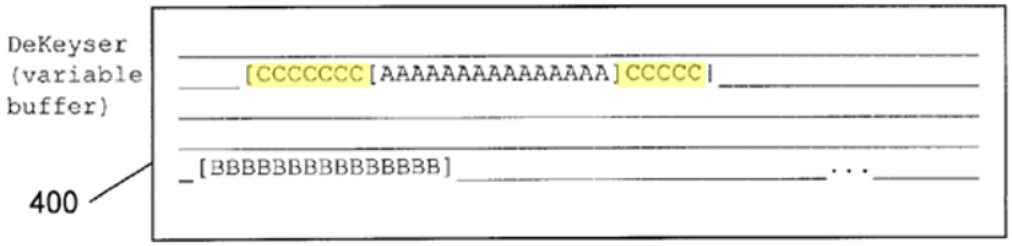


FIG. 4H

Id., Fig. 4H (color added). The file shown collects together the physically dis-contiguous "C" portions to form an identifiable collection of data. Once identified as such, the data making up the file can be used in various ways (*e.g.*, the file can be offloaded to a remote memory or played back). *Id.*, 9:62-10:5.

121. In sum, the '901 and '910 patents use "file" in a manner consistent with its plain and ordinary meaning as of June 2007, *i.e.*, "an identifiable collection of data." These patents do not suggest any particular type of file is required and thus provides no basis for departing from this plain and ordinary meaning.

122. The prosecution histories of the patent family likewise do not compel a narrower construction. During prosecution, Applicant reiterated what was recited in

the various pending claims but did not otherwise limit the claimed "files" to any particular types of files. *E.g.*, EX1011, 77; EX1013, 285-86.

123. General-purpose and technical dictionaries confirm the plain and ordinary meaning of "file" as "an identifiable collection of data." The American Heritage Dictionary defined "file" as "a collection of related data or program records stored as a unit with a single name" (EX1025, 518), and Merriam-Webster's Collegiate Dictionary defined it as "a collection of related data records (as for a computer)" (EX1026, 467). A technical dictionary, the Wiley Electrical and Electronics Engineering Dictionary, defined "file" as "a collection of information which is stored as a unit." EX1027, 283. Likewise, "Operating Systems" (Third Ed. 2004) by H.M Deitel, P.J. Deitel, and D.R. Choffnes, a well-known, reputable textbook, states that "[m]ost computer users are familiar with the concept of file as a named collection of data that is manipulated as a unit," further confirming a POSITA's understanding of "file" as "an identifiable collection of data." Appx II (included in EX1041) at 586.

124. In sum, it is my opinion that the term "file" should be interpreted as meaning "an identifiable collection of data" for claims 17 and 18 of the '901 patent, and claim 13 of the '910 patent.

B. "a computer processor configured to"

125. Claim 1 of the '901 patent recites "a computer processor configured to" perform certain recited functions. Claim 1 of the '910 patent likewise recites "a computer processor configured to" perform certain recited functions. I understand

Patent Owner's position is that (i) there are no MPF limitations in claim 1 of the '901 patent, and (ii) there are no MPF limitations in claim 1 of the '910 patent. EX1056, 008-019.[2]

126. If the "computer processor configured to" limitations of the '901 and '910 patents are MPF limitations, I understand that the Parties in the related litigation have identified the claimed functions and corresponding structures. Starting with the '901 patent, the functions and corresponding structures identified by the Parties are as follows:

'901 Patent – Claim 1 Limitations	**Patent Owner's Construction**	**Petitioner's Construction**
Element 3: **a computer processor configured to:** record the sensor data in the first memory;	Function: recording the sensor data in the first memory Structure: FIGS 1, 3, and 4A-H including corresponding descriptions in the specification and equivalents thereof; 2:18-3:19, 4:67-5:3, 6:5-21; A component of a recording device including software or hardware that accomplishes the functions described	Function: record the sensor data in the first memory Structure: hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 4:67-5:2, 5:38-50, Fig. 3, 7:48-59, Fig. 4A, 7:60-65.
Element 4: in response to a first trigger signal, designate for saving a first portion of the sensor	Function: designating for saving in response to a first trigger signal a first portion of sensor data	Function: in response to a first trigger signal, designate for saving a first portion of the sensor

[2] Citations to EX1056 and EX1057 refer to page numbers added by Petitioner.

'901 Patent – Claim 1 Limitations	Patent Owner's Construction	Petitioner's Construction
data that was captured prior to occurrence of the first trigger signal, wherein the portion of the sensor data occupies a portion of the first memory that is less than the entirety of the first memory and corresponds to a length of time prior to the first trigger signal;	captured prior to occurrence of the first trigger signal, wherein the saved sensor data includes data captured prior to the first trigger signal and occupies less than the entirety of the first memory Structure: Same structure as identified for element 3	data that was captured prior to occurrence of the first trigger signal, wherein the portion of the sensor data occupies a portion of the first memory that is less than the entirety of the first memory and corresponds to a length of time prior to the first trigger signal Structure: hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, Fig. 4B, 8:9-37, Fig. 4C, 8:52-67, 9:62-10:5.
Element 5: contiguously continuing to record the sensor data in the first memory while the first portion of the sensor data is designated for saving;	Function: contiguously continuing to record the sensor data in the first memory while the first portion of the sensor data is designated for saving Structure: Same structure as identified for element 3	Function: contiguously continuing to record the sensor data in the first memory while the first portion of the sensor data is designated for saving Structure: hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, Fig. 3, 7:48-59, Fig. 4D, 9:21-26, Fig. 4B, 8:9-37, Fig. 4C, 8:52-67, 9:62-10:5.

'901 Patent – Claim 1 Limitations	Patent Owner's Construction	Petitioner's Construction
Element 6: in response to a subsequent second trigger signal, designate for saving a second portion where in the second portion occupies less than the remaining entirety of the first memory not designated for saving and corresponds to a length of time prior to the second trigger signal; and	Function: designating for saving in response to a second trigger signal a second portion of sensor data captured prior to occurrence of the second trigger signal, wherein the saved sensor data includes data captured prior to the second trigger signal and occupies less than the remaining entirety of the first memory not previously designated for saving Structure: Same structure as identified for element 3	Function: in response to a subsequent second trigger signal, designate for saving a second portion where in the second portion occupies less than the remaining entirety of the first memory not designated for saving and corresponds to a length of time prior to the second trigger signal Structure: hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, Fig. 4E, 9:48-50, 9:62-10:5.
Element 7: automatically overwrite portions of the sensor data that were recorded in the first memory that were not designated for saving.	Function: automatically overwriting portions of the recorded sensor data not previously designated for saving Structure: Same structure as identified for element 3	Function: automatically overwrite portions of the sensor data that were recorded in the first memory that were not designated for saving Structure: hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 4:67-5:2, 5:38-50, Fig. 3, 7:48-59, Fig. 4A, 7:60-65.

EX1057, 008-014.

127. For the ’910 patent, I understand that the Parties have identified the following functions and corresponding structures:

’910 Patent – Claim 1 Limitations	Patent Owner’s Construction	Petitioner’s Construction
Element 2: **a computer processor configured to:** record sensor data obtained by the sensor in the at least one memory;	Function: recording sensor data in the at least one memory Structure: FIGS 1, 3, and 4A-H including corresponding descriptions in the specification and equivalents thereof; 2:21-3:21, 5:1-6, 6:6-22; A component of a recording device including software or hardware that accomplishes the functions described	Function: record sensor data obtained by the sensor in the at least one memory Structure: hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 5:3-5, 5:40-52, Fig. 3, 7:48-59, Fig. 4A, 7:60-65.
Element 3: in response to a first trigger signal, designate for write-protecting a first portion of the sensor data that was captured prior to occurrence of the first trigger signal, wherein the first portion of the sensor data occupies a portion of the at least one memory that is less than the entirety of the at least one memory and corresponds to a length of time prior to the first trigger signal;	Function: designating a portion of the memory for write-protecting including at least a portion captured prior to the trigger signal and a portion and which is less than the entirety of the at least one memory Structure: Same structure as identified for element 3	Function: in response to a first trigger signal, designate for write-protecting a first portion of the sensor data that was captured prior to occurrence of the first trigger signal, wherein the first portion of the sensor data occupies a portion of the at least one memory that is less than the entirety of the at least one memory and corresponds to a length of time prior to the first trigger signal

'910 Patent – Claim 1 Limitations	Patent Owner's Construction	Petitioner's Construction
		Structure: hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 2:49-67, 5:3-5, 5:40-52, Fig. 4B, 8:10-40, Fig. 4C, 8:55-9:3, 9:65-10:8.
Element 4: continuing to record the sensor data in the at least one memory while the first portion of the sensor data is designated for write-protecting;	Function: continuing to record additional data while designating a portion of the memory for write-protecting Structure: Same structure as identified for element 3	Function: continuing to record the sensor data in the at least one memory while the first portion of the sensor data is designated for write-protecting Structure: hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 2:49-67, 5:3-5, 5:40-52, Fig. 3, 7:48-59, Fig. 4D, 9:24-29, Fig. 4B, 8:10-40, Fig. 4C, 8:55-9:3, 9:65-10:8.
Element 5: in response to a subsequent second trigger signal, designate for write-protecting a second portion wherein the second portion occupies less than the remaining entirety of the at least one memory not designated for write-	Function: designating for write protection an additional portion of the remaining memory not previously designated for write-protecting Structure: Same structure as identified for element 3	Function: in response to a subsequent second trigger signal, designate for write-protecting a second portion wherein the second portion occupies less than the remaining entirety of the at least one memory not designated for write-protecting and

'910 Patent – Claim 1 Limitations	Patent Owner's Construction	Petitioner's Construction
protecting and corresponds to a length of time prior to the second trigger signal; and		corresponds to a length of time prior to the second trigger signal Structure: hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 2:49-67, 5:3-5, 5:40-52, Fig. 4E, 9:51-53, 9:65-10:8.
Element 6: upon reaching at least one of the first portion and the second portion while continuing to record the sensor data in the at least one memory, excluding from overwriting the at least one of the first portion and second portion.	Function: excluding from overwriting the at least one of the first portion and second portion, upon reaching a protected portion in the at least one memory Structure: Same structure as identified for element 3	Function: upon reaching at least one of the first portion and the second portion while continuing to record the sensor data in the at least one memory, excluding from overwriting the at least one of the first portion and second portion Structure: hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 5:3-5, 5:40-52, Fig. 3, 7:48-59, Fig. 4A, 7:62-65, Fig. 4G, 9:56-60.

Id., 014-020.

128. For purposes of this declaration, I have applied the constructions (MPF and non-MPF) argued by Patent Owner, as well as Petitioner's constructions.

VII. Summary Of The Prior Art

A. Yerazunis

129. Yerazunis, EX1017, entitled "Video Recording Device for a Targetable Weapon," was filed September 9, 1998 and issued January 2, 2007. Accordingly, it is my understanding that Yerazunis is prior art to the '901 and '910 patents.

130. Yerazunis discloses a "compact video image recording device" for different applications. EX1017, Abstract, 1:21-31, 3:5-10, 9:8-16. In one application, it is "mounted to a targetable weapon, such as a gun," for "recording video images before and after the firing of the gun." *Id.*, Abstract, 3:9-10, 4:28-30, 8:8-25, 9:60-10:11, 16:4-8, 16:43-17:38 *see also, generally* U.S. 2002/005895 ("Freeman 1") (EX1028) (continuation of Appl. No. 08/906,493, for which Yerazunis is a continuation-in-part); U.S. 7,088,387 ("Freeman 2"), attached as Appendix EE (included in EX1041), (issued from Appl. No. 08/906,493).

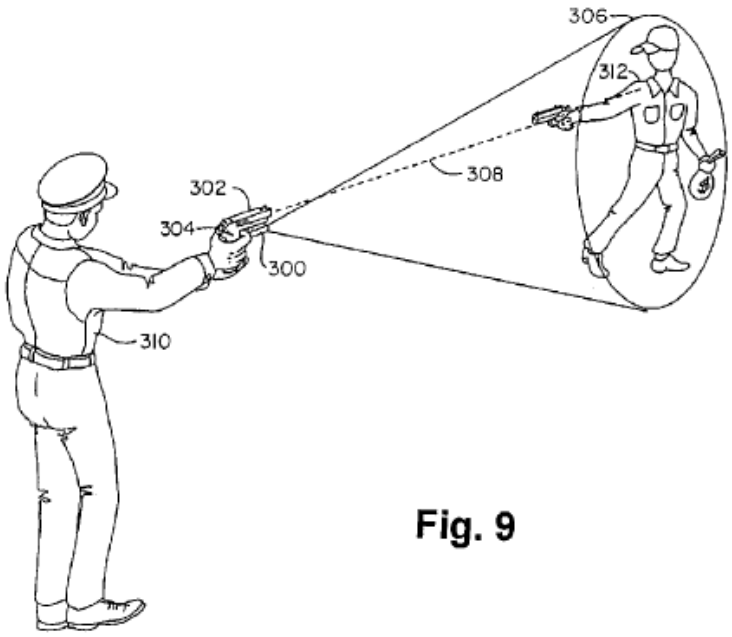


Fig. 9

Id., Fig. 9.

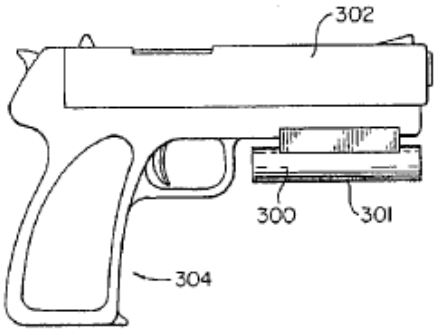


Fig. 10a

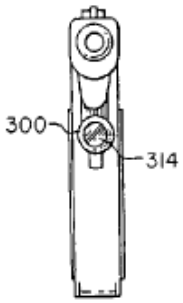


Fig. 10b

Id., Figs. 10a, 10b.

131. Yerazunis's video recording device "records video frames successively in at least one circular buffer memory organized as a continuous loop overwriting the oldest frame within the respective buffer memory with a more recently received frame." *Id.*, 2:19-23. For a gun-mounted application, Yerazunis discloses that a "gun firing signal may be generated upon discharge of the gun," and "specified frame data

associated with that firing event both before and after the event is preserved and cannot be overwritten as a result of further use of the gun or subsequent firing events." *Id.*, 3:19-31. "Frame data associated with each subsequent firing event[] is stored within an unused portion of the circular buffer memory." *Id.*, 3:31-33.

132. Figure 3 depicts an "electrical block diagram of the video recording device" (*id.*, 3:55-56), and Figure 14 illustrates "a video recording device in accordance with the present invention for use with a gun" (*id.*, 4:28-30).

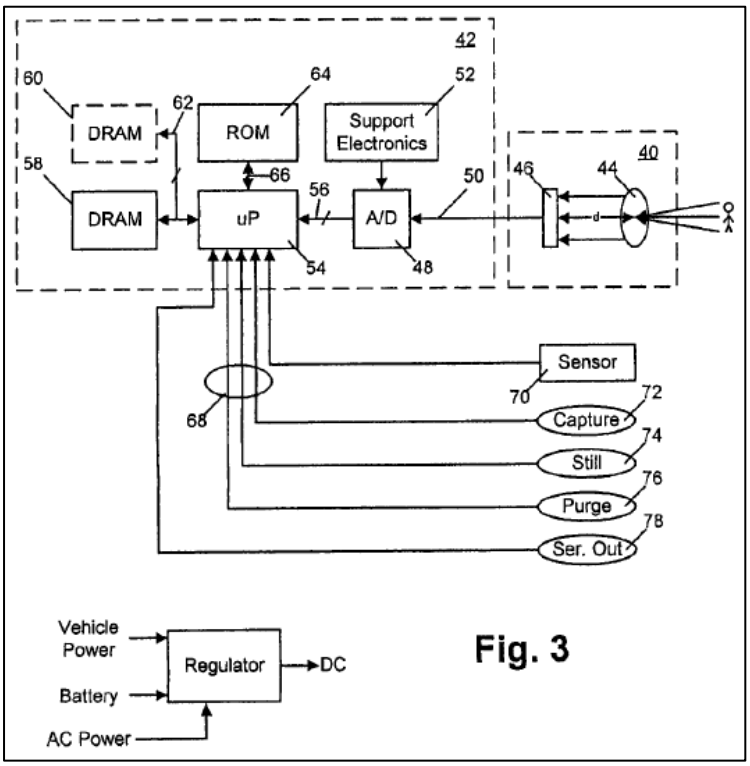


Fig. 3

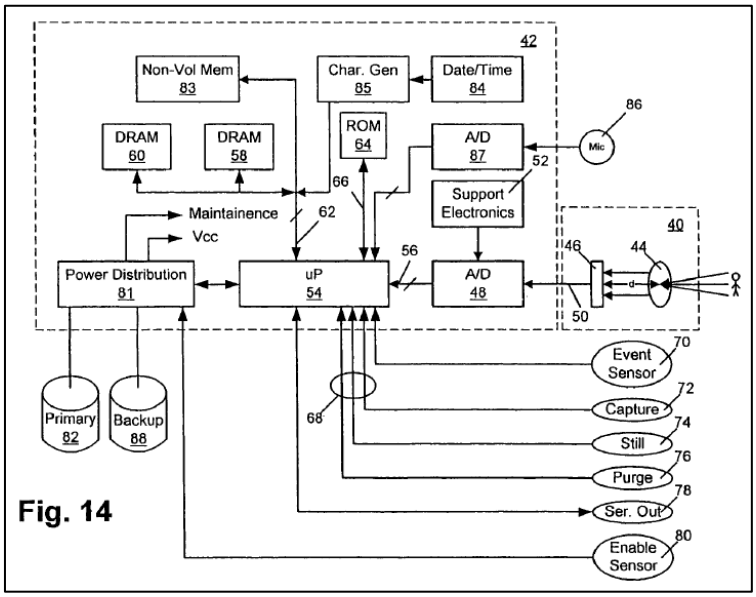


Fig. 14

Id., Figs. 3, 14; *id.*, 16:4-8 ("[t]he operation of the [Figure 14] recording device is generally in accord with the description provided with respect to FIG. 3"), 17:34-38. These figures and other relevant disclosure of Yerazunis are described in further detail below.

133. Figure 4a depicts a circular memory buffer formed in DRAM (*id.*, 7:9-11), and Figure 4b shows "a semiconductor memory buffer employed in the video recording device of FIG. 3 to implement a circular memory buffer and associated head and tail pointers" (*id.*, 3:60-63).

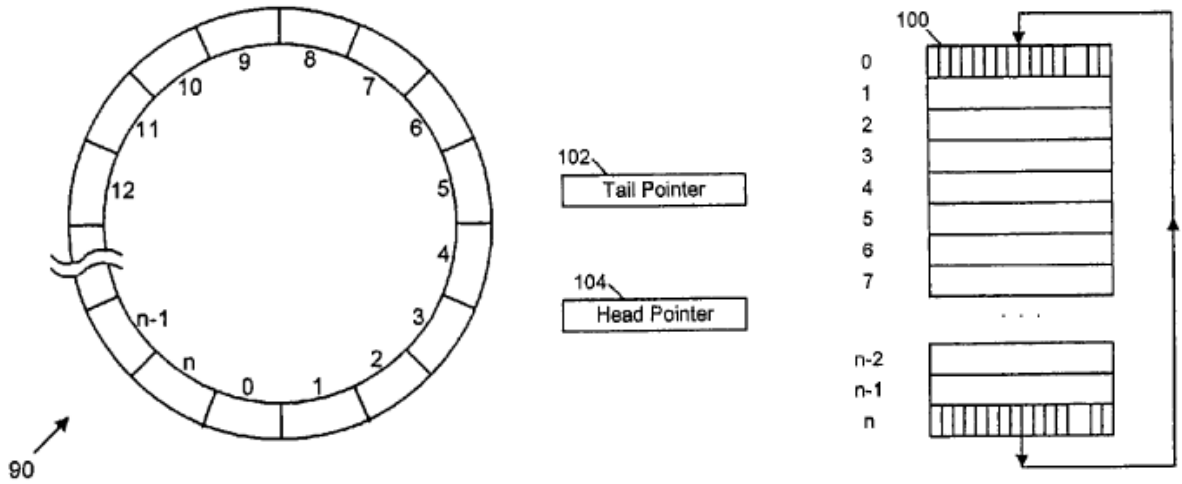


Fig. 4a

Fig. 4b

Thus, following compression, each compressed video frame is stored in the next successive frame buffer location and any frame data continued in such location is overwritten. For example, referring to FIG. 4 a, if the last frame were stored at location 3 of the circular buffer 90, the subsequent video frame would be stored at location 4 of the circular frame buffer. The video recording device, absent receipt of some trigger event from the sensor 54 or activation of other input by the user, continues to store captured frame data in successive locations of the circular buffer, overwriting previously received frame data stored in respective buffer locations with the most recently received frame data.

Id. at 7:11-22; Freeman 1 at [0037]; Freeman 2 at 6:9-20. "The operation of the circular buffer is described with more particularity below and with respect to FIG. 4b." *Id.* at 7:23-24; Freeman 1 at [0038]; Freeman 2 at 6:21-22.

Associated with the semiconductor memory buffer 58 (and additional buffer memory 60 if such is employed) are a tail pointer 102 and a head pointer 104. The head pointer points to the address of the frame buffer

> location for storage of the next frame data. Such address is offset in the respective frame to address the respective byte for the frame data being stored. For simplicity, the operation of the buffer is explained with respect to the frame addresses recognizing that plural locations are utilized within the buffer to store the data associated with any given frame.

Id. at 7:33-61; Freeman 1 at [0039] – [0040]; Freeman 2 at 6:31-59.

134. In Figures 3 and 14, the recording device includes camera 40 and video electronics 42. *Id.*, 5:40-42; *id.*, 16:4-8. The device further includes local memory (DRAMs 58, 60) coupled to camera 40 via microprocessor 54. *Id.*, 6:24-26; Freeman 1 at [0033]; Freeman 2 at 5:22-24. Microcontroller 54 has "a number of inputs 68 which permit activation of the video recording device and control of the device by a user." *Id.*, 6:40-42; Freeman 1 at [0034]; Freeman 2 at 5:38-40. Inputs include capture button 72 that causes video data in the local memory's circular buffer to be write-protected. *Id.*, 6:43-44, 7:11-22, 8:8-61, 9:17-26; Freeman 1 at [0034]; Freeman 2 at 5:41-42.

135. Inputs further include event sensor 70 configured to detect gun firings and other events. *Id.*, 8:8-61, 16:43-17:61. Upon event detection, microprocessor 54 preserves video data for the event by write-protecting it in the circular buffer. *Id.*; *see also id.*, 9:34-42; Freeman 1 at [0047]; Freeman 2 at 8:32-36. In embodiments, the microprocessor "tag[s] protected frame locations containing captured still frames and check[s] to determine whether a frame location is protected prior to writing to the frame location." *Id*., 9:39-42; Freeman 1 at [0047]; Freeman 2 at 8:37-40. In Yerazunis's

gun-camera embodiment (Figures 9-14), "recording of data continues [after a gun-firing event] since a subsequent firing event may occur," accomplished by storing pointers "defining the area(s) of the circular buffer memory" to be write-protected in a table. *Id.*, 17:45-61. This "allow[s] later retrieval of the video data pertaining to each firing of the gun." *Id.*; *see also id.*, 17:9-12.

B. Ely

136. Ely, EX1020, entitled "Distributed Video Data Storage in Video Surveillance System," was filed on April 22, 1996, and issued on November 9, 1999. Accordingly, it is my understanding that Ely is prior art to the '901 and '910 patents.

137. Figure 2 of Ely, reproduced below, is "a block diagram of a video surveillance system provided in accordance with the present invention." *Id.* at 5:21-22.

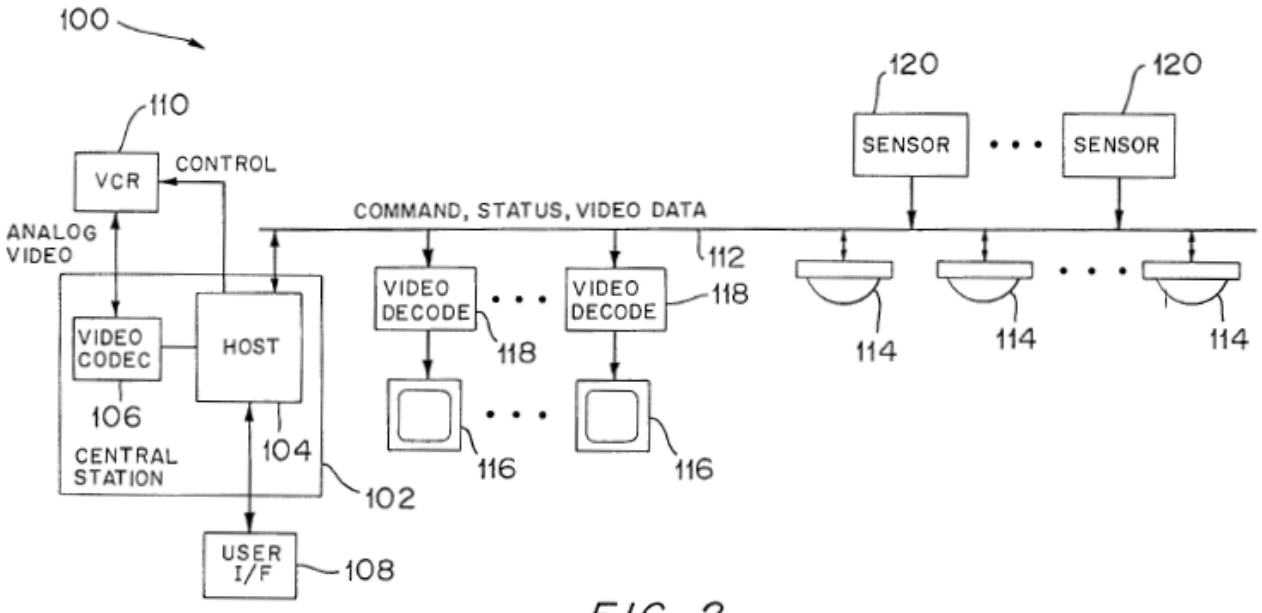


FIG. 2

Id. at Fig. 2. This figure depicts a plurality of camera units 114 and sensor devices 120, the latter of which "are preferably of conventional types that detect, for example,

unauthorized opening of doors, windows and display cases and the like and generate alarm signals indicative of these occurrences." *Id.* at 5:46-53. These system components are connected to the host computer 104 at the central station 102 via a network, which in Figure 3 is a local area network (LAN) 112. *Id.*

138. The camera units 114 are described with respect to Figure 3:

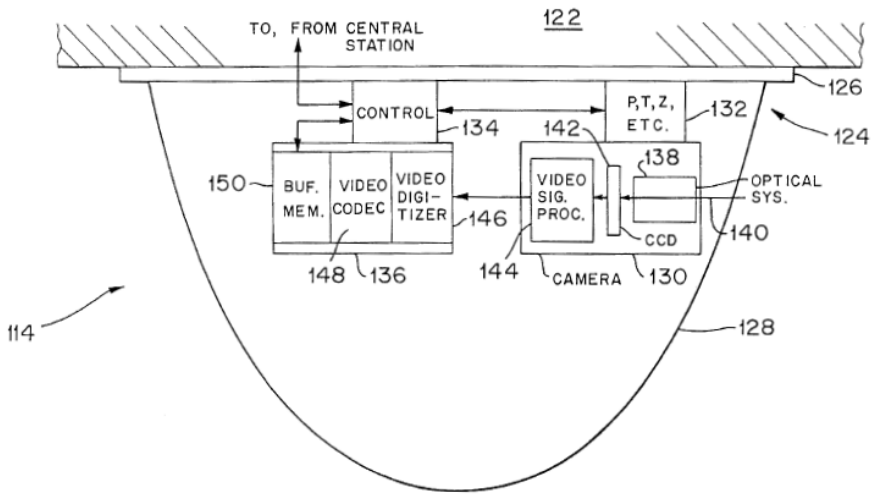


FIG. 3

Id. at Fig. 3. As seen above, the camera unit 114 includes a video camera 130 and memory board 136. *Id.* at 6:17-21, 6:48-51. The memory board 136 includes a memory device 150 that "functions as a buffer for the video signal generated by the camera 130, and is controlled by the control circuit 134." *Id.* at 6:51-53, 6:61-65. Ely states that the buffer is preferably a "ring buffer," in which "currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150." *Id.* at 7:28-34. A POSITA would have understood the "ring buffer" to mean a "circular buffer" of the type disclosed in the '901 and '910 patents.

139. Ely discloses that "over-writing of the oldest data [in the ring buffer] is subject to inhibition in response to alarm commands." *Id.* at 7:34-36. "On such occasions, the live compressed video data is written into a portion of the memory device 150 which does not hold video data that is to be preserved." *Id.* at 7:36-39. "When an alarm command is received, a process (indicated by block 160) is carried out in which the control circuit 134 protects from over-writing compressed digital video data previously stored in the memory 150, and corresponding to a time interval beginning at a predetermined time prior to receipt of the alarm command, and continuing for a predetermined time after receipt of the alarm command." *Id.* at 7:48-55. The write protecting carried out in response to an alarm command at step 160 is highlighted below:

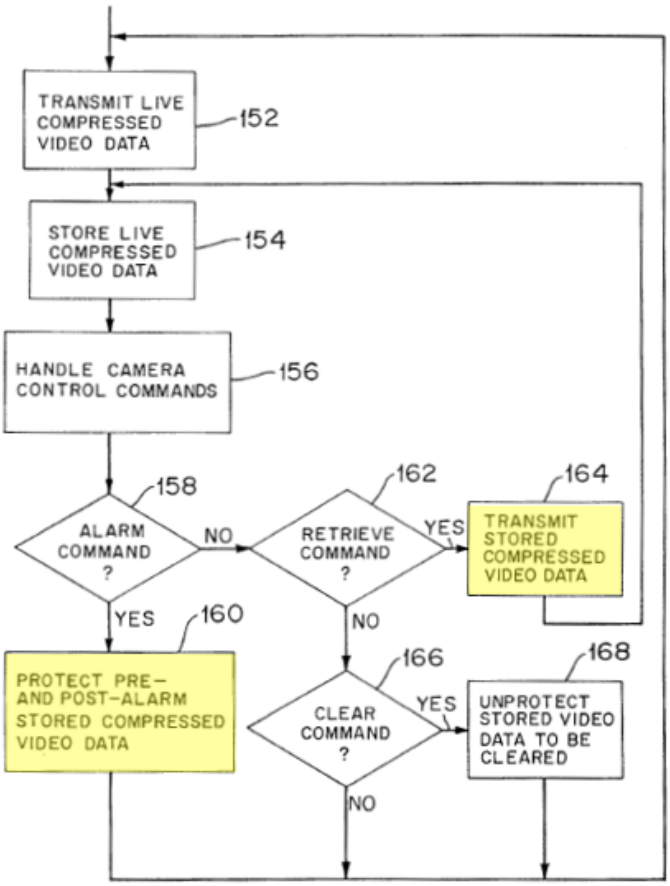


FIG. 4
CAMERA UNIT OPERATION

Id. at Fig. 4 (color added).

140. This figure illustrates "processes carried out by the control circuit 113 under the control of a stored program." *Id.* at 7:12-16. As seen above, if a "retrieve" command is received, then at step 164 (highlighted above) the control circuit 134 causes video data previously stored in the ring buffer of the memory device 150 to be transmitted to a remote central station. *Id.* at 7:56-8:6. "The stored data to be retrieved may be data that was previously protected from over-writing in response to an alarm command, or may be other data that has previously been stored in the buffer memory

150." *Id.* at 7:59-63. "As indicated by decision block 166, the control circuit 134 is also conditioned to receive 'clear' commands, in response to which the control circuit removes a previously protected block of stored video data from protection, thereby permitting 'live' video data to be written over the now-unprotected stored video data." *Id.* at 8:7-12.

C. Fiore

141. Fiore, EX1009, entitled "Data Recording and Playback System and Method," was filed April 9, 2002 and published December 19, 2002. Fiore incorporates by reference and claims priority to U.S. Provisional Application No. 60/282,162, filed April 9, 2001 (EX1030). Accordingly, it is my understanding that Fiore is prior art to the '901 and '910 patents.

142. Fiore discloses "data recording and playback systems for monitoring processes or occurrences of events which allows the replay and/or analysis of a time sampled signal." EX1009, [0003]. FIG. 2 shows a schematic illustration of the signal processor 10 in accordance with one embodiment of the present invention." *Id*. at [0043]. "As can be seen, the signal processor 10 is in communication with monitoring device 6 that provides an input signal data to the signal processor 10 such as a video, audio or other type of signal." *Id*. "The network 4 may be any type of a network such as a local area network, wireless network, wide area network, or the Internet." *Id*. at [0039]. "[I]n the networked embodiment of the present invention as shown in FIGS. 1 to 4, the network allows transfer and access of data utilized and stored by the data

recording and playback system of the present invention." *Id*. at [0077]. Fiore's circular storage buffer 15 stores data frames of an input signal from monitoring device 6 (which may be a video camera, *id.*, [0040]):

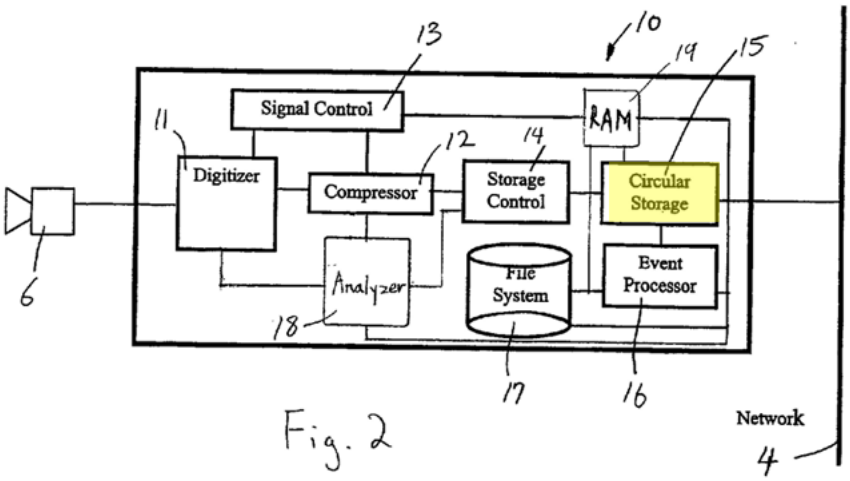
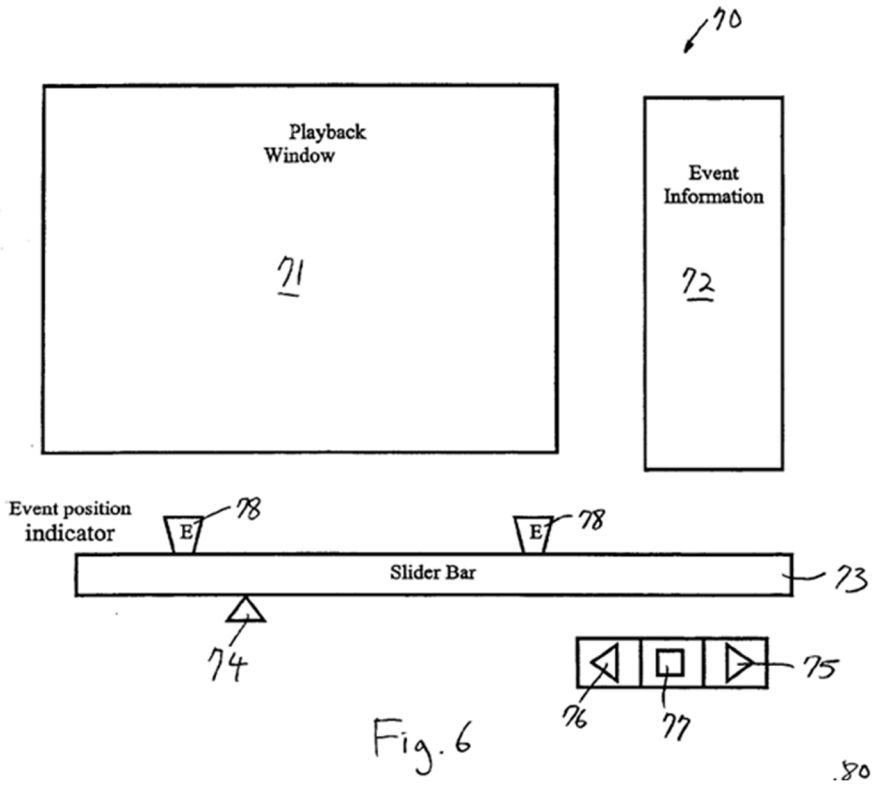


Fig. 2

Id., Fig. 2 (color added); *id.*, [0048]. Circular storage buffer 15 "may be implemented as a reserved area in memory, a disk file, or as a storage in a looped media." *Id.*, [0065]. "The signal processor 10 also includes an event processor 16 that is adapted to extract data frames starting from a data frame that is a predetermined number of data frames before the external event time provided by the server 20 as described in further detail below, and ending a predetermined number of data frames after the external event time." *Id*. at [0048]. "The extracted data frames are then stored in file system 17 thereby providing a permanent record of the data frames before, during, and after the event prior to the data frames being overwritten in the circular storage buffer 15 by more recent data frames." *Id* "[T]he event processor 16 of the present embodiment is also adapted to mark the input signal data being stored in the circular storage buffer 15

when an event occurs to thereby flag the location of an occurrence of an external event in the circular storage buffer 15, signal to mark the input signal data being provided by the event processor 16." *Id*. "Further in this regard, the event Signals may be initiated manually by the user of the data recording and playback System 10 as well using an input device Such as a keyboard, mouse, etc. So that a particular data frame in the circular Storage device may be manually marked." *Id*. at [0049].

143. Circular storage buffer 15 is implemented as a memory-mapped file. *Id.*, [0047], [0068]. In the context of Fiore, a memory-mapped file is a file "having the same address space as the memory device for storing the input signal data" to allow "the input signal data" to be "swapped between the RAM" and "the file system," "as needed." *Id.*, Abstract, [0047]. "The client circular storage control 32 receives the playback commands provided by the user playback control 31, and receives the signal data from the circular storage buffer 15 of the signal processor 10 or from previously saved event files stored in the file system 17." *Id*. at [0053]. "FIG. 6 shows one embodiment of a user playback control screen 70 which may be provided to or by the client computers 30 and 30' of FIG. 1 that allows a user to control and interface with the data recording and playback system 2." *Id*. at [0057]. "The playback control screen 70 is provided with a video playback window 71 for graphically displaying the retrieved data frames from the circular buffer 15 or the file system 17 of the signal processor 10." *Id*. "As can also be seen, the slider bar [Fig. 6] is marked by event position indicators 78 …." *Id*. at [0059]; Fig. 6.

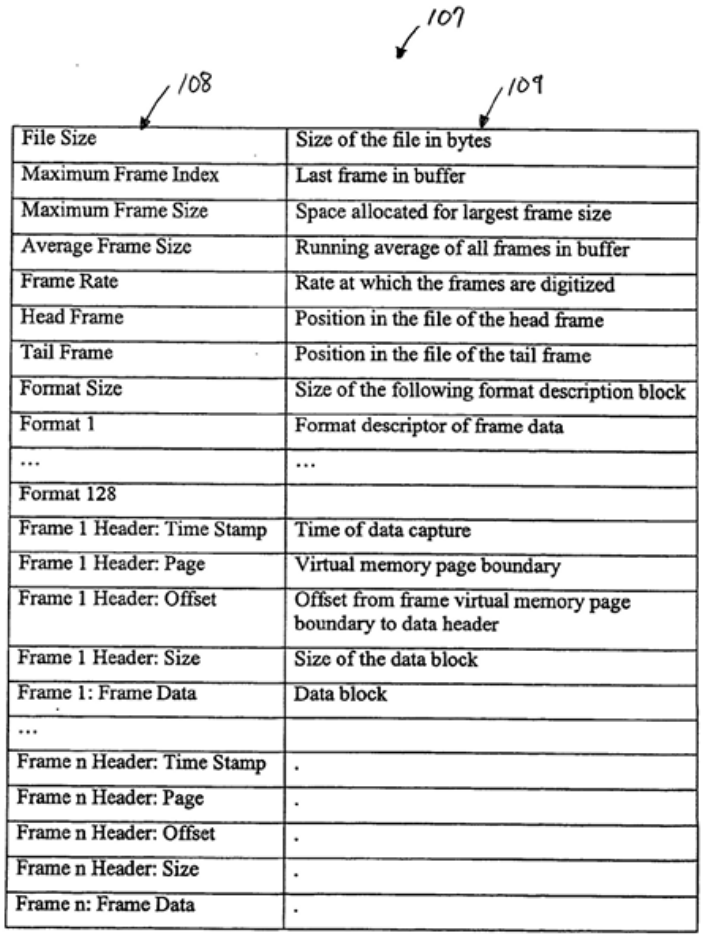


Id. at Fig. 6. "These event position indicators 78 … mark the position along the slider bar 73 where an event has occurred and is stored in the circular storage buffer 15 of the signal processor 10." *Id*. at [0059]. "The corresponding information may also be displayed in the event information window 72, the displayed event information serving as embedded links to playback the respective data frames associated to the event." *Id*.

144. "The storage control 14 provided in the signal processor 10 receives the digitized and/or compressed input signal data from the monitoring device 6, and stores the input signal data and the analysis data in the circular storage buffer 15 together with a time stamp for each record." *Id*. at [0047]. "In this regard, the circular storage buffer 15 has two unique positions, the head and tail." *Id*. "The head represents the position in the circular storage buffer 15 having the most recent signal data, and the tail position

represents the position in the buffer having the oldest signal data that is leaving the circular storage buffer 15, i.e. being overwritten by the most recent signal data." *Id.* "The circular storage buffer 15 is preferably implemented as a memory mapped file." *Id.*

145. POSITAs recognized the advantages provided by memory-mapped files, including increased input/output (I/O) performance. *Id.*, [0065]. Figure 9 "shows details of a file format in a table 107 suitable for implementing the circular storage buffer 15" (EX1009, [0064]), noting file size and other details of the file:



File Size	Size of the file in bytes
Maximum Frame Index	Last frame in buffer
Maximum Frame Size	Space allocated for largest frame size
Average Frame Size	Running average of all frames in buffer
Frame Rate	Rate at which the frames are digitized
Head Frame	Position in the file of the head frame
Tail Frame	Position in the file of the tail frame
Format Size	Size of the following format description block
Format 1	Format descriptor of frame data
...	...
Format 128	
Frame 1 Header: Time Stamp	Time of data capture
Frame 1 Header: Page	Virtual memory page boundary
Frame 1 Header: Offset	Offset from frame virtual memory page boundary to data header
Frame 1 Header: Size	Size of the data block
Frame 1: Frame Data	Data block
...	
Frame n Header: Time Stamp	.
Frame n Header: Page	.
Frame n Header: Offset	.
Frame n Header: Size	.
Frame n: Frame Data	.

Fig. 9

Id., Fig. 9. "[T]he file format shown in table 107 has been found to be well suited for implementing the circular storage buffer 15 and for storing video data that are made of sequence of frames, each representing an individual image." *Id*. at [0064]. "In addition, the size of the circular storage buffer is fixed and has a fixed size file header that points to the beginning (head) and end (tail) of the circular storage buffer data." *Id*. "Initially, it should be noted that the circular storage buffer may be implemented as a reserved area in memory, a disk file, or as a storage in a looped media." *Id*. at [0065]. "The memory mapped file 110 has a memory mapped architecture that combines the access speed of the RAM memory with large storage capacity of a disk file." *Id*. "The memory mapped architecture allows the playback from the circular storage buffer to be independent from recording into the buffer so that such recording is uninterrupted by the playback." *Id*. "In particular, the memory mapped file 110 of the circular storage buffer 15 is mapped in the sense that multiple sections of the file 120 stored on disk drives 102 and/or 103 are mapped to specific ranges of addresses within the RAM 19 of the signal processor 10." *Id*. at [0066]. "Such a configuration maximizes access and utilization of the circular storage buffer 15 while minimizing disk latency and performance penalties." *Id*. "Because the circular storage buffer is implemented via a memory mapped file 110 which is preferably a single contiguous disk file, reads and writes to adjacent virtual memory locations are insured to be physically adjacent on the disk drive." *Id*. at [0071]. "In this manner, the circular storage buffer cannot become fragmented on the disk drive.

146. Fiore teaches indexing data frames associated with events as files within circular storage buffer 15. Fiore's Background section describes conventional approaches that do not differentiate event data as files in the circular buffer. EX1009, [0005]-[0006]. In contrast, Fiore describes indexing identifiable collections of data (*i.e.*, files) for respective events in circular storage buffer 15. *Id.*, [0022]-[0023], [0051], [0059], [0060].

147. Specifically, when an external event occurs (as indicated via an event signal generated by a sensor, *id.*, [0041]), time stamps associated with the event are stored in event database 23, and "the input signal data being stored in the circular storage buffer 15 [is marked] … to thereby flag the location of an occurrence of an external event in the circular storage buffer." *Id.*, [0048], [0050], [0051]. An event processor copies data frames associated with the event—including "frames before, during, and after the event"—to file system 17. *Id.*, [0048], [0051]. The use of files in circular storage buffer 15 for indexing event data enables data to be offloaded to file system 17 for permanent preservation. *Id.*, [0022], [0051].

148. Use of files in circular storage buffer 15 also enables event data to be played back directly from circular storage buffer 15 "without interrupting simultaneous recording of new input signal data into the circular storage buffer." *Id.*, Abstract, [0023], [0057]-[0060], [0065], [0068], [0072], Fig. 6. "FIG. 7 shows an example playback control screen which has been implemented as a computer window screen 80." *Id*. at [006].

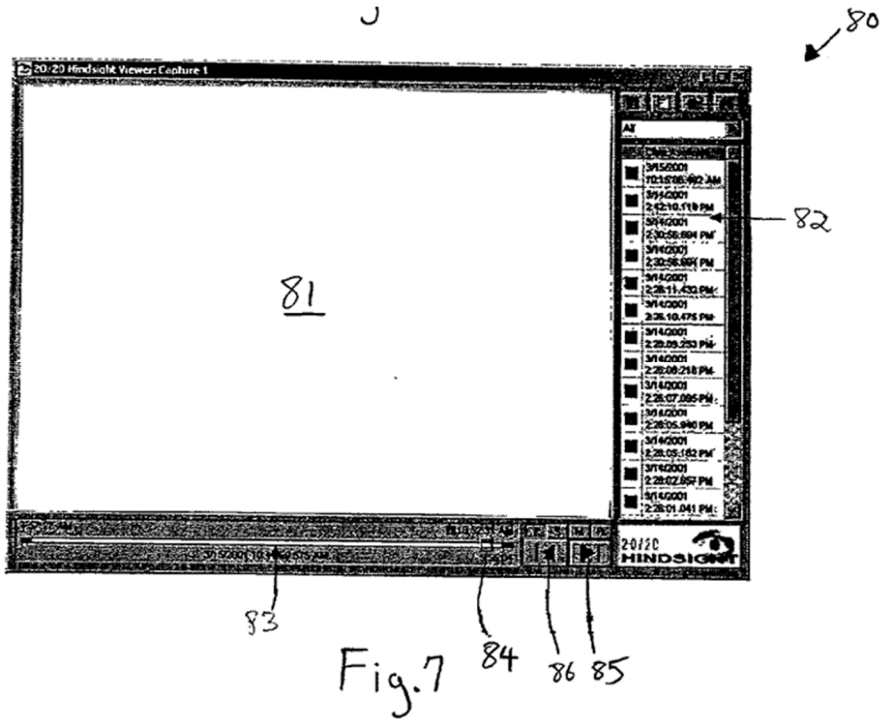


Fig. 7

Id. at Fig. 7. "As can be seen, the window screen 80 is provided with a playback window 81 that displays the reconstructed data frames, and an event information window 82 which lists the events that may be viewed the user, the listed events serving as embedded links to playback the respective data frames associated to the event." *Id*.

149. "One embodiment of the data recording and playback system also includes an event controller that provides an event signal associated to time of an event. An event database is provided for storing event signal data, and an event processor is provided that copies a plurality of data frames stored in the circular storage buffer that have time stamps proximate to the time of the event into additional secondary memory mapped files, each containing a single event, indexed from the event database. An access controller may be provided which is adapted to retrieve the plurality of data frames that have time stamps proximate to the time of the event from the event database, the event

database being provided in at least one hard disk drive of a computer in one embodiment. The access controller may be connected to a network to allow remote access thereof. In such an embodiment, the system may be provided with at least one client device connected to the network, the client device such as a computer being adapted to remotely control the access controller. In this regard, the client device may include a display device for displaying the plurality of data frames copied from the circular storage buffer." *Id.* at [0022]. Therefore, it was known to treat a circular buffer as a single file and to index write-protected portions of a circular buffer as a second, distinct file in the circular buffer.

150. Fiore's December 2002 disclosure of a file-based approach for enabling playback and offloading of data from the circular buffer without interrupting recording of new data to the circular buffer predates by many years the similar description in the '901 and '910 patents.

D. Lewellen

151. Lewellen, EX1019, entitled "Vehicle Video System and Method" was filed on July 11, 2002, and published on January 15, 2004. Accordingly, it is my understanding that Lewellen is prior art to the '901 and '910 patents.

152. Lewellen describes a "vehicle video system" that "records video information on a digital video recorder that uses digital media such as a hard disk drive." EX1019 at Abstract. Lewellen discloses that "a vehicle video system includes a small camera in the passenger area." *Id*. at [0010].

> The vehicle video system records video information on a digital video recorder that uses digital media such as a hard disk drive, recordable CD (CD-R), rewritable CD (CR-RW), or writable Digital Video Disc (DVD). The vehicle video system includes a local wireless interface, such as a Bluetooth-compatible interface, that automatically connects to a compatible device in the parking area of the vehicle that is coupled to a database. In this manner, the digital video information collected by the vehicle video system is automatically transferred to the database when the vehicle is parked, removing the need for any human intervention for the logging and cataloging of video tapes. The local wireless interface of the vehicle video system also allows other devices, such as a handheld device or a vehicle video system in a different vehicle, to access the stored digital video information.

Id. "Vehicle video system 300 includes a local wireless interface 390." *Id*. at [0031]. "Local wireless interface 390 provides a significant advantage over the prior art vehicle video systems." *Id*. "Devices enabled with Bluetooth wireless technology will be able to: free electronic accessories and peripherals from wired connections" and "exchange files." *Id*. at [0035]. "Products that incorporate a Bluetooth interface are already on the market." *Id*. at [0040]. "Nokia Corp. is selling its Bluetooth 6310 phones in Europe, and are expected to be available in the United States sometime in 2002." *Id*. "Bluetooth wireless technology…provides links between mobile computers, mobile phones, other portable handheld devices, and connectivity to the Internet." *Id*. at 32.

153. "The digital video information collected by the vehicle video system is automatically transferred" via a wireless interface to a "database when the vehicle is parked, removing the need for any human intervention for the logging and cataloging of video tapes." *Id.* Figure 3 of Lewellen depicts a vehicle video system 300 having long-distance and local wireless interfaces (380, 390, respectively):

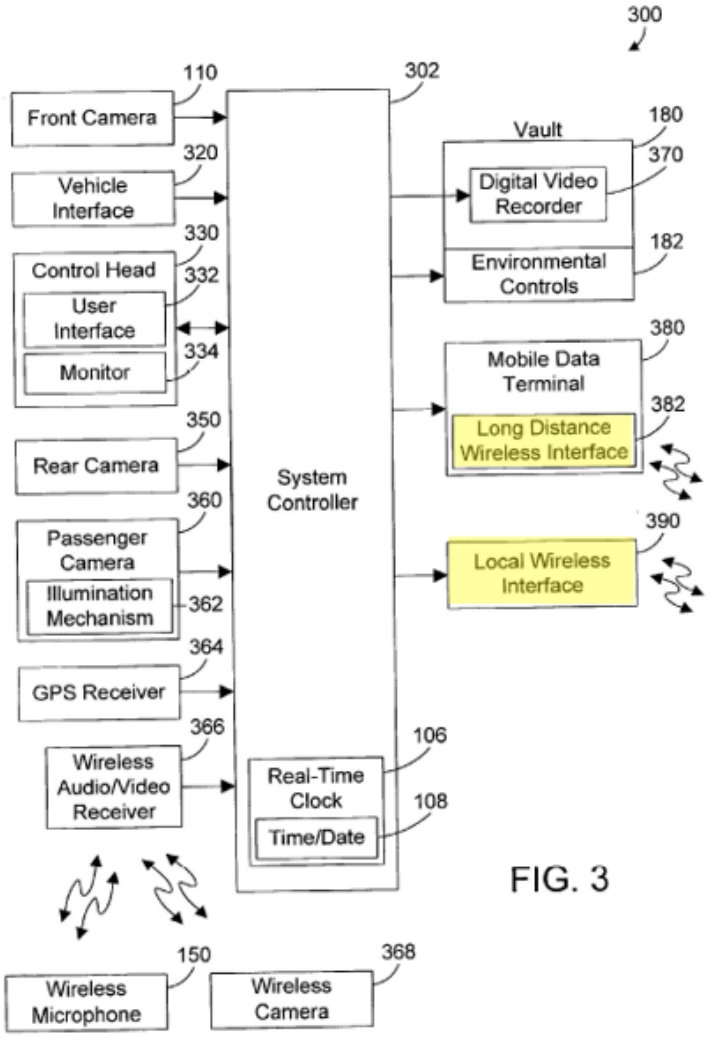


FIG. 3

Id. at Fig. 3 (color added).

154. The long-distance wireless interface 382 enables communication with police headquarters, whereas the local wireless interface 390 enables communication with devices located in the nearer vicinity via short-range wireless communications. *Id.* at [0030]-[0031]. "The local wireless interface of the vehicle video system … allows other devices, such as a handheld device or a vehicle video system in a different vehicle, to access the stored digital video information." *Id.* at Abstract. The local wireless interface 390 may be "a Bluetooth-compatible interface, which can communicate with other Bluetooth-compatible devices," including mobile phones. *Id.* at [0031], [0037], [0041]. Lewellen explains that the "benefit of providing the local wireless interface 390 is that digital information recorded by the digital video recorder 370 may be automatically transmitted and received to and from compatible devices." *Id.* at [0043]. "As shown in FIG. 5, one example of a compatible device is a parking area data transfer mechanism 510." *Id.* "A second example of a compatible device is a portable data transfer mechanism 520." *Id.* "A third example of a compatible device is a vehicle video system 300A in a different vehicle." *Id.* For example, "[i]n response to the upload command, the vehicle video system transmits digital data to the parking area data transfer mechanism (step 860)" including "recorded digital video data." *Id.* at [0049]. "[T]he present invention relieves the law enforcement officer from the chore of handling video tapes." *Id.* at [0045].

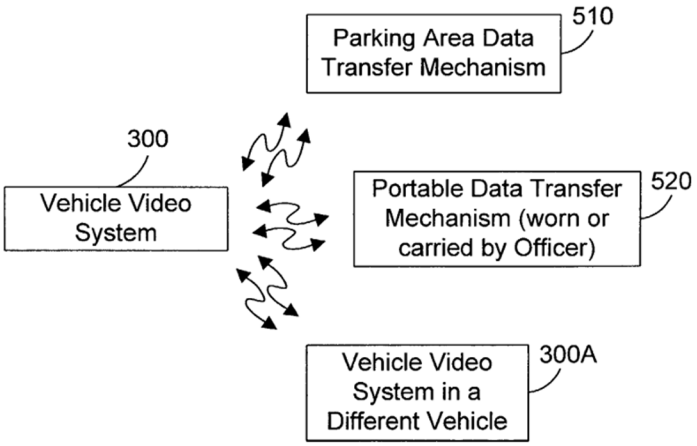


FIG. 5

"Referring back to FIG. 5, a second suitable wireless device that is compatible with the local wireless interface 390 in the vehicle video system 300 is a portable data transfer mechanism 520, which may be worn or carried by a law enforcement officer." *Id*. at [0046]. "Such a portable data transfer mechanism 520 could act in the same manner as the parking area data transfer mechanism 510, exchanging digital information in both directions as needed." *Id*. "Note, however, that the portable nature of the portable data transfer mechanism 520 allows for easily exchanging digital information with the vehicle video system 300 in the field, without having to return to the parking garage." *Id*.

> During the chase, let's assume that the police car is wrecked. If the only data transfer mechanism were in the parking garage, the car would have to be towed to the parking garage to retrieve the digital information recorded by the digital video recorder 370. However, with a portable data transfer mechanism 520 or using a vehicle video system in a different vehicle 300A, the stored digital information in the wrecked

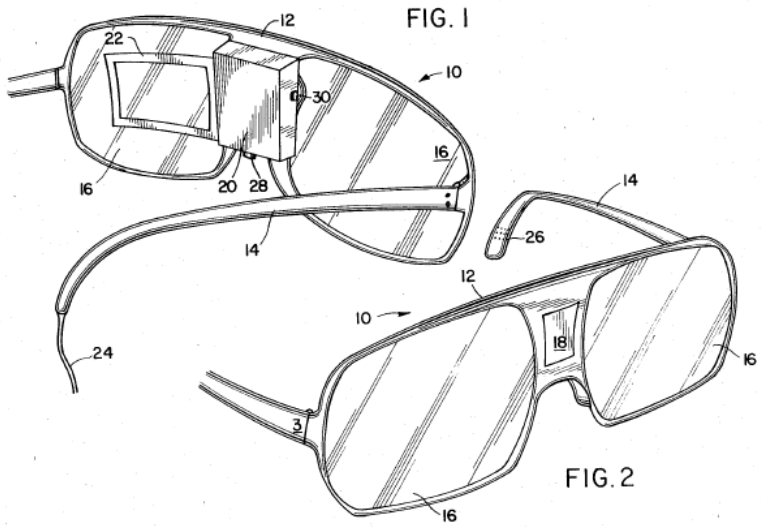
> police car can be uploaded to a different device, which can then transfer the data to the central database. We see from this simple example that exchange of digital information in the field is a significant advantage of the preferred embodiments.

Id. at [0047].

E. Campbell

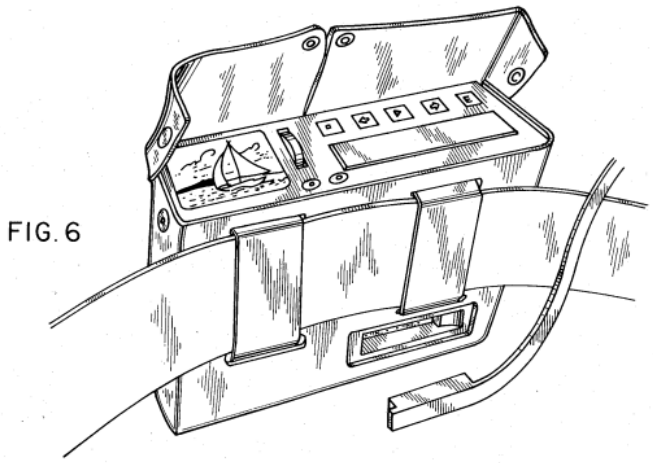
155. Campbell, EX1059, entitled "Portable Electronic Camera," was filed October 27, 1983 and issued May 7, 1985. Accordingly, it is my understanding that Campbell is prior art to the '901 and '910 patents.

156. Campbell describes a "video recording device" "arranged to be worn by the user like a pair of spectacles." EX1056, Abstract. A camera may be concealed within the spectacle frame (*id.*, Abstract, 2:46-51, Figs. 1, 2 (miniature camera 20)) or between the lenses (*id.*, 4:5-9, Fig. 5 (camera 72)), or a pair of cameras may be mounted adjacent to each hinge on the frame (*id.*, 3:49-59, Figs. 3, 4). Mounting a camera to spectacles in this fashion "has a wide range of uses," including "in the security and military fields where concealment is sometimes desirable." *Id.*, 6:3-20.



Id., Figs. 1, 2.

157. Campbell states it is "preferred that the video camera be connected to a recorder mounted on the user's person, and it is particularly preferred that the recorder be mounted on a belt, in such a manner as to be concealed, as shown in FIG. 6":

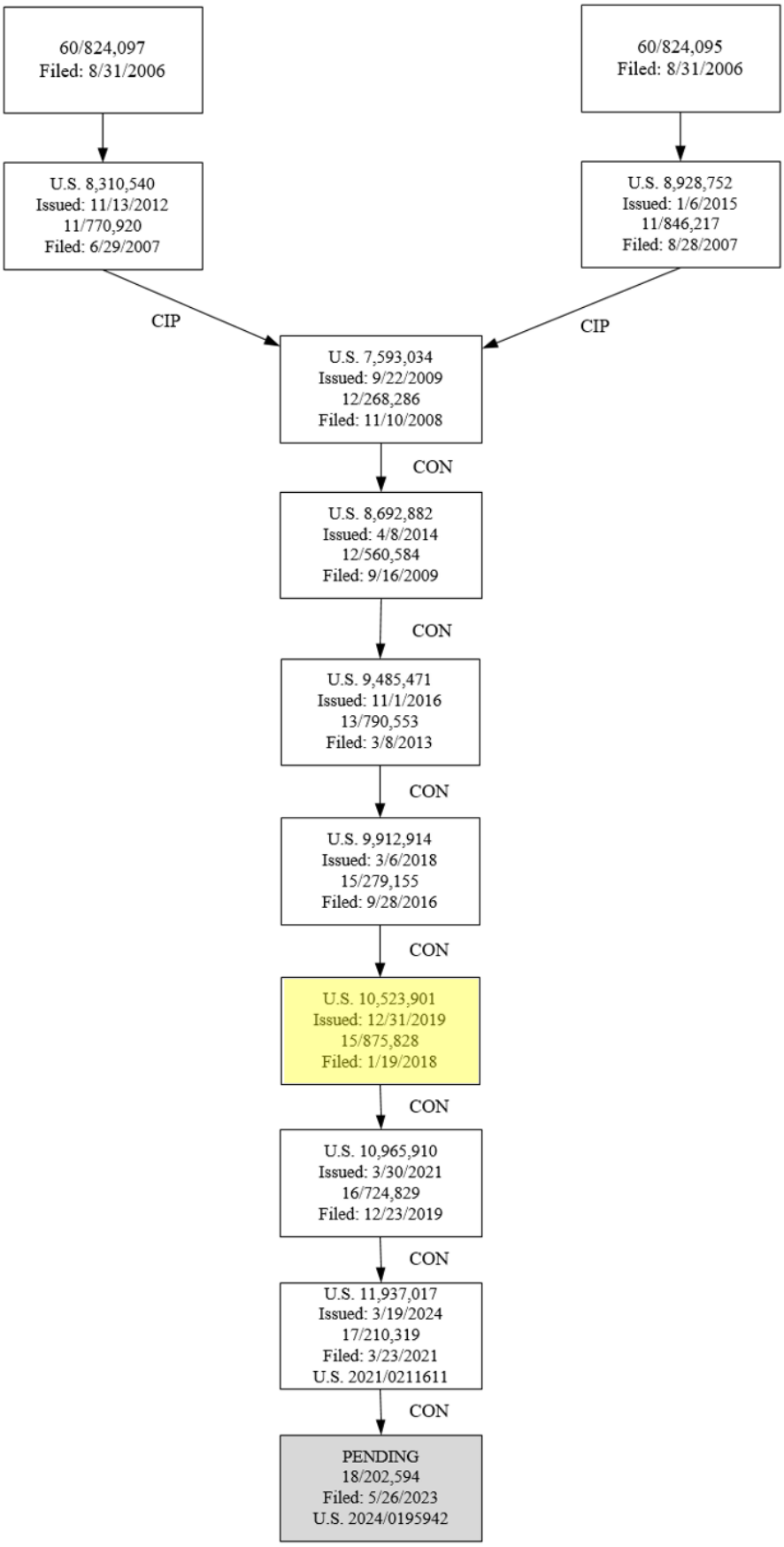


Id., 4:42-46, Fig. 6. The recorder comprises a "recording medium" that may be any "means of storing a signal from the CCD." *Id.*, 4:49-55.

158. Campbell describes a "transmitting means" that "may involve a cable connecting the portable camera" to the belt-worn recorder, or "may include a radio or other transmitter for transmitting the signal to a remote recording station" for preservation, display, or playback. *Id.*, 1:57-59, 1:65-2:2, 5:1-55.

VIII. ’901 Patent: Claims 1-25

159. The ’901 patent of the Stellar patent family is highlighted below:


60/824,097
Filed: 8/31/2006
60/824,095
Filed: 8/31/2006
U.S. 8,310,540
Issued: 11/13/2012
11/770,920
Filed: 6/29/2007
U.S. 8,928,752
Issued: 1/6/2015
11/846,217
Filed: 8/28/2007
CIP
CIP
U.S. 7,593,034
Issued: 9/22/2009
12/268,286
Filed: 11/10/2008
CON
U.S. 8,692,882
Issued: 4/8/2014
12/560,584
Filed: 9/16/2009
CON
U.S. 9,485,471
Issued: 11/1/2016
13/790,553
Filed: 3/8/2013
CON
U.S. 9,912,914
Issued: 3/6/2018
15/279,155
Filed: 9/28/2016
CON
U.S. 10,523,901
Issued: 12/31/2019
15/875,828
Filed: 1/19/2018
CON
U.S. 10,965,910
Issued: 3/30/2021
16/724,829
Filed: 12/23/2019
CON
U.S. 11,937,017
Issued: 3/19/2024
17/210,319
Filed: 3/23/2021
U.S. 2021/0211611
CON
PENDING
18/202,594
Filed: 5/26/2023
U.S. 2024/0195942

160. As shown above, the ’901 patent claims priority back to USP 7,593,034 (the ’034 patent, EX1010), filed November 10, 2008, as a continuation application. The ’034 patent claims priority as a continuation-in-part to U.S. App. No. 11/770,920 (the ’920 application, EX1011), filed on June 29, 2007, and U.S. App. No. 11/846,217 (the ’217 application, EX1012), filed August 28, 2007. As noted above, I have been asked to apply the June 29, 2007 filing date of the ’920 application as the priority date for the challenged claims of the ’901 patent.

A. Summary Of The ’901 Patent File History

161. I understand that Application No. 15/875,828, which eventually issued as the ’901 patent, was filed on January 19, 2018 with 24 claims. EX1058, 1-36. During prosecution, the Office rejected claims 1-24 as being unpatentable over U.S. 5,523,799 to Hattori (EX1016) in combination with other prior art. *Id*., 319-331. After Applicant made several narrowing amendments and added new claim 25 (*id*., 352-360, 393-402), the Office allowed the claims (*id*., 403-409).

B. Ground 1a: Claims 1-14 And 19-25 Of The ’901 Patent Would Have Been Obvious Over Yerazunis In View Of Campbell

162. Claims 1-14 and 19-25 would have been obvious over the combination of Yerazunis (EX1017) and Campbell (EX1059).

1. Motivation To Combine

163. A POSITA would have been motivated to combine Yerazunis and Campbell. First, each of Yerazunis and Campbell discloses compact, mountable video

recording systems, such that a POSITA would have been aware of and motivated to combine these references.

164. Second, Campbell describes why a POSITA would have been motivated to implement Yerazunis's video recording device in an eyeglasses-mounted apparatus. For example, Campbell's apparatus is "hands free" and "provides almost instantaneous recording of a scene as the act of looking at the scene points the camera and the view finder towards that portion of the scene to be captured." EX1059, Abstract. Campbell's eyeglasses-mounted apparatus would therefore facilitate, for example, a police officer's on-foot pursuit of a suspect, as it would free the officer's hands and would not require the officer to "point" a recorder in the direction of the suspect. Campbell also teaches that mounting to eyeglasses is useful "in the security and military fields where concealment is sometimes desirable." *Id.*, 6:3-20.

165. Further, Yerazunis describes why a POSITA would have been motivated to implement Yerazunis's teachings of a circular buffer in Campbell's eyeglasses-mounted device. Yerazunis describes capturing multiple events in a circular buffer without overwriting event data. By preserving only event data and overwriting unimportant data, Yerazunis requires less memory storage. EX1017, 10:37-49, Recording could also be triggered automatically and capture pre-event and post-event data. *Id.*, Abstract. A POSITA would have had a reasonable expectation of success because Yerazunis provides a detailed disclosure of its buffer-based approach, and

applying those techniques to Campbell's eyeglasses-mounted apparatus would have been routine and well within a POSITA's skill.

2. Independent Claim 1

a) Preamble: A recording system for saving a sequence of clips comprising:

166. Yerazunis discloses the preamble of claim 1. Yerazunis discloses "a video recording device" that "is contained within a compactly sized housing" and captures video images for, e.g., security purposes. EX1017, 2:12-14; *see also id*., 1:17-43. Further, Yerazunis's video recording device saves sequences of clips, as recited in the preamble. *Id.*, 14:45-64; 15:9-13.

167. Campbell also discloses the preamble of claim 1. Campbell's eyeglasses-mounted apparatus "can be used to record moving pictures or still pictures." EX1059, Abstract.

b) Element 1: a pair of eyeglasses having a sensor that captures sensor data;

168. Yerazunis discloses this element. Yerazunis's video recording device includes camera 40 that discloses the "sensor that captures sensor data":

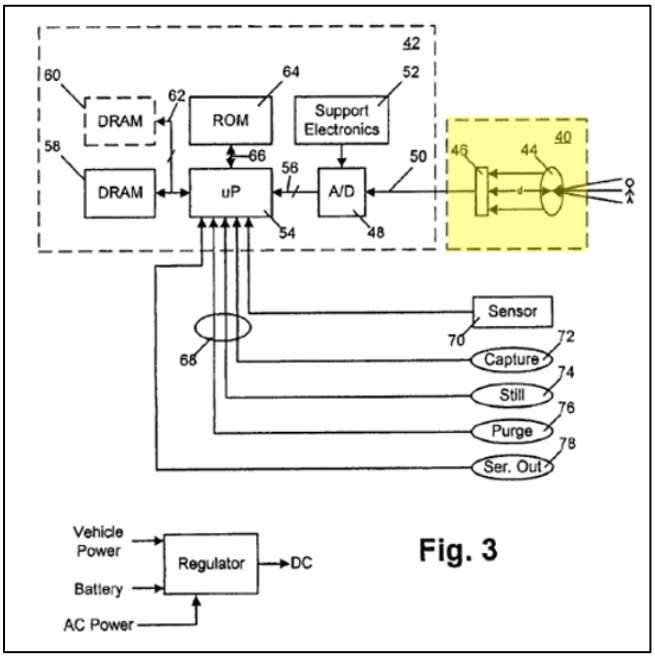


Fig. 3

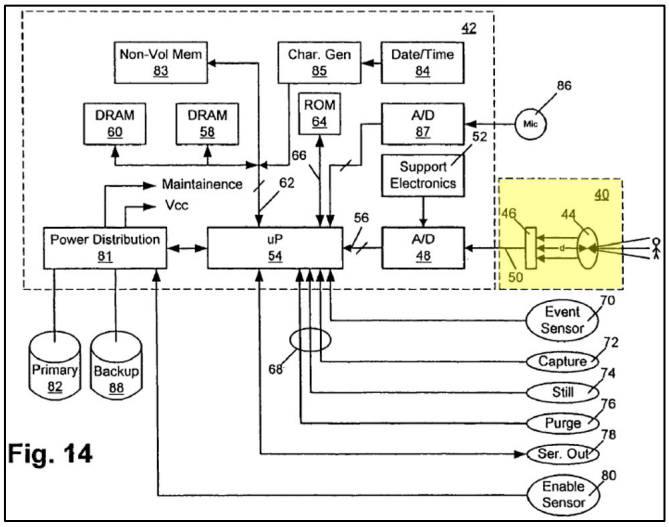


Fig. 14

EX1017, Figs. 3, 14 (color added); *see also id.*, 2:33-41.

169. In Yerazunis, the camera 40 is "comprised of a lens 44 which is disposed a predetermined distance d from the surface of an image sensor 46." *Id.*, 5:43-45. "The image sensor 46, as described above, may comprise a [CCD] array, an artificial retina, or any other suitable image sensor operative to provide an output signal representative of a video image which impinges upon the sensor." *Id.*, 5:45-49. The output signal is

"an analog signal which is coupled to one or more A/D converters" that "generate a digital representation of the video image." *Id.*, 2:37-41. The camera 40 discloses the "sensor" because it has an image sensor 46 that captures video images impinging on it ("sensor data").

170. I further note that Yerazunis's disclosure of the camera 40 is similar to that of the '901 patent referring to cameras as being sensing devices. EX1048, 4:16-43.

171. Yerazunis discloses a "compact video image recording device" that can be utilized in a number of different applications, including mounted to a vehicle, bicycle, or gun. EX1017, Abstract, 4:35-56, 9:8-14, 14:45-15:20.

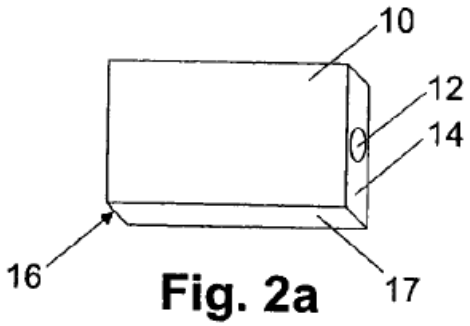


Fig. 2a

Id., Fig. 2a.

172. To the extent Yerazunis does not disclose the sensor being part of "a pair of eyeglasses," the '901 patent discloses "[t]he eyeglasses 110 are used here euphemistically to represent any type of camera mount" (EX1048, 3:62-63), such as the examples Yerazunis discloses. And, regardless, including Yerazunis's sensor as part of a pair of eyeglasses would have been obvious in view of Campbell. Campbell

discloses a pair of eyeglasses having a sensor that captures sensor data. The reference specifically discloses one or more cameras, typically CCD devices, comprising a video receptor and mounted to eyeglasses for capturing video. EX1059, 2:47-52, 3:27-33, 3:49-59.

173. A POSITA would have been motivated to implement Yerazunis's sensor that captures sensor data in a pair of eyeglasses, as taught by Campbell, for at least the reasons explained in Section VIII.B.1. The '901 patent also concedes that eyeglasses cameras were known in the art, citing EP 1,064,783 to Mann (EX1015) and stating Mann "describes a camera mountable to a pair of eyeglasses that continuously saves recorded images to a circular buffer in a computer on the user's waist." EX1048, 2:1-3.

c) Element 2: a first memory communicatively coupled with the sensor; and

174. Yerazunis discloses this element. Specifically, Yerazunis's video recording device includes video electronics 42 with semiconductor memory comprising DRAMs 58, 60 that disclose the "first memory communicatively coupled with the sensor" (EX1017, 5:40-43, 6:24-36):

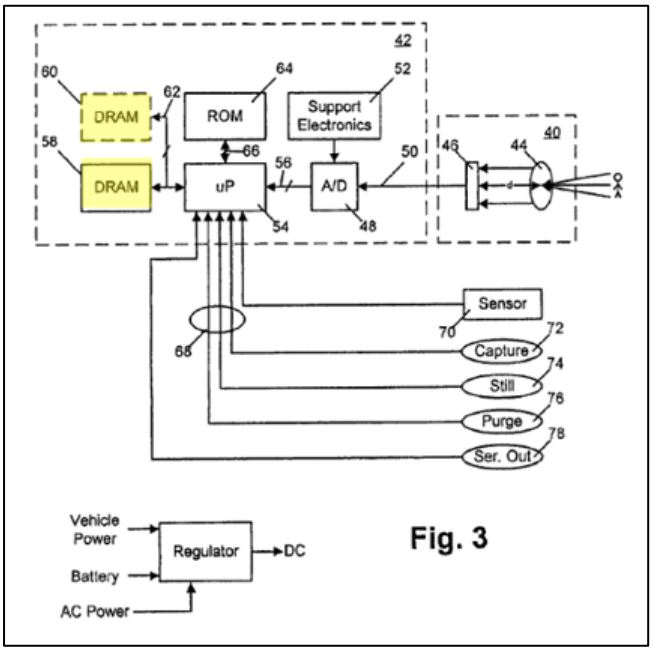


Fig. 3

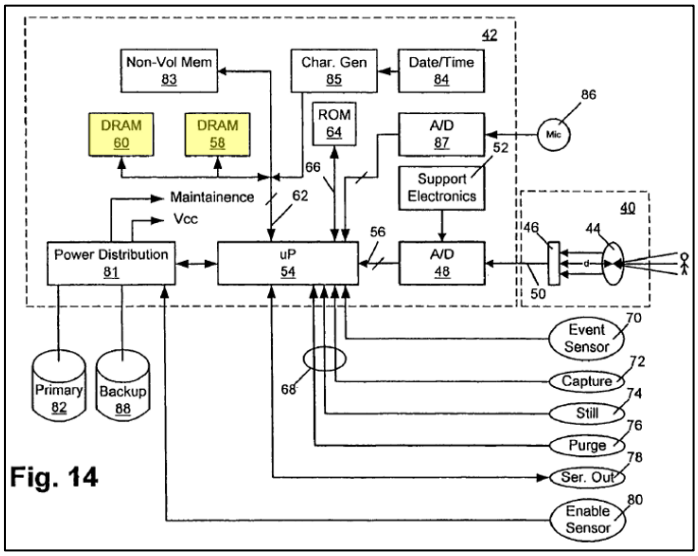


Fig. 14

Id., Figs. 3, 14 (color added).

175. DRAMs 58, 60 are coupled to camera 40 (*i.e.*, the sensor). Microprocessor 54 and DRAM 58 "may be obtained as a single integrated circuit [IC]" (*id.*, 6:24-29), meaning their connection would be via physical connectors on the IC (*e.g.*, conductive lines and/or vias, etc.). DRAM 60 is "coupled to the microprocessor 54 via a bus 62." *Id.*, 6:30-36. Microprocessor 54, in turn, is coupled to analog-to-digital converter

(ADC) 48 "via signal path 56 which comprises a parallel signal bus." *Id.*, 6:14-23. Finally, ADC 48 is coupled to camera 40 "via signal path 50" to enable ADC 48 to sample the output of image sensor 46 at predetermined intervals. *Id.*, 5:40-67. Accordingly, DRAMs 58, 60 are "communicatively coupled with the sensor."

176. Campbell also discloses "a first memory communicatively coupled with the sensor." Specifically, Campbell's recorder is "connected to" the "video camera" and comprises a "recording medium" ("memory") for "storing a signal from the CCD." EX1059, 4:42-55.

d) Element 3: a computer processor configured to: record the sensor data in the first memory;

177. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

178. ***Patent Owner's Constructions:*** I understand Patent Owner's position is that the "computer processor configured to" claim limitations are not MPF limitations, and that claim 1 broadly covers any "computer processor" configured to perform the functions recited in the claim. EX1056, 008-019. Yerazunis's microprocessor 54 (a computer processor) records sensor data from camera 40 in DRAM 58 (the first memory). Specifically, Yerazunis's video recording device under control of microprocessor 54 "records video frames successively in at least one circular buffer memory organized as a continuous loop." EX1017, 2:19-23, 17:9-20, 17:50-59. Camera 40 captures video, and ADCs 48 convert the captured video into a digital signal.

Id., 5:40-67. The digital signal is provided to microprocessor 54, which "compresses the digitized frame data and stores the compressed frame data in the next sequential location of [a] circular buffer" formed in DRAM 58. *Id.*, 2:45-47, 6:24-26, 6:52-7:6, 10:55-67, 11:50-14:44, 17:50-59, and Figs. 3, 4a, 4b, 6-8, 14.

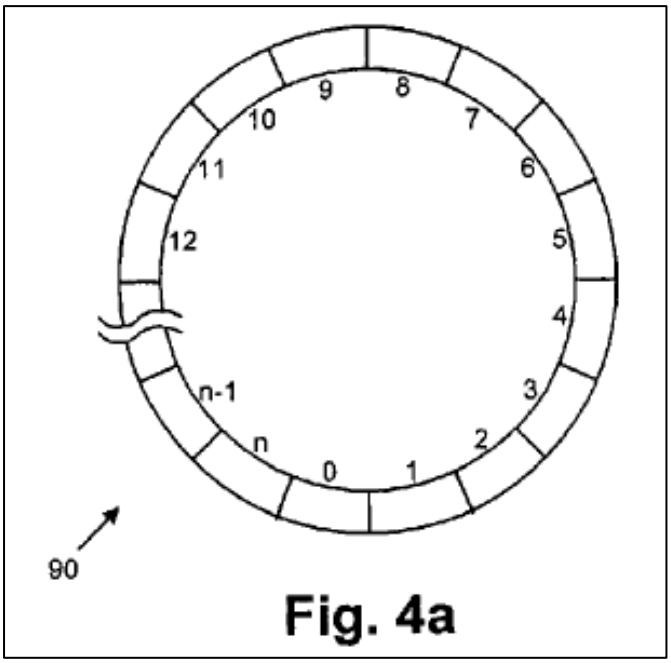


Fig. 4a

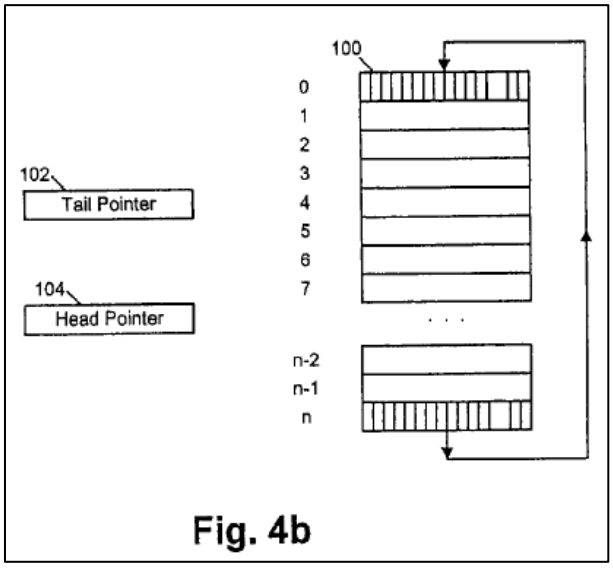


Fig. 4b

Id., Figs. 4A, 4B.

179. Figure 5 depicts aspects of Yerazunis's process for "record[ing] the sensor data in the first memory" at least at steps 122, 124, 126, and 130.

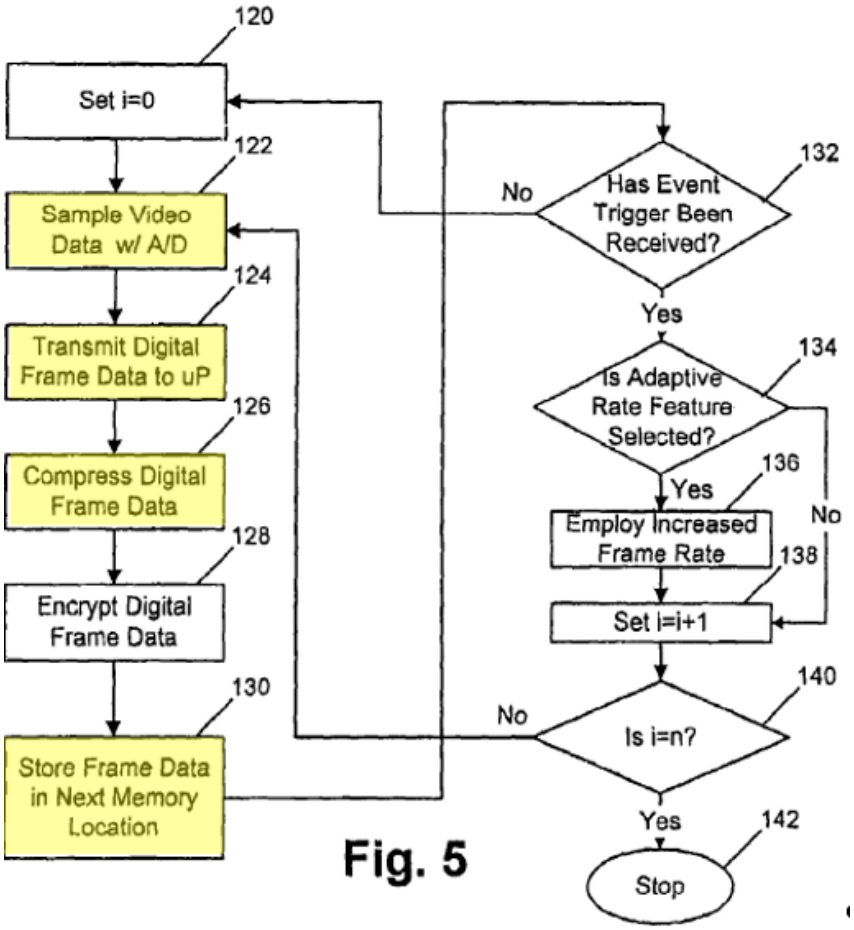


Fig. 5

Id., Fig. 5 (color added); *see also id.*, 10:55-11:7.

180. Therefore, Yerazunis describes a "computer processor" (microprocessor 54) that is "configured to: record the sensor data in the first memory," disclosing element 3 under Patent Owner's non-MPF position.

181. Yerazunis also discloses element 3 under Patent Owner's MPF position. I understand Patent Owner also contends the corresponding structure for elements 3-7 broadly encompasses any "component of a recording device including software or

hardware that accomplishes the functions described." EX1057, 008-014. As explained for Patent Owner's non-MPF position, Yerazunis's microprocessor 54 runs software to accomplish the function of "record the sensor data in the first memory." *See also* EX1017, 6:17-23, 6:37-51. Yerazunis thus discloses element 3 under Patent Owner's MPF position.

182. ***Petitioner's Construction:*** I understand Petitioner has identified the following corresponding structure for element 3: "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 4:67-5:2, 5:38-50, Fig. 3, 7:48-59, Fig. 4A, 7:60-65." EX1057, 008-009. Yerazunis discloses this corresponding structure.

183. Yerazunis discloses a recorder with memory that runs software to accomplish functions, consistent with the '901 patent's disclosure at 4:67-5:2. In particular, Yerazunis discloses video electronics 42 (a recorder) having microcontroller 54 that runs software for performing instructions. EX1017, 6:17-23, 6:37-51. The video electronics 42 include DRAM 58, 60 (memory), and microprocessor 54 records sensor data from camera 40 in the circular buffer formed in the memory, consistent with the '901 patent's disclosure at 2:33-39, Fig. 3, 7:48-59, 7:60-65, and Figure 4A:

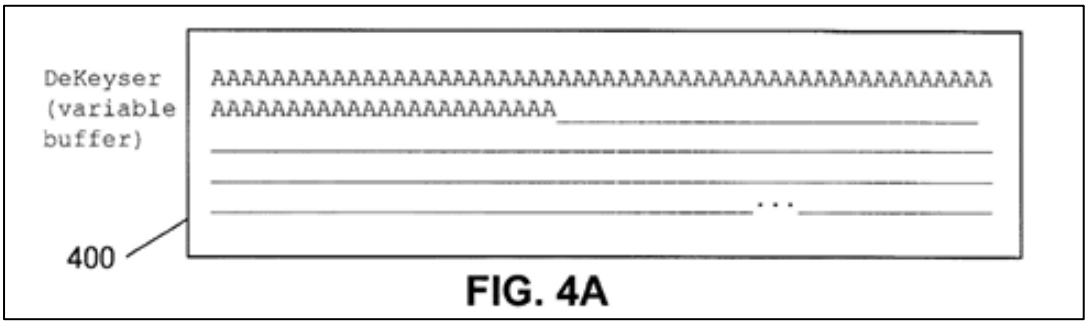


FIG. 4A

184. In Figure 4A, a recording facility records data stream "A" into circular buffer 400. EX1048, 7:60-65.

185. In Yerazunis's gun-camera embodiment, microprocessor 54 stores a first digital data stream generated by one or more ADCs 48 in a circular buffer formed in DRAM 58, 60 (memory). EX1017, 2:19-23, 2:45-47, 6:24-26, 6:52-7:6, 10:55-67, 11:50-14:44, 17:9-20, 17:50-59, and Figs. 3, 5 (*e.g.*, steps 122, 124, 126, 130), 6-8, 14. A POSITA would have understood the digital output of Yerazunis's ADCs 48 as including data streams because the output is a continuous sequence of data. EX1017, 2:33-52, 5:49-67, 6:52-56, 7:23-32; Appx MM (included in EX1041) at 109.

186. Further, in recording the sensor data in the circular buffer formed in the memory, Yerazunis's microcontroller 54 skips over write-protected matter, consistent with the '901 patent's disclosure at 2:33-39. *Id.*, 3:28-33, 17:45-61. Yerazunis's recorder (video electronics 42) records the sensor data "in digital [or analog] format," consistent with the '901 patent's disclosure at 5:38-50. *Id.*, 2:37-47, 5:49-67, 6:14-16, 6:52-57.

e) Element 4: in response to a first trigger signal, designate for saving a first portion of the sensor data that was captured prior to occurrence of the first trigger signal, wherein the portion of the sensor data occupies a portion of the first memory that is less than the entirety of the first memory and corresponds to a length of time prior to the first trigger signal;

187. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

188. ***Patent Owner's Constructions:*** Yerazunis's microprocessor 54 is a "computer processor" that performs the function of element 4, under Patent Owner's non-MPF position. EX1056, 008-019. In embodiments, microprocessor 54 comprises "a number of inputs 68 which permit activation of the video recording device and control of the device by a user." EX1017, 6:40-42, Figs. 3, 14. Inputs include still button 74, the activation of which causes a video frame to be "stored within a frame location within the circular buffer," with the "frame [being] protected from overwriting while video capture within the circular buffer continues." *Id.*, 9:27-31, 9:34-42.

189. Further, in Yerazunis's gun-camera embodiment, event sensor 70 generates a "gun firing signal" "upon discharge of the gun." *Id.*, 3:20-33, 8:8-25, 14:55-61. Upon detecting the gun-firing signal, microprocessor 54 causes "specified frame data associated with [the] firing event both before and after the event" to be "preserved," such that it "cannot be overwritten as a result of further use of the gun or subsequent firing events." *Id.*, 3:25-38, 8:26-30, 15:9-13. With the specified frame data write-

protected, "[f]rame data associated with each subsequent firing event[] is stored within an unused portion of the circular buffer memory." *Id*., 3:31-33. Microprocessor 54 performs the claimed function of element 4 ("in response to a first trigger signal, designate for saving a first portion of the sensor data that was captured prior to occurrence of the first trigger signal").

190. Yerazunis also discloses "wherein the portion of the sensor data occupies a portion of the first memory that is less than the entirety of the first memory." Yerazunis discloses its "circular buffer memory may be subdivided evenly to accommodate a predetermined number of firings of the gun," such that the first firing event occupies less than the full buffer. EX1017, 17:9-20. For the above reasons, Yerazunis discloses element 4 under Patent Owner's non-MPF position.

191. Further, Yerazunis discloses element 4 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Yerazunis's microprocessor 54 runs software to accomplish the function of element 4. *See also id.*, 6:17-23, 6:37-51. Yerazunis thus discloses element 4 under Patent Owner's MPF position.

192. ***Petitioner's Construction:*** Yerazunis discloses the corresponding structure identified by Petitioner: "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, Fig. 4B, 8:9-37, Fig. 4C, 8:52-67, 9:62-10:5." EX1057, 009-010.

193. As explained for Petitioner's corresponding structure for element 3 of claim 1, Yerazunis discloses a recorder (video electronics 42) with memory and microcontroller 54 that runs software to accomplish functions, consistent with the '901 patent's disclosure at 2:33-39, 4:67-5:2, 5:38-50, 7:48-59, and Fig. 3. EX1017, 6:17-23, 6:37-51. Further, the operation of Yerazunis's microprocessor 54 is consistent with the '901 patent's disclosure at 2:46-64, Fig. 4B (described at 8:9-37), and Fig. 4C (described at 8:54-67):

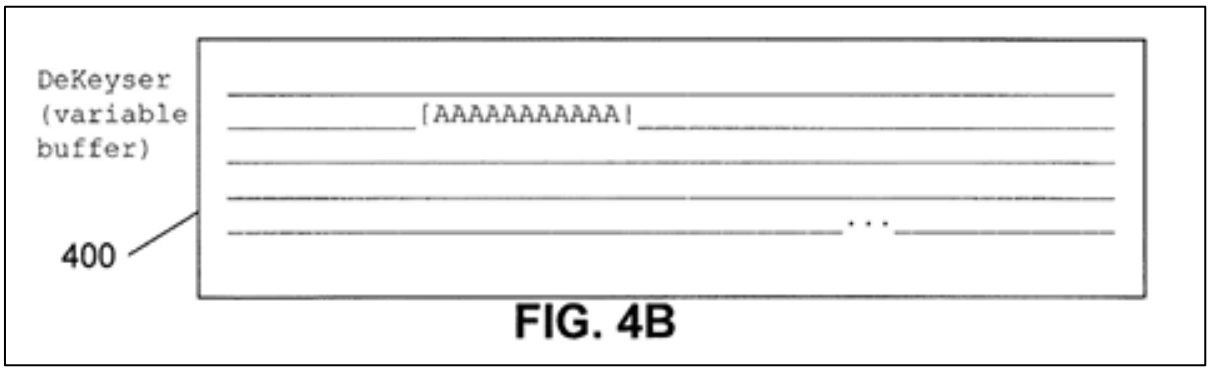


FIG. 4B

194. In Figure 4B, the protecting facility has protected a recent period of data stream "A" as a function of a "start" signal. In protecting recent data, the system can protect a historical time period preceding the "start" signal. EX1048, 8:9-37.

195. In Yerazunis's gun-camera embodiment, microprocessor 54 protects a recent period of the first data stream recorded in the circular buffer based on a first trigger signal (a start signal) generated by event sensor 70 or capture button 72. EX1017, 2:1-4, 2:19-33, 3:20-38, 4:45-49, 8:8-30, 9:17-26, 9:34-38, 14:55-61, 15:9-13, 17:45-61. The protected portion of the first data stream in the circular buffer is associated with a first event, *e.g.*, a first firing of a gun (*id.*, 3:20-38, 8:26-30, 15:9-13,

16:66-17:4, 17:45-61), and includes a period of the first data stream preceding the first trigger signal. *Id.*, 3:20-38, 14:55-64.

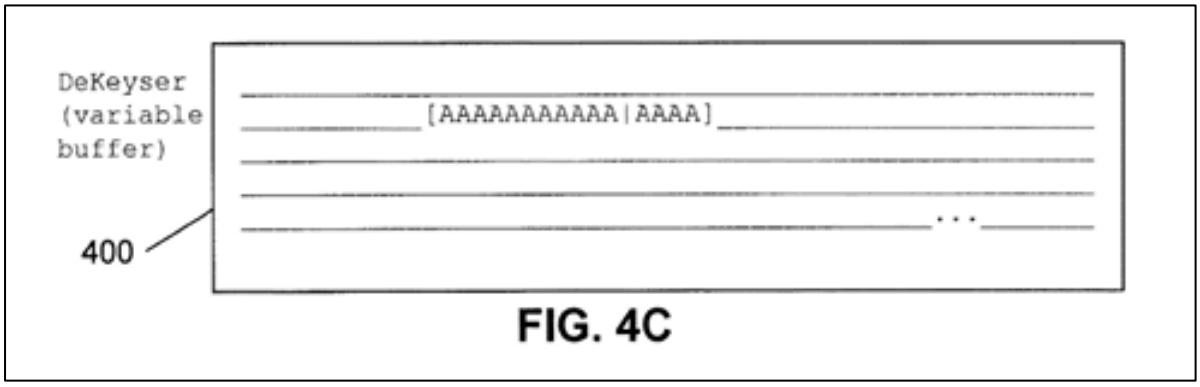


FIG. 4C

196. In Figure 4C, the protecting facility has received a "stop" signal sometime after receiving the start signal, thereby lengthening the protected portion of the "A" data stream. EX1048, 8:52-67.

197. In Yerazunis's gun-camera embodiment, the video recording device responds to a signal from a user, and the user's signal includes a stop signal. EX1017, 3:20-38, 8:8-30, 14:55-61, 15:9-13. Specifically, Yerazunis's signal from the user tells the video recording device when to (i) start recording, i.e., upon detection of the signal (*id.*, 3:25-38, 8:26-30, 15:9-13), and when to (ii) stop recording by designating an end of a write-protected portion, *i.e.*, when a predetermined number of frames subsequent to the trigger event have been write protected (*id.*, 2:53-64, 4:35-56, 8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:38).

198. Yerazunis write protects sensor data in the circular buffer by indexing it in an electronic index, consistent with Petitioner's corresponding structure for element 4 at 9:62-10:5 of the '901 patent ("segments of recorded data are 'write-protected' by

being indexed in an electronic index"). Specifically, the write protecting performed by microprocessor 54 may include storing pointers that define areas of the circular buffer not to be overwritten. EX1017, 17:45-61. A POSITA would have understood Yerazunis's use of pointers to identify a sensor data for write protection and storage of such pointers in a table "to allow later retrieval" of video data for gun-firing events (id.) to be indexing in an electronic index. A POSITA would have understood retrieving video data for gun-firing events necessitates an ability to locate the video data within the buffer, such that Yerazunis necessarily uses indexing. Thus, while Yerazunis does not expressly refer to "indexing" write-protected portions, a POSITA would have understood Yerazunis as describing (or at least rendering obvious) such indexing. *Id.*, 6:1-13, 6:33-36, 7:23-32, 10:37-39, 10:63-67, 11:31-43.

199. A POSITA would have recognized indexing as being one of a finite number of identified solutions for storing and retrieving data in Yerazunis. Further, a POSITA would have recognized Yerazunis's event data must be stored and retrieved in some way, and indexing such data was a well-known approach for doing so. Storing and retrieving event data using this conventional approach was not innovative but rather a straightforward application of ordinary skill or common sense.

f) Element 5: contiguously continuing to record the sensor data in the first memory while the first portion of the sensor data is designated for saving;

200. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

201. ***Patent Owner's Constructions:*** Yerazunis's microprocessor 54 ("computer processor") performs the function of element 5, under Patent Owner's non-MPF position. EX1056, 008-019. Yerazunis discloses that its recording occurs "continuously" in embodiments, such that designating the first portion to be saved necessarily occurs while "continuing to record the sensor data in the first memory." Indeed, Yerazunis expressly discloses frame data is "protected from overwriting while video capture within the circular buffer continues." EX1017, 9:34-38; see also id., 2:1-4, 2:19-23, 4:45-49, 17:45-61.

202. Further, when Yerazunis's video recording device is employed with a gun, "it may be desirable to generate a video record which is associated with each firing of the gun." *Id.*, 16:66-17:4. "To accommodate this objective, after the conclusion of data storage associated with one firing event, the head pointer 104 and the tail pointer 102 … defining the area(s) of the circular buffer memory, are stored in a table to allow later retrieval of the video data pertaining to each firing of the gun," and the pointers "are then reset to allow continued recording into another portion of the circular buffer memory without over writing the previously stored and preserved data." *Id.*, 17:50-59. Thus, while designating the first portion for saving, "recording of data continues since a subsequent firing event may occur." *Id.*, 17:45-50.

203. Yerazunis also discloses "contiguously" continuing to record the sensor data. For example, in Yerazunis's gun-camera embodiment, the video recording device under control of microprocessor 54 records into the circular buffer continuously. *Id.*,

2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 17:45-61. A POSITA would have thus understood Yerazunis as disclosing "contiguously" continuing to record the sensor data in the first memory while designating the first portion for saving because "[a]dditional frames are successively stored in the unused portion of the buffer memory" after protecting event data (*id*., Abstract, 3:9-35, 17:45-61) and in one embodiment discloses protecting a frame "from overwriting while video capture within the circular buffer continues" (*id*., 9:27-46). Yerazunis's disclosure of "contiguously continuing to record the sensor data in the first memory while the first portion of the sensor data is designated for saving" is consistent with the disclosure of the '901 patent (*e.g*., with reference to Figure 4D). I explain this below with reference to Petitioner's corresponding structure for element 5. Yerazunis thus discloses element 5 under Patent Owner's non-MPF position.

204. Yerazunis also discloses element 5 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Yerazunis's microprocessor 54 runs software to accomplish the function of element 5. *See also* EX1017, 6:17-23, 6:37-51. Yerazunis thus discloses element 5 under Patent Owner's MPF position.

205. ***Petitioner's Construction:*** Yerazunis discloses the corresponding structure identified by Petitioner: "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, Fig. 3, 7:48-59, Fig. 4D, 9:21-26, Fig. 4B, 8:9-37, Fig. 4C, 8:52-67, 9:62-10:5."

206. As explained for Petitioner's corresponding structure for elements 3 and 4 of claim 1, Yerazunis discloses a recorder (video electronics 42) with memory and microcontroller 54 that runs software to accomplish functions, consistent with the '901 patent's disclosure at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, 7:48-59, Fig. 3, Fig. 4B (described at 8:9-37), Fig. 4C (described at 8:54-67), and 9:62-10:5. The operation of Yerazunis's microprocessor 54 is also consistent with the '901 patent's disclosure at Fig. 4D (described at 9:21-26):

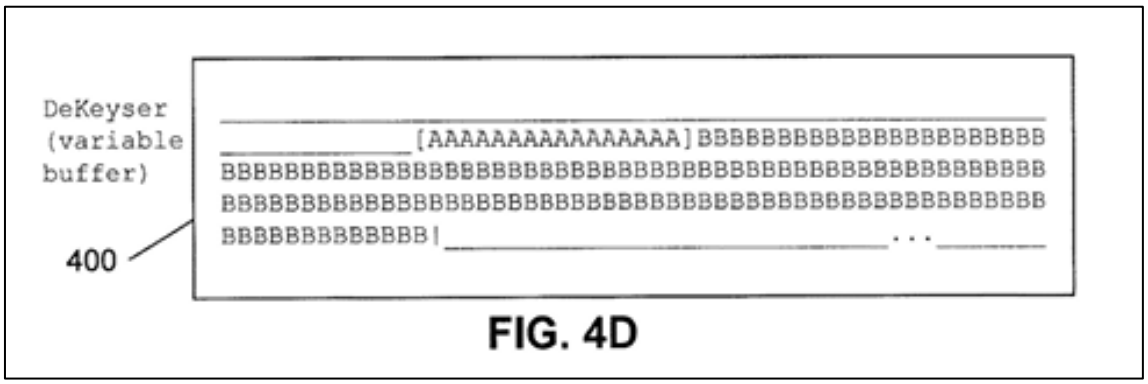


FIG. 4D

207. In Figure 4D, the system has finished protecting the desired portion of the "A" data stream, and the recording facility continues to store a "B" data stream. The "B" data stream may be contiguous with the "A" data stream, "so that differentiation of 'A' and 'B' streams is merely an artifact of how the data is being stored." EX1048, 9:21-26.

208. In Yerazunis's gun-camera embodiment, the video recording device under control of microprocessor 54 records into the circular buffer continuously, such that storing of a second data stream in the circular buffer continues after protecting a portion of the first data stream. EX1017, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 17:45-61.

The second data stream is continuous with the write-protected portion of the first data stream, with the second data stream being recorded in a non-protected portion of Yerazunis's circular buffer immediately following the write-protected portion of the first data stream. *Id.*, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 17:45-61.

g) Element 6: in response to a subsequent second trigger signal, designate for saving a second portion where in the second portion occupies less than the remaining entirety of the first memory not designated for saving and corresponds to a length of time prior to the second trigger signal; and

209. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

210. ***Patent Owner's Constructions:*** In embodiments, Yerazunis's microprocessor 54 comprises "a number of inputs 68 which permit activation of the video recording device and control of the device by a user" (EX1017, 6:40-42, Figs. 3, 14), including a still button 74 causing a video frame in the circular buffer to be "protected from overwriting." *Id.*, 9:27-31, 9:34-42.

211. In Yerazunis's gun-camera embodiment, microprocessor 54 is configured to protect a second portion of sensor data in the circular buffer associated with a second event, *e.g.*, a second firing of the gun, based on a second trigger signal generated by event sensor 70 or capture button 72 subsequent to the first trigger signal described for element 4 of claim 1. *Id.*, 4:35-56, 8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:61. Like the first portion designated for saving, the second portion designated for saving

includes a period of the sensor data preceding the second trigger signal. *Id.*, 3:20-38, 14:55-64. Thus, microprocessor 54 performs the claimed function: "in response to a subsequent second trigger signal, designate for saving a second portion." I further note that saving of video data for multiple events in a circular buffer was also well-known in the art. *See*, *e.g.*, EX1008 (Kawasaki), Abstract, 4:30-5:11, Figs. 4, 5; EX1009 (Fiore), [0022]-[0023], [0051], [0059], [0060].

212. Yerazunis also discloses "where in [sic] the second portion occupies less than the remaining entirety of the first memory not designated for saving and corresponds to a length of time prior to the second trigger signal." Yerazunis discloses its "circular buffer memory may be subdivided evenly to accommodate a predetermined number of firings of the gun," such that first and second firing events each occupy less than the full buffer. EX1017, 17:9-20. Yerazunis thus discloses element 6 under Patent Owner's non-MPF position.

213. Yerazunis also discloses element 6 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Yerazunis's microprocessor 54 runs software to accomplish the function of element 6. *See also* EX1017, 6:17-23, 6:37-51. Yerazunis thus discloses element 6 under Patent Owner's MPF position.

214. ***Petitioner's Construction:*** Yerazunis discloses the corresponding structure identified by Petitioner: "hardware and/or software programmed to perform

the circular buffer algorithm disclosed at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, Fig. 4E, 9:48-50, 9:62-10:5."

215. As explained for Petitioner's corresponding structure for elements 3 and 4 of claim 1, Yerazunis discloses a recorder (video electronics 42) with memory and microcontroller 54 that runs software to accomplish functions, consistent with the '901 patent's disclosure at 2:33-39, 2:46-64, 5:38-50, 4:67-5:2, 7:48-59, 9:62-10:5, and Fig. 3. EX1017, 6:17-23, 6:37-51. The operation of Yerazunis's microprocessor 54 is also consistent with the '901 patent's disclosure at Fig. 4E (described at 9:48-50):

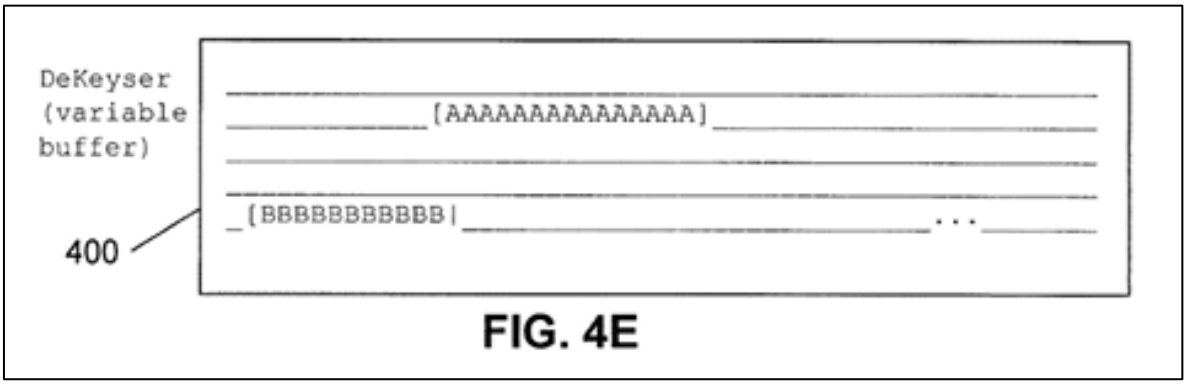


FIG. 4E

216. Figure 4E illustrates protection of a portion of the "B" data stream based on receipt of a start signal. EX1048, 9:48-50.

217. In Yerazunis's gun-camera embodiment, microprocessor 54 is configured to protect a portion of the second data stream in the circular buffer associated with a second event, *e.g.*, a second firing of the gun, based on a second trigger signal generated by event sensor 70 or capture button 72. EX1017, 4:35-56, 8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:61. Like the protected portion of the first data stream, the

protected portion of the second data stream includes a period of the second data stream preceding the second trigger signal. *Id.*, 3:20-38, 14:55-64.

h) Element 7: automatically overwrite portions of the sensor data that were recorded in the first memory that were not designated for saving.

218. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

219. ***Patent Owner's Constructions:*** Yerazunis's microprocessor 54 performs the function of element 7, under Patent Owner's non-MPF position. EX1056, 008-019. Yerazunis's video recording device "records video frames successively in at least one circular buffer memory organized as a continuous loop overwriting the oldest frame within the respective buffer memory with a more recently received frame." EX1017, 2:19-23. This occurs automatically "absent receipt of some trigger event from the sensor 54 or activation of other input by the user." *Id*., 7:11-22. This is also true of Yerazunis's gun-mounted devices, which record continuously into the circular buffer memory and thus overwrite sensor data recorded in the memory and not designated for saving. *Id*., 15:56-16:3, 18:4-12. Yerazunis thus discloses element 7 under Patent Owner's non-MPF position.

220. Yerazunis also discloses element 7 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, microprocessor 54 runs software to accomplish the function of element 7. *See also* EX1017, 6:17-23, 6:37-51. Yerazunis thus discloses element 7 under Patent Owner's MPF position.

221. ***Petitioner's Construction:*** Yerazunis discloses the corresponding structure identified by Petitioner: "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 4:67-5:2, 5:38-50, Fig. 3, 7:48-59, Fig. 4A, 7:60-65." This structure is the same as that identified by Petitioner for element 3 of claim 1. Accordingly, Yerazunis thus discloses Petitioner's corresponding structure for element 7 for the reasons stated above for element 3.

3. Dependent Claims 2-14 And 19-25

222. ***Claims 2-6:*** Claim 2 depends from claim 1 and recites "where in [sic] the computer processor is further configured to copy the first designated portion to a second memory." Claims 3-6 depend from claim 2 and add limitations "wherein the second memory comprises a different part of the first memory" (claim 3), "wherein the first designated portion is stored in the second memory using compression" (claim 4), "wherein the computer processor is further configured to copy, to the second memory, another portion of the sensor data that was captured after occurrence of the first trigger signal" (claim 5), and "wherein the computer processor is further configured to copy, to the second memory, another portion the sensor data that was captured during occurrence of the first trigger signal" (claim 6). Yerazunis discloses all of these limitations.

223. *Claim 2:* Yerazunis discloses that "after the trigger event occurs and the video data which is to be preserved is defined, the non-volatile memory may be

powered up under the control of the microprocessor 54 and the video data written from the DRAMs to the non-volatile memory 83." *Id.*, 18:4-28, claim 23.

224. *Claim 3:* Yerazunis's semiconductor memory may comprise "at least one dynamic random access memory and a nonvolatile memory," so nonvolatile memory ("second memory") is a different part of the semiconductor memory. *Id.*, claim 23. Moreover, it is well known before the purported June 2007 priority date of the challenged patents that a single memory can be treated as multiple distinct portions.

225. *Claim 4:* Yerazunis's microprocessor 54 "compresses the digitized frame data" received from the image sensor "and stores the compressed frame data in the next sequential location of the circular buffer." *Id.*, 2:45-47; *see also id*., 6:52-55, 7:7-14, 10:63-67.

226. *Claim 5:* Yerazunis's video recording device write-protects video data "before *and after*" an event, such that copying a write-protected portion would necessarily copy sensor data "captured after occurrence of the first trigger signal." *Id.*, Abstract, 3:9-35, 8:51-55, 14:45-64, 19:52-56.

227. *Claim 6:* Because Yerazunis discloses write-protecting video data "before and after" an event and records continuously, Yerazunis necessarily discloses capturing sensor data "during occurrence of the first trigger signal" and would necessarily copy that data as part of the write-protected portion. *Id.*, 2:19-23, 17:9-20, 17:50-59.

228. ***Claim 7:*** Claim 7 depends from claim 1 and recites "including with the first designated portion, another portion of the sensor data that was captured after

occurrence of the first trigger signal." Yerazunis discloses these limitations. Yerazunis's video recording device write-protects video data "before *and after*" an event. EX1017, Abstract, 3:9-35, 8:51-55, 14:45-64, 19:52-56. The pre- and post-event data comprise an indexed, identifiable collection of data in the circular buffer. *Id*., 17:9-20, 17:45-61; *see also* 6:1-13, 6:33-36, 7:23-32, 10:37-39, 10:63-67, 11:31-43.

229. ***Claim 8:*** Claim 8 depends from claim 1, reciting "wherein the computer processor is further configured to transmit, via a wireless transmitter, the first designated portion to a remote memory." Yerazunis discloses these limitations. Yerazunis's microprocessor 54 includes a serial output channel 78 "employed to download captured and stored video images" from the circular buffer of DRAM 58 "to an external Personal Computer (PC)" or to "a radio transmitter to transmit RF signals to a base station." EX1017, 3:1-2, 6:45-51, 9:60-10:3, 18:60-66.

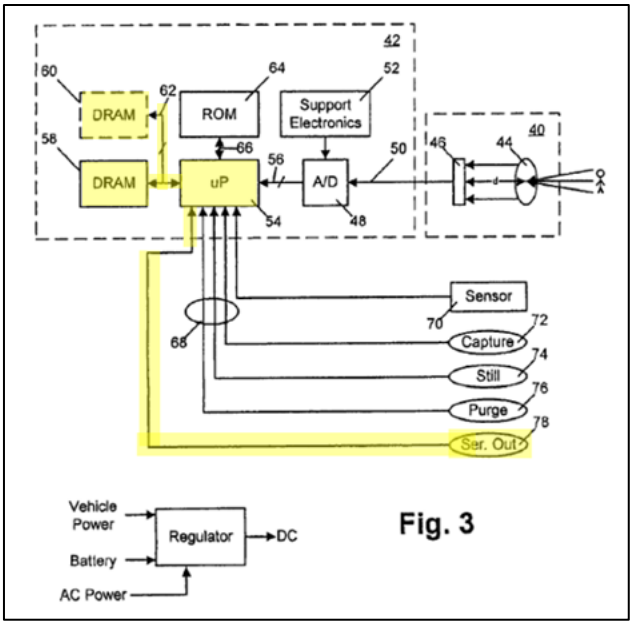
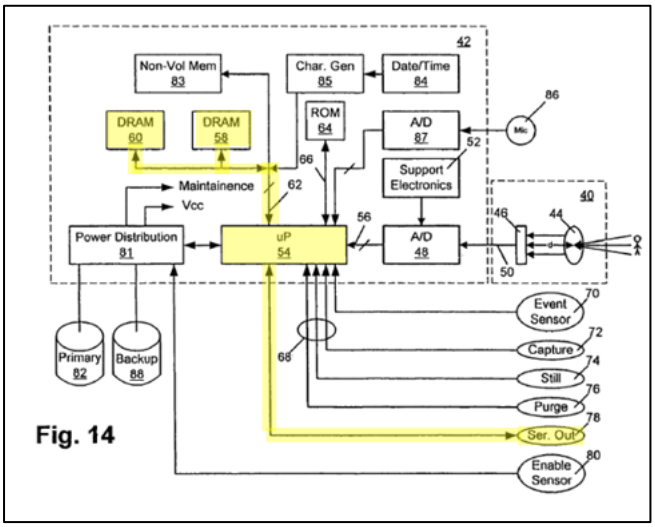


Fig. 3



Id., Figs. 3, 14 (color added). A POSITA would have recognized Yerazunis's radio transmitter is a "wireless transmitter."

230. Further, Campbell discloses the limitations added in claim 8. Campbell describes a "transmitting means" that "may include a radio or other transmitter for transmitting the signal to a remote recording station" for preservation. EX1059, 1:57-59, 1:65-2:2, 5:1-55.

231. ***Claim 9:*** Claim 9 depends from claim 1 and recites "wherein the sensor data comprises at least one of the following: image data and video data." Yerazunis discloses these limitations. Yerazunis's video recording device includes camera 40 with a sensor that captures video data. EX1017, 2:33-41, 5:43-49, Figs. 3, 14. Additionally, video data includes by necessity a sequence of images.

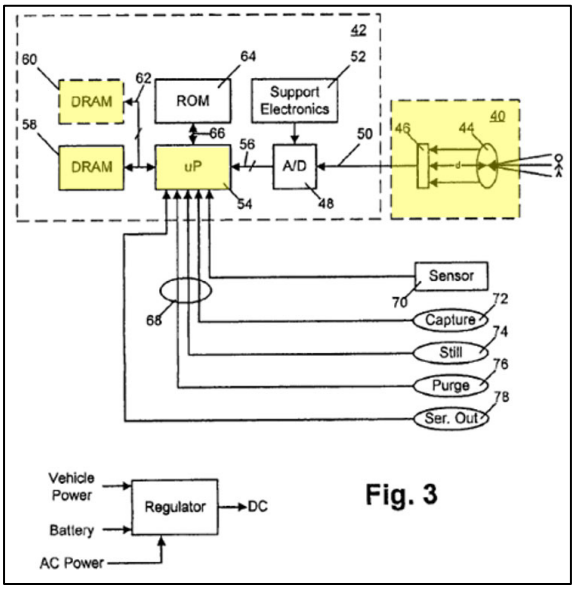
232. ***Claim 10:*** Claim 10 depends from claim 1, reciting "wherein the first memory comprises a circular buffer." Yerazunis discloses these limitations. Yerazunis's video recording device "records video frames successively in at least one

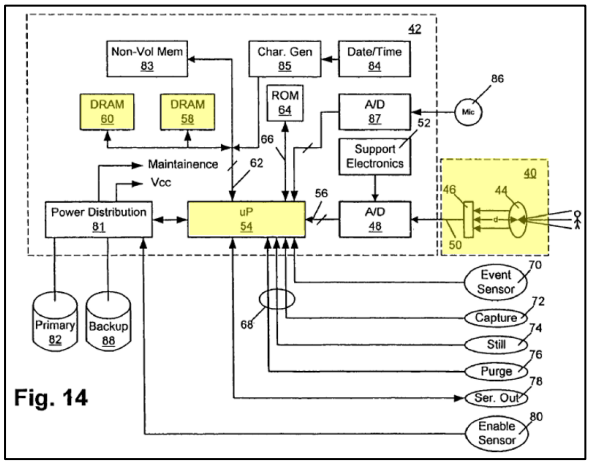
circular buffer memory organized as a continuous loop overwriting the oldest frame within the respective buffer memory with a more recently received frame." EX1017, 2:19-23, 7:7-61, 17:9-20, 17:50-59, 18:7-12.

233. ***Claims 11 and 12:*** Claims 11 and 12 depend from claim 1 and recite "wherein the first designated portion is stored using time compression" (claim 11) or "frame compression" (claim 12). These limitations would have been obvious in view of Yerazunis's disclosure. Yerazunis discloses that various compression techniques were well-known in the art as of the purported June 2007 priority date. EX1017, 6:55-7:6. Yerazunis also discloses that compression "permit[s] a greater number of frames to be stored within the circular buffer memory than would otherwise be possible absent such compression." *Id.*, 10:63-67. "For images of the above identified sizes a compression ratio of four to one (4:1) is readily achievable. Such would permit 256 black and white images or 200 color images to be stored in the two (2) megabyte memory. At a recording rate of ten (10) frames per second, the two (2) megabyte memory will accommodate thus accommodate 25 seconds of black and white images or 20 seconds of color images. A greater recording interval may be achieved by employing a lower sampling rate or by utilizing a larger memory." *Id.* at 5:11-13. These known compression techniques as of June 2007 included time compression and frame compression, and it would have been obvious to a POSITA to select either conventional compression technique in the video recording system of the Yerazunis/Campbell combination.

234. Before the purported June 2007 priority date of the challenged patents, image and video data, by necessity, was almost always compressed to save storage as well as I/O and network bandwidth requirements. Cameras and video encoders before June 2007 already had the ability to change the frame rate and bitrate. MPEG-1, released in 1991, used a combination of spatial and temporal compression. Appx NN (included in EX1041), a set of lecture notes entitled "Video Compression," discuss this (downloaded from https://www.cs.ucf.edu/courses/ cap5015/Video_compression_ 2005.pdf, last accessed July 21, 2024).

235. ***Claims 13 and 14:*** Claim 13 depends from claim 1, reciting "comprising a camera that includes the sensor interface, the first memory, and the computer processor." Claim 14 depends from claim 13, reciting "wherein the camera comprises a security camera." Yerazunis discloses these limitations. For claim 13, Yerazunis's video recording system includes signal path 50 from the sensor to the rest of the recording device, DRAMs 58, 60, and microprocessor 54 (EX1017, 5:40-53, 6:24-36):





Id., Figs. 13, 14 (color added).

236. Although Yerazunis refers to lens 44 and image sensor 46 as components of "camera 40," a POSITA would have understood Yerazunis's video recording system (including video electronics 42 and camera 40) as being a camera. In June 2007, the term "camera" was often used in referring to systems with imaging components, microprocessor controllers, and memory for storing image and video data, like the systems depicted in Figures 3 and 14 of Yerazunis.

237. For claim 14 of the '901 patent, Yerazunis discloses that its video recording device is suitable "in security applications" (EX1017, 1:22-31), and trigger events include "a signal indicative of a security or fire alarm condition," such as "movement, glass breakage, or unauthorized entry" (*id.*, 2:53-64, 8:8-25). Thus, Yerazunis discloses a "security camera."

238. ***Claim 19:*** Claim 19 depends from claim 1, reciting "wherein the first trigger signal represents detection of at least one of the following: a motion, a sound, an image, content in a data stream, a pattern in the sensor data, a person, a human face, a computer screen, an event, a verbal command, operation of switch, and operation of a button." Yerazunis discloses these limitations. In Yerazunis, "the event sensor 70 is operative to generate a trigger signal in response to the discharge of the gun," and preferably comprises "*a microphone*, or any other suitable sensor which can detect a characteristic associated with the firing of the gun." EX1017, 16:43-50. "In the case of a microphone, the event sensor 70 is *operative to detect the sound* associated with the firing of the gun." *Id*., 16:53-55. Thus, Yerazunis discloses "wherein the trigger signal represents detection of at least … a sound." Additionally, "[t]he event sensor 70 may comprise any sensor which provides a trigger output signal in response to a condition which is desired to initiate the capture of the video image or images occurring prior to and following the occurrence of the trigger output signal. For example, the sensor 70 may comprise an accelerometer, an air bag deployment sensor of the type normally used in automobiles to initiate the deployment of an air-bag, a security or fire

alarm alert condition sensor such as are used to detect movement, glass breakage, or unauthorized entry. The trigger output signal may also be an acoustic signal characteristic of a specific event such as gunshots, or any other signal indicative of a specified event. Moreover, while a single sensor 70 is illustrated for simplicity, it should be appreciated that plural sensors may be employed to activate the capture of video images by the present video recording device and that video image capture may be initiated by any one of such sensors or a combination of such sensors." *Id.*, 8:8-25.

239. ***Claims 20 and 21:*** Claim 20 depends from claim 1, reciting "wherein the computer processor is further configured to write-protect the first designated portion as a write-protected portion in the first memory." Claim 21 depends from claim 20, reciting "wherein the computer processor is further configured to free the write-protected portion following a transmission of the designated portion." Yerazunis discloses these limitations.

240. Yerazunis discloses the limitations of claim 20 for the reasons discussed above for element 4 of claim 1 ("in response to a first trigger signal, designate for saving a first portion of the sensor data that was captured prior to occurrence of the first trigger signal, wherein the portion of the sensor data occupies a portion of the first memory that is less than the entirety of the first memory and corresponds to a length of time prior to the first trigger signal").

241. For claim 21, Yerazunis discloses purge button 76 electronically coupled to microprocessor 54. EX1017, 9:47-48. "Upon activation of the purge button, the

contents of the circular buffer and any still images that have been captured are erased," including any the "user does not desire to retain." *Id*., 9:48-53. Accordingly, write-protection is removed from a write-protected portion of the circular buffer. It would have been obvious one reason the "user does not desire to retain" captured images is when they have been offloaded, as disclosed by Yerazunis and discussed above for claim 8.

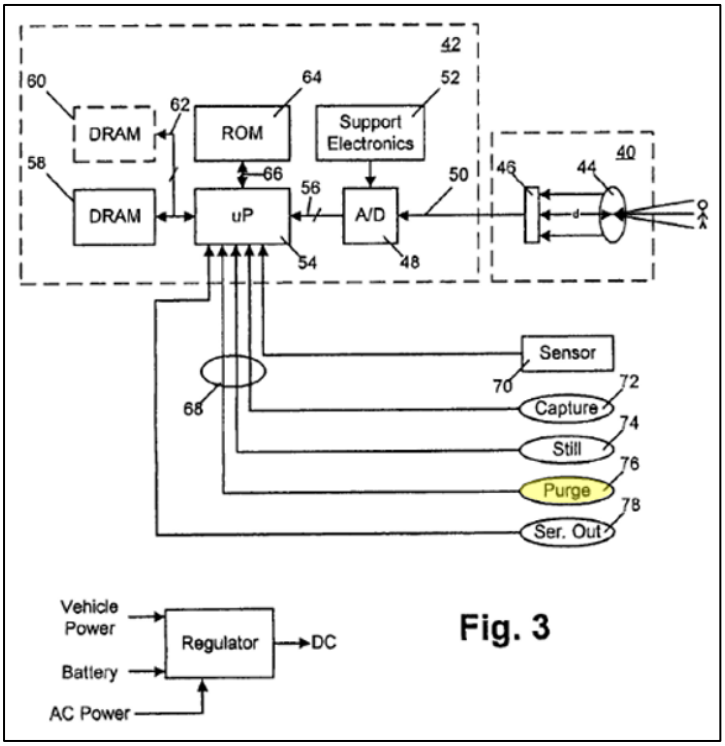
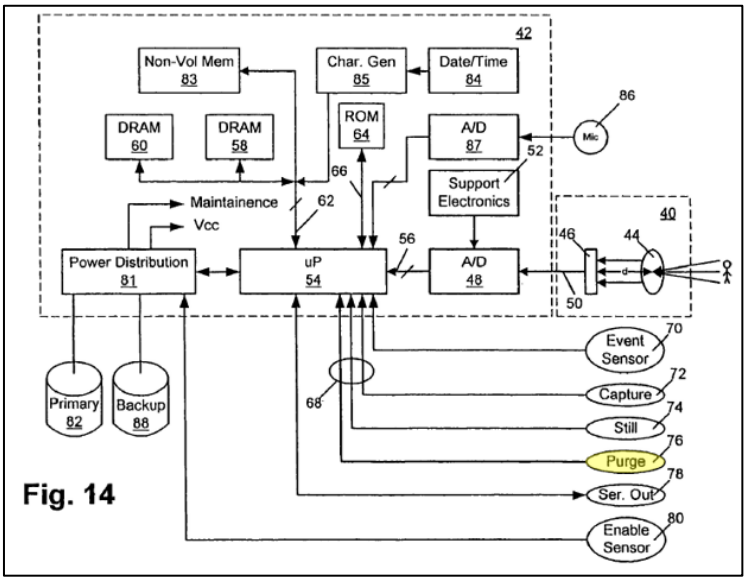


Fig. 3



Id., Figs. 3, 14 (color added); *id.*, 19:30-34.

242. ***Claims 22 and 23:*** Claim 22 depends from claim 1, reciting "wherein the computer processor is further configured to index in the first memory the first designated portion." Claim 23 depends from claim 1, reciting "wherein the computer processor is further configured to index the first designated portion while the recording facility is still recording the sensor data into the first memory." Yerazunis discloses these limitations. When Yerazunis's video recording device is used with a gun, "recording of data continues [during and after a first firing event] since a subsequent firing event may occur." EX1017, 17:45-50. This is achieved by indexing, as explained above for claim 1, element 4 ("in response to a first trigger signal, designate for saving a first portion of the sensor data that was captured prior to occurrence of the first trigger signal, wherein the portion of the sensor data occupies a portion of the first memory

that is less than the entirety of the first memory and corresponds to a length of time prior to the first trigger signal"). *Id*., 2:19-23, 4:45-49, 7:7-61, 9:34-38, 17:45-61.

243. ***Claim 24:*** Claim 24 depends from claim 1, reciting "wherein the computer processor is configured to record the sensor data continuously, from before the first trigger signal, through a pre-designated time period, and after the pre-designated time period." Because Yerazunis discloses write-protecting video data "before and after" an event and records continuously, Yerazunis necessarily discloses recording sensor data "continuously, from before the first trigger signal, through a pre-designated time period, and after the pre-designated time period." EX1017, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 15:56-16:3, 16:66-17:61, 18:4-12.

244. ***Claim 25:*** Claim 25 depends from claim 1, reciting "wherein the first portion of the sensor data also corresponds to a pre-determined length of time after the trigger signal." Yerazunis discloses these limitations. Yerazunis discloses write-protecting a predetermined number of frames subsequent to the trigger event. EX1017, 2:53-64, 4:35-56, 8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:38. A POSITA would have understood that for a given frame rate, the predetermined number of frames is equivalent to a predefined length of time (*e.g*., for video having a frame rate of 30 frames per second, protection of 150 frames is equivalent to a pre-defined length of time of 5 seconds). Yerazunis further discloses that the pre-defined length of time is a matter of design choice: "the number of frames that are recorded before and after [the detection of the trigger event] are a matter of design choice." *Id.*, 8:51-55. Yerazunis

thus discloses "wherein the first portion of the sensor data also corresponds to a pre-determined length of time after the trigger signal."

C. Ground 1b: Claims 15 And 16 Of The '901 Patent Would Have Been Obvious Over Yerazunis In View Of Campbell, In Further View Of Lewellen

245. Claims 15 and 16 would have been obvious over the combination of Yerazunis (EX1017), Campbell (EX1059), and Lewellen (EX1019).

246. Claim 15 depends from claim 1, reciting "comprising a cell phone including the sensor interface, the first memory, and the computer processor." Claim 16 depends from claim 1, reciting "a personal area network coupled with the computer processor and including at least two of the following: the sensor interface, the first memory, and the computer processor." To the extent Yerazunis and Campbell do not disclose the limitations added in claims 15 or 16, these limitations would have been obvious in view of Lewellen.

247. For claim 15, Lewellen discloses a cell phone including a sensor interface that communicatively couples various sensors (*e.g.*, cameras) to other portions of the cell phone, including a memory and a computer processor. EX1019, [0041]-[0043]. Cell phones as of June 2007 included cameras, memory, and processor components.

248. Lewellen also discloses the "personal area network" of claim 16. The '901 patent provides minimal disclosure on the "personal area network," stating it can be (i) implemented with a Bluetooth wireless interface or other suitable interface, and (ii) used to couple the disclosed recording system to other Bluetooth-compatible components.

EX1048, 6:31-36, 7:22-28, 10:17-49. Lewellen likewise discloses the use of a Bluetooth wireless interface for coupling to Bluetooth-compatible devices. EX1019, [0022], [0031], [0042]-[0048].

249. A POSITA would have been motivated to apply Lewellen's teachings of a personal area network to the Yerazunis/Campbell device. All three references disclose recording systems, for law enforcement or security applications. EX1017, 1:32-43, 9:60-10:11; EX1019, [0002]-[0009], [0024]-[0026], [0042]; EX1059, 6:16-20. In an embodiment, Yerazunis describes using a radio transmitter, "such as found in a police cruiser," to "transmit RF signals to a base station for viewing." EX1017, 3:1-4, 6:45-51, 9:60-10:3, 18:60-66. Further, Campbell describes a "transmitting means" that "may include a radio or other transmitter for transmitting the signal to a remote recording station." *Id*., 1:57-59, 1:65-2:2, 5:1-55. However, a POSITA would recognize that such radio transmitters, as described in Yerazunis and Campbell, may not be available at all times. For example, when a police officer is using Yerazunis's gun-camera out in the field, away from his police cruiser or a computer, the radio transmitter of the police cruiser is unavailable, and the police officer would not be able to offload critical video evidence for safe storage on another device. Accordingly, a POSITA would have been motivated to apply Lewellen's teachings of a personal area network to provide a way to offload data in such scenarios. Bluetooth-compatible mobile phones (as disclosed in Lewellen) were ubiquitous as of June 2007 and carried by many police officers in the field on a daily basis.

250. Accordingly, a POSITA would have also been motivated to implement the Yerazunis/Campbell system using a cell phone comprising a sensor interface, memory, and computer processor, as disclosed in Lewellen. EX1019, [0010], [0031], [0037], [0041]. A POSITA would have recognized that using these mobile phones (including sensor interface, memory, and computer processor) as the video recording device would have been a simple and low-cost method for preserving important video, and Lewellen expressly recognizes the significant advantages of Bluetooth technology, including that it is "very inexpensive." EX1019, [0032], [0034], [0042].

251. A POSITA would have had a reasonable expectation of success in implementing the Yerzunis/Campbell device with Lewellen's wireless interface and related techniques Lewellen describes because local wireless interfaces were well-known and commercially available as of June 2007, and adding such an interface in the Yerazunis/Campbell system would have been routine and well within a POSITA's skill.

D. Ground 1c: Claims 17 And 18 Of The '901 Patent Would Have Been Obvious Over Yerazunis In View Of Campbell, In Further View Of Fiore

252. Claims 17 and 18 would have been obvious over the combination of Yerazunis (EX1017), Campbell (EX1059), and Fiore (EX1009).

253. Claim 17 depends from claim 1, reciting "wherein the first memory is configured to record the first designated portion of the sensor data in a file." Claim 18 depends from claim 1 and recites "wherein the first memory is configured to record the first designated portion of the sensor data in a single file." The term "file" in these

claims should be interpreted as "an identifiable collection of data" for the reasons explained above in Section VI.A.

254. Yerazunis discloses the limitations added in claims 17 and 18. The write protecting performed by Yerazunis's microprocessor 54 includes storing pointers that define areas of the circular buffer not to be overwritten, thus providing an electronic index to each write-protected segment—a single identifiable collection of data in the buffer, *i.e.*, "a single file" in the buffer—"to allow later retrieval." EX1017, 17:45-61.

255. But to the extent a POSITA wanted further guidance as to particular methods for implementing Yerazunis's circular buffer and recording image data into the buffer, a POSITA would have been motivated to turn to Fiore (EX1009). Fiore discloses "data recording and playback systems for monitoring processes or occurrences of events which allows the replay and/or analysis of a time sampled signal." EX1009, [0003]. Fiore's circular storage buffer 15 stores data frames of an input signal from a monitoring device 6 (which may be a video camera, *id.*, [0040]):

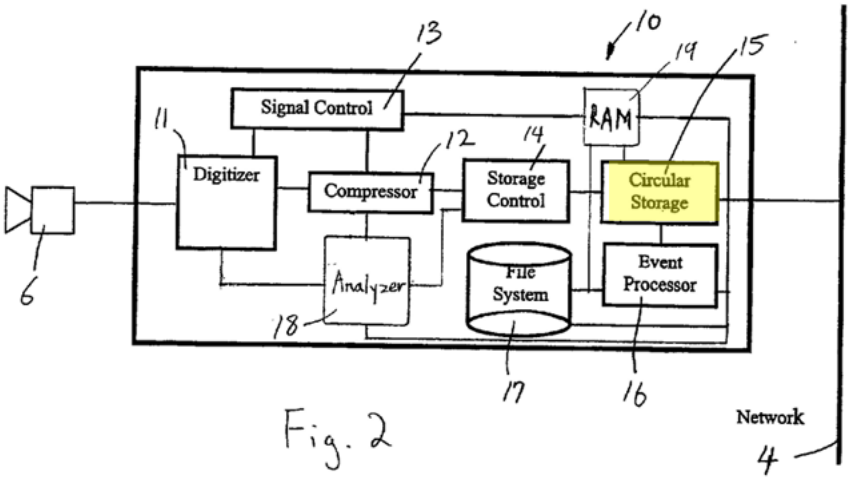


Fig. 2

Id., Fig. 2 (color added); *see also id.*, [0048]. Circular storage buffer 15, described further below, "may be implemented as a reserved area in memory, a disk file, or as a storage in a looped media." *Id.*, [0065].

256. Fiore discloses the limitations added in claims 17 and 18. Fiore's circular storage buffer 15 is implemented as a single, memory-mapped file (*id.*, [0047], [0068]), and Fiore describes indexing collections of frame data for respective events as files within the memory-mapped file. *Id.*, [0022]-[0023], [0051], [0059]-[0060]. "One embodiment of the data recording and playback system also includes an event controller that provides an event signal associated to time of an event. An event database is provided for storing event signal data, and an event processor is provided that copies a plurality of data frames stored in the circular storage buffer that have time stamps proximate to the time of the event into additional secondary memory mapped files, each containing a single event, indexed from the event database." *Id.*, [0022].

257. A POSITA would have been motivated to apply Fiore's teachings to the Yerazunis/Campbell device. Both references describe similar technologies and solve similar problems. As detailed above, Yerazunis describes a "compact video image recording device" that uses a circular buffer to record video frames continuously, and portions of the circular buffer are write protected upon detection of certain events. *See*, *e.g.*, EX1017 at Abstract, 2:19-23, 3:19-28, 14:45-50, 16:66-17:61. The write-protected portions include frame data that was recorded both before and after the event. *See*, *e.g.*, at 3:28-33, 14:50-61. Fiore similarly discloses a "data recording and playback system"

that uses "a circular storage buffer having a memory mapped file with [the] same address space as the memory device for storing the input signal data." EX1009 at Abstract. In Fiore, "data frames before, during, and after [an] event" are preserved, similar to what is disclosed in Yerazunis. *Id.* at [0048]. Because Yerazunis and Fiore both disclose data recording systems that store data in a circular buffer and preserve data associated with an event—both before and after an event trigger—a POSITA would have been aware of and motivated to combine the two references.

258. A POSITA implementing the Yerazunis/Campbell device would have been motivated to utilize Fiore's teachings regarding indexing within the memory-mapped file. Fiore provides a fulsome description of its file-based approach, which includes (i) implementing the circular storage buffer 15 as a memory-mapped file, and (ii) indexing event data for events as respective files within the memory-mapped file. *See*, *e.g.*, EX1009 at [0022]-[0023], [0051], [0059], [0060]. Fiore also describes numerous benefits of its file-based approach, including:

> [I]t should be noted that the circular storage buffer may be implemented as a reserved area in memory, a disk file, or as a storage in a looped media…. *The memory mapped file 110 has a memory mapped architecture that combines the access speed of the RAM memory with large storage capacity of a disk file*.

Id. at [0065].

> The above implementation of the circular storage buffer 15 with a memory mapped file 110 has *the advantage of using the same address*

> *pointer access as RAM 19 of the signal processor 10 making the indexing of data in the memory mapped file 110 transparent to the circular storage buffer's 15 access objects*…. When the RAM 19 of the signal processor 10 mapped to the memory mapped file 110 has been filled, the file is unmapped and the signal data is cached to the file system 17.

Id. at [0067].

> The memory mapped file implementation of the circular storage buffer is *especially advantageous in that it allows the abstraction of the circular storage buffer to a direct pointer virtual address space thereby avoiding issues of switching between Random Access Memory (RAM) and disk files*. This enables multiple processes mapped in virtual memory space to read from, and write to the same memory, thereby concurrently sharing the circular storage buffer. *Thus, the present system allows the playback from the circular storage buffer without interrupting recording into the circular storage buffer, and significantly reduces the likelihood of dropped frames*.

Id. at [0068]; *see also id.* at [0072] (describing approach as providing "significant performance gains" and allowing "playback from the circular storage buffer without interrupting recording into the circular storage buffer").

259. A POSITA would have had a reasonable expectation of success because Fiore provides a detailed disclosure of its file-based approach, and applying those techniques to the Yerazunis/Campbell device would have been routine and well within a POSITA's skill.

E. Ground 2a: Claims 1, 7-14, And 19-25 Of The '901 Patent Would Have Been Obvious Over Ely In View Of Campbell

260. Claims 1, 7-14, and 19-25 would have been obvious over the combination of Ely (EX1020) and Campbell (EX1059).

1. Motivation To Combine

261. Ely discloses a "video surveillance system" that "includes a central control station and a plurality of video cameras each mounted inside a dome housing unit." EX1020, Abstract. Like Ely, Campbell discloses a recording device useful "in the security and military fields." EX1059, 6:3-20. Because both disclose video recording systems, a POSITA would have been aware of and motivated to combine these references.

262. Campbell also describes why a POSITA would have been motivated to implement the camera unit of Ely's surveillance system in an eyeglasses-mounted apparatus: Among other reasons, Campbell's apparatus is "hands free" and "provides almost instantaneous recording of a scene as the act of looking at the scene points the camera and the view finder towards that portion of the scene to be captured." EX1059, Abstract. Additionally, Campbell teaches that mounting to eyeglasses is useful "in the security and military fields where concealment is sometimes desirable." *Id.*, 6:3-20. A POSITA would have been motivated to implement the Ely surveillance system and/or components thereof (*e.g.*, camera unit 114) in an eyeglasses-mounted apparatus for

several reasons, including to enable discreet, concealed, and hands-free recording, and to give more control to the wearer over what is recorded.

263. Further, Ely describes why a POSITA would have been motivated to implement Ely's teachings of a circular buffer in Campbell's eyeglasses-mounted device: For example, Ely describes capturing multiple events in a circular buffer without overwriting event data, which enables capture of important pre- and post-event data without requiring significant storage. EX1020, 1:52-65. Ely describes how recording could be triggered automatically in response to an alarm signal, *e.g.*, "unauthorized opening of doors, windows and display cases and the like." *Id.*, 5:50-55. A POSITA would have had a reasonable expectation of success because Ely provides a detailed disclosure of its buffer-based approach, and applying those techniques to Campbell's eyeglasses-mounted apparatus would have been routine and well within a POSITA's skill.

2. Independent Claim 1

a) Preamble: A recording system for saving a sequence of clips comprising:

264. Ely discloses the language of the preamble. Ely discloses a "video surveillance system" and method in which a "camera unit or units respond to the alarm command by protecting buffered video data which corresponds to a predetermined pre- and post-alarm time period," with multiple "blocks of alarm data" being saved.

EX1020, 10:10-15, 10:59-11:8. Ely therefore discloses a "recording system for saving a sequence of clips."

265. Campbell also discloses the preamble language, as explained above with respect to the combination of Yerazunis and Campbell for Ground 1a.

b) Element 1: a pair of eyeglasses having a sensor that captures sensor data;

266. Ely discloses "a sensor that captures sensor data." Ely's video surveillance system includes a camera 130 with the "sensor that captures sensor data":

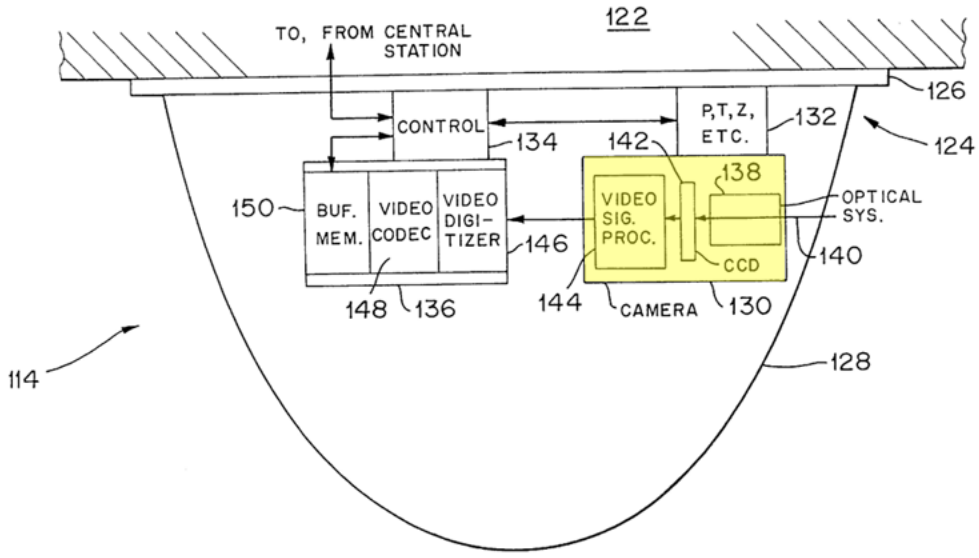


FIG. 3

EX1020, Fig. 3 (color added).

267. In the camera 130, an "image formed by the optical system 138 is converted into an electrical signal at CCD 142 and the resulting signal is subjected to conventional analog signal processing at video signal processing circuit 144." *Id.*, 6:21-28. The camera 130 thus discloses the "sensor" because it has a CCD 142 that captures

video images impinging on it ("sensor data"). I further note the '901 patent describes that "eyeglasses" as recited in claim 1 "are used here euphemistically to represent any type of camera mount," including "security camera mounts." EX1048 4:9-16. Ely describes a security camera mount (*see*, *e.g.*, EX1020, Abstract, Fig. 3) and thus discloses the claimed "pair of eyeglasses having a sensor that captures sensor data" for this additional reason.

268. Campbell also discloses this element as explained above with respect to the combination of Yerazunis and Campbell for Ground 1a. A POSITA would have been motivated to combine Ely and Campbell for at least the reasons stated in Section VIII.E.1 above.

c) Element 2: a first memory communicatively coupled with the sensor; and

269. Ely discloses this element. Ely's video surveillance system includes a memory board 136 having a memory device 150 that discloses the "memory" (EX1020, 6:17-21, 6:48-53, 6:61-65):

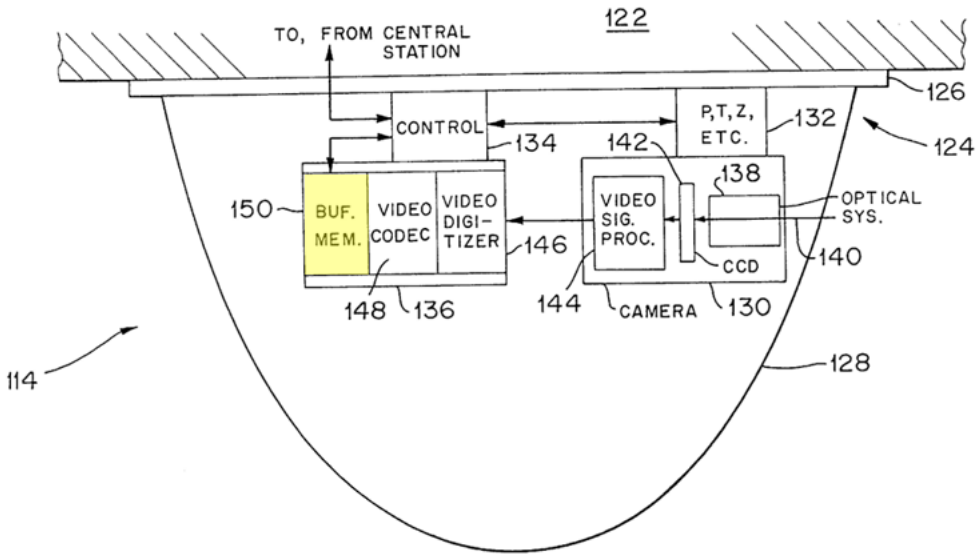


FIG. 3

Id., Fig. 3 (color added).

270. As seen above, the camera 130 is coupled to the memory board 136, with the memory board 136 being configured "to receive an analog video signal output from the camera 130 and to digitize, compress and store the video signal" in the memory device 150. *Id.*, 6:48-65.

271. Campbell also discloses this element as explained above with respect to the combination of Yerazunis and Campbell for Ground 1a.

d) Element 3: a computer processor configured to: record the sensor data in the first memory;

272. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

273. ***Patent Owner's Constructions:*** Ely discloses a computer processor that performs the function of element 3, under Patent Owner's non-MPF position. EX1056,

008-019. Specifically, Ely's camera unit 114 includes control circuit 134 ("computer processor") "for controlling the storage device to operate as a ring buffer in which digital data representative of a video signal currently formed by the video camera is written over oldest digital data stored in the storage device." EX1020, 4:1-7.

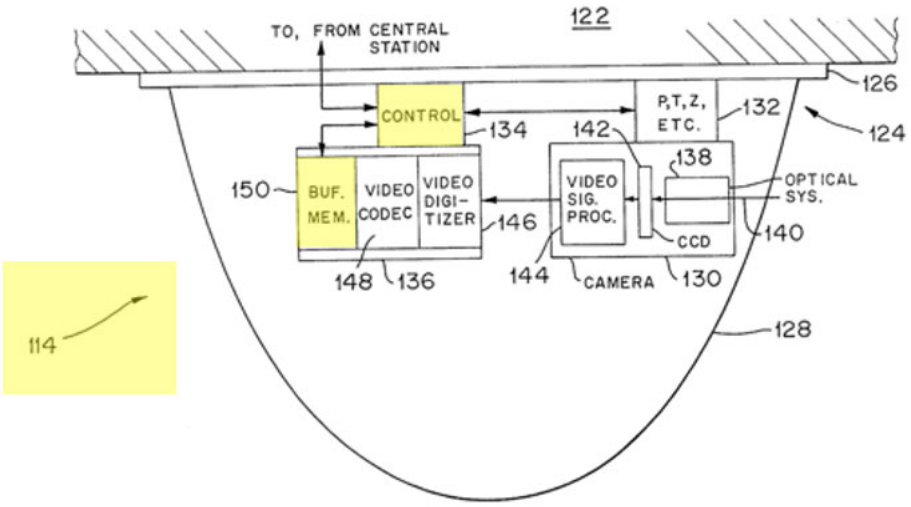


FIG. 3

Id., Fig. 3 (color added).

274. Memory device 150 "functions as a buffer for the video signal generated by the camera 130, and is controlled by the control circuit 134." *Id.*, 6:48-65. More particularly, "the memory 150 serves as a ring buffer, in which currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150." *Id.*, 7:28-34.

275. Control circuit 134 "may be a conventional microcontroller," and is "programmed, according to practices of the present invention, to carry out memory

control, as well as data storage and retrieval functions" (EX1017, 6:37-47), as Figure 4 illustrates. *Id.*, 5:25-26. One such function is to record sensor data in the memory device 150:

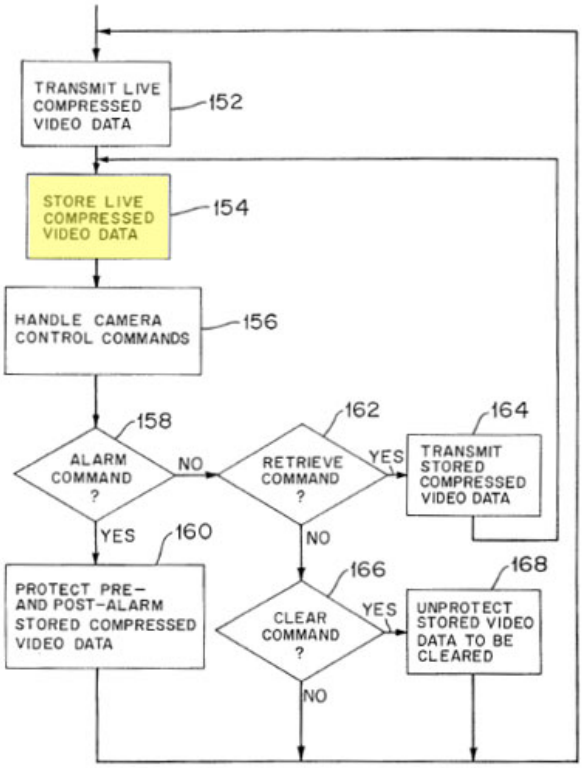


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4 (color added); *see also id.*, 7:27-35.

276. For these reasons, Ely discloses element 3 under Patent Owner's non-MPF position.

277. Ely also discloses element 3 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Ely's control circuit 134 runs software to accomplish the function of element 3. *See also* EX1020,

4:1-8, 6:37-47, 7:12-8:12. Ely thus discloses element 3 under Patent Owner's MPF position.

278. ***Petitioner's Construction:*** Ely discloses the corresponding structure identified by Petitioner: "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 4:67-5:2, 5:38-50, Fig. 3, 7:48-59, Fig. 4A, 7:60-65."

279. Ely discloses a recorder with a memory that runs software to accomplish functions, consistent with the '901 patent's disclosure at 4:67-5:2. Specifically, Ely's control circuit 134 runs software for performing instructions. EX1020, 4:1-8, 6:37-47, 7:12-8:12. Camera unit 114 also includes memory device 150, and control circuit 134 records sensor data from camera 130 in the ring buffer formed in the memory, consistent with the '901 patent's disclosure at 2:33-39, Fig. 3, 7:48-59, 7:60-65, and Figure 4A:

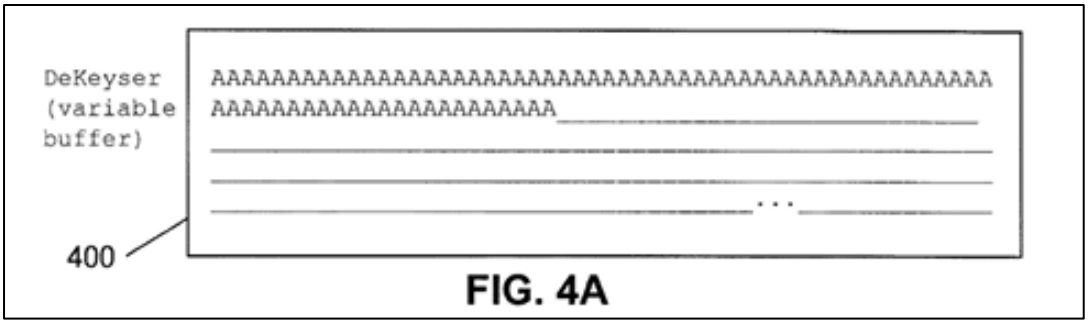


FIG. 4A

280. In Figure 4A, a recording facility records data stream "A" into circular buffer 400. EX1048, 7:60-65.

281. Ely's control circuit 134 stores a first digital data stream generated by video digitizer 146 in a ring buffer formed in memory device 150. EX1020, 7:17-38.

A POSITA would have understood the digital output of Ely's video digitizer 146 as including data streams because the output is a continuous sequence of data. EX1020, 6:48-65, 7:17-8:6, 10:1-23, Fig. 4; Appx MM (included in EX1041) at 109.

282. Additionally, in recording the sensor data in the ring buffer formed in the memory, Ely's control circuit 134 skips over write-protected matter, consistent with the '901 patent's disclosure at 2:33-39. *Id.*, 7:34-38, 10:11-23. Ely's camera unit 114 records the sensor data "in digital [or analog] format," consistent with the '901 patent's disclosure at 5:38-50. *Id.*, 2:55-3:5, 4:1-8, 6:48-7:11.

e) Element 4: in response to a first trigger signal, designate for saving a first portion of the sensor data that was captured prior to occurrence of the first trigger signal, wherein the portion of the sensor data occupies a portion of the first memory that is less than the entirety of the first memory and corresponds to a length of time prior to the first trigger signal;

283. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

284. ***Patent Owner's Constructions:*** Ely's control circuit 134 is a "computer processor" that performs the function of element 4, under Patent Owner's non-MPF position. EX1056, 008-019. Ely's camera system responds to an "alarm command by protecting buffered video data which corresponds to a predetermined pre- and post-alarm time period," and the "protected data is then available for subsequent retrieval, display, and permanent recording." EX1020, 10:11-17. In Ely, "[a]fter the compressed

video data stored at one of the camera units has been protected pursuant to an alarm command, the data (which will sometimes be referred to as 'alarm data') can be selectively retrieved in response to user instruction either for display (block 180) or directly for taperecording (block 182)." *Id.*, 10:17-23.

285. "When an alarm command is received, a process (indicated by block 160) is carried out in which the control circuit 134 protects from over-writing compressed digital video data previously stored in the memory 150." *Id.*, 7:48-55. The alarm data "correspond[s] to a time interval beginning at a predetermined time *prior to* receipt of the alarm command, and continuing for a predetermined time after receipt of the alarm command." *Id.* Thus, Ely's control circuit 134 performs the claimed function: "in response to a first trigger signal, designate for saving a first portion of the sensor data that was captured prior to occurrence of the first trigger signal."

286. Ely also discloses "wherein the portion of the sensor data occupies a portion of the first memory that is less than the entirety of the first memory." Ely discloses its camera unit's buffer memory may contain multiple blocks of event data, such that the first event occupies less than the full buffer. *Id.*, 10:56-11:8. Ely thus discloses element 4 under Patent Owner's non-MPF position.

287. Ely also discloses element 4 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Ely's control circuit 134 runs software to accomplish the function of element 4. *See also* EX1020,

4:1-8, 6:37-47, 7:12-8:12. Ely thus discloses element 4 under Patent Owner's MPF position.

288. ***Petitioner's Construction:*** Ely discloses the corresponding structure identified by Petitioner: "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, Fig. 4B, 8:9-37, Fig. 4C, 8:52-67, 9:62-10:5."

289. As explained for Petitioner's corresponding structure for element 3 of claim 1, Ely discloses a recorder (camera unit 114) with memory and control circuit 134 that runs software to accomplish functions, consistent with the '901 patent's disclosure at 2:33-39, 4:67-5:2, 5:38-50, 7:48-59, and Fig. 3. EX1020, 4:1-8, 6:37-47, 7:12-8:12. The operation of Ely's control circuit 134 is also consistent with the '901 patent's disclosure at 2:46-64, Fig. 4B (described at 8:9-37), and Fig. 4C (described at 8:54-67):

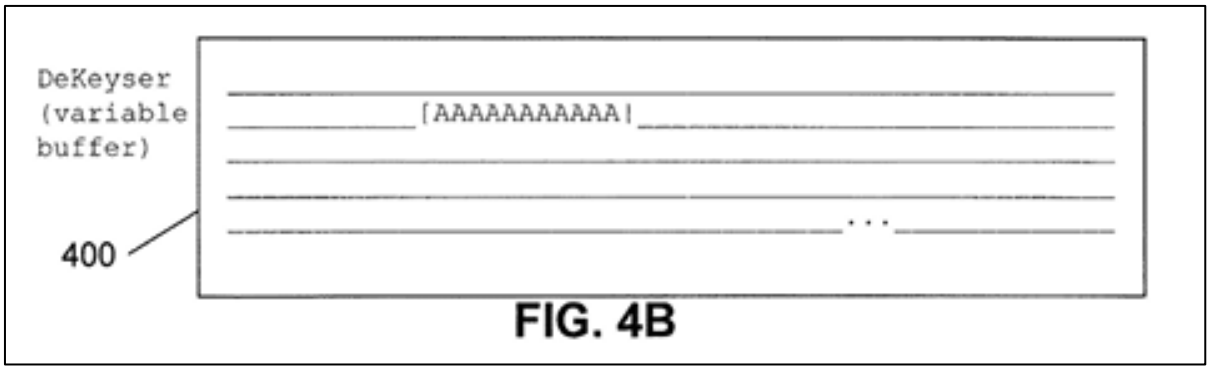


FIG. 4B

290. Ely's control circuit 134 protects a recent period of the first data stream recorded in the ring buffer based on a first alarm command (a start signal) generated by sensor 120. EX1020, 4:7-8, 7:48-55, 10:11-23. The protected portion of the first data

stream in the ring buffer is associated with a first alarm event (*id.*, 4:7-8, 7:48-55, 10:11-23), and includes a period of the first data stream preceding the first alarm command. *Id.*, 7:48-55, 10:11-23.

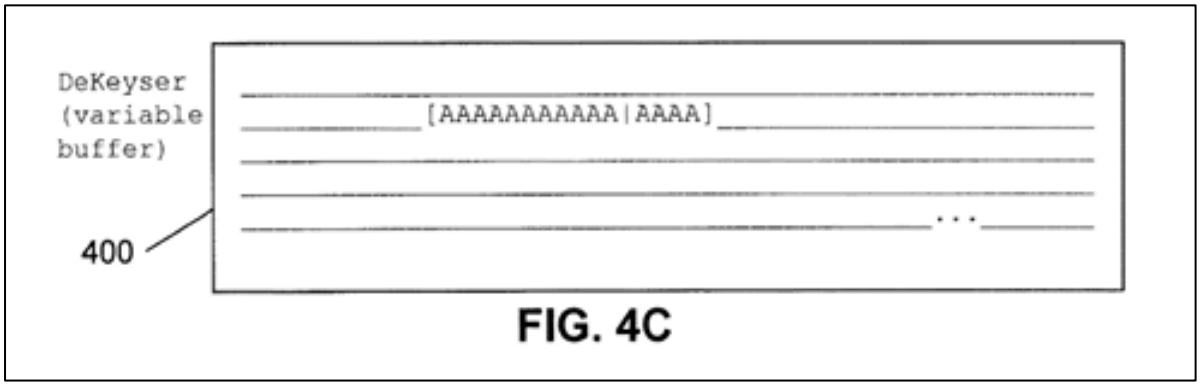


FIG. 4C

291. Ely's control circuit 134 stops protection of the first data stream in the ring buffer based on a stop signal. EX1020, 7:48-55, 10:11-23. Specifically, Ely's system responds to a signal from a user to save a recording, and this signal includes a "stop signal." *Id.*, 7:48-55, 10:11-15. Ely's alarm command tells the video recording device when to (i) start recording, *i.e.*, upon receipt of the alarm command, and when to (ii) stop recording, *i.e.*, when a predetermined amount of time has passed after receipt of the alarm command. *Id.*, 7:48-55, 10:11-23.

292. Additionally, Ely write protects sensor data in the circular buffer by indexing it in an electronic index, consistent with Petitioner's corresponding structure for element 4 at 9:62-10:5§ of the '901 patent ("segments of recorded data are 'write-protected' by being indexed in an electronic index"). "After the compressed video data stored at one of the camera units has been protected pursuant to an alarm command, the data (which will sometimes be referred to as 'alarm data') can be selectively retrieved

in response to user instruction either for display (block 180) or directly for taperecording (block 182)." EX1020, 10:17-23. A POSITA would have understood selectively retrieving alarm data associated with an alarm command necessitates an ability to locate the alarm data within the buffer by indexing the alarm data in a table/index corresponding to the buffer. Thus, a POSITA would have understood Ely as describing (or at least rendering obvious) indexing alarm data in a table/index corresponding to the buffer.

293. A POSITA would have recognized indexing in an electronic index as being one of a finite number of identified solutions for preserving alarm data in Ely, further evidencing its obviousness. A POSITA would have recognized Ely's alarm data must be preserved in some way, and indexing data to be preserved in an electronic index was a well-known approach for doing so, as explained in Section IV.B.6 above. Preserving event data using this conventional approach was not innovative but rather a straightforward application of ordinary skill or common sense.

f) Element 5: contiguously continuing to record the sensor data in the first memory while the first portion of the sensor data is designated for saving;

294. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

295. ***Patent Owner's Constructions:*** Ely's control circuit 134 ("computer processor") performs the function of element 5, under Patent Owner's non-MPF position. EX1056, 008-019. The protection of alarm data performed by control

circuit 134 occurs while "continuing to record the sensor data in the first memory." As Figure 4 illustrates, protection of alarm data (at block 160) loops back to the beginning of a process including, at block 154, "stor[ing] live compressed video data":

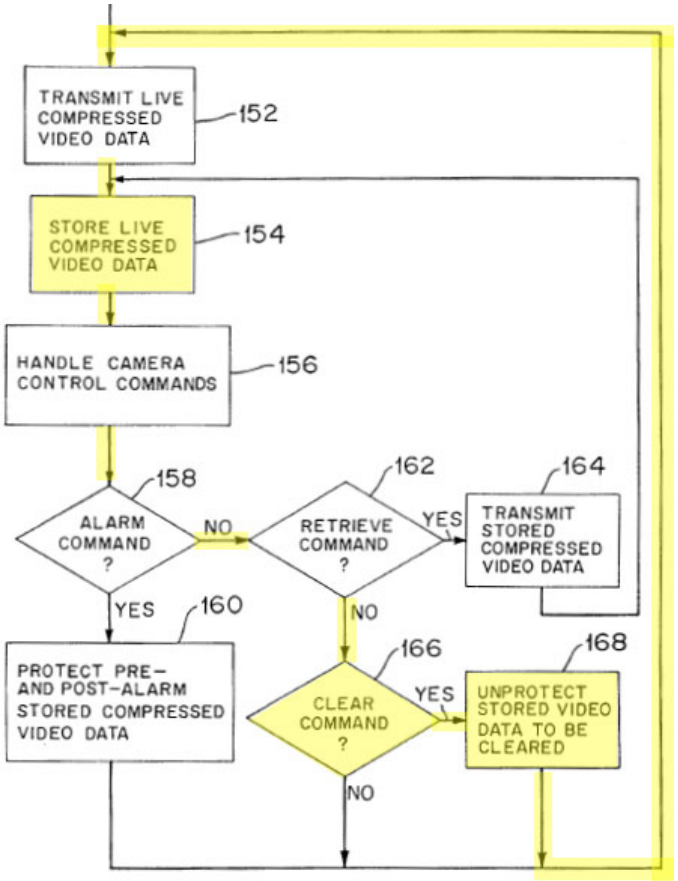


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4 (color added); *see also id.*, 7:45-48, 8:3-6.

296. Because the recording of live video data is "ongoing" (continuous), the protection of alarm data necessarily occurs while "continuing to record the sensor data in the first memory." *See id.*, Fig. 4, 7:45-48, 7:56-8:6.

297. Ely also discloses write-protecting multiple events (as multiple "blocks") in the ring buffer. *Id.*, 10:59-11:2. A POSITA would have understood that to preserve

video for multiple events in the ring buffer, Ely must "contiguously" continue to record the sensor data in memory while designating the first portion for saving. Ely thus discloses element 5 under Patent Owner's non-MPF position.

298. Ely also discloses element 5 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Ely's control circuit 134 runs software to accomplish the function of element 5. *See also* EX1020, 4:1-8, 6:37-47, 7:12-8:12. Ely thus discloses element 5 under Patent Owner's MPF position.

299. ***Petitioner's Construction:*** Ely discloses the corresponding structure identified by Petitioner: "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, Fig. 3, 7:48-59, Fig. 4D, 9:21-26, Fig. 4B, 8:9-37, Fig. 4C, 8:52-67, 9:62-10:5."

300. As explained for Petitioner's corresponding structure for elements 3 and 4 of claim 1, Ely discloses a recorder (camera unit 114) with memory and control circuit 134 that runs software to accomplish functions, consistent with the '901 patent's disclosure at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, 7:48-59, Fig. 3, Fig. 4B (described at 8:9-37), Fig. 4C (described at 8:54-67), and 9:62-10:5. EX1020, 4:1-8, 6:37-47, 7:12-8:12. The operation of Ely's control circuit 134 is also consistent with the '901 patent's disclosure at Fig. 4D (described at 9:21-26):

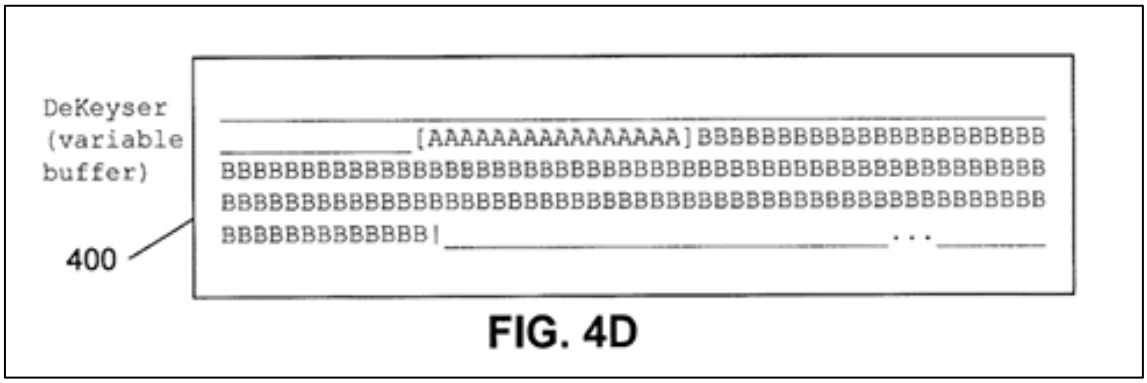


FIG. 4D

301. Ely's camera unit 114 under control of control circuit 134 records into the ring buffer on an "ongoing," continuous basis, such that storing of a second data stream in the ring buffer continues immediately after protecting a portion of the first data stream. EX1020, Fig. 4, 7:45-48, 7:56-8:6, 10:11-23. The second data stream is continuous with the write-protected portion of the first data stream, with the second data stream being recorded in a non-protected portion of Ely's ring buffer immediately following the write-protected portion of the first data stream. *Id.*

g) Element 6: in response to a subsequent second trigger signal, designate for saving a second portion where in the second portion occupies less than the remaining entirety of the first memory not designated for saving and corresponds to a length of time prior to the second trigger signal; and

302. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

303. ***Patent Owner's Constructions:*** As explained for element 3 of claim 1, when an alarm command is received, Ely's control circuit 134 "protects from over-writing compressed digital video data previously stored in the memory 150." EX1020,

7:48-55. The alarm data "correspond[s] to a time interval beginning at a predetermined time prior to receipt of the alarm command, and continuing for a predetermined time after receipt of the alarm command." *Id.* Ely's control circuit 134 is configured to designate for protecting a second portion of the sensor data in the ring buffer associated with a second alarm event based on a second alarm command generated by sensor 120. *Id.*, 4:7-8, 7:48-55, 10:11-23, 10:59-11:2. Like the first portion designated for saving, the second portion designated for saving includes a period of the sensor data preceding the second trigger signal. *Id.*, 7:48-55. Thus, Ely's control circuit 134 performs the claimed function: "in response to a subsequent second trigger signal, designate for saving a second portion." Saving of video data for multiple events in a circular buffer was also well-known in the art, as evidenced, for instance, by EX1008 (Kawasaki), Abstract, 4:30-5:11, Figs. 4, 5; and EX1009 (Fiore), [0022]-[0023], [0051], [0059], [0060].

304. Ely also discloses "where in [sic] the second portion occupies less than the remaining entirety of the first memory not designated for saving and corresponds to a length of time prior to the second trigger signal." Ely discloses its camera unit's buffer memory may contain multiple blocks of event data, such that first and second events each occupy less than the full buffer. EX1020, 10:56-11:8. Ely thus discloses element 6 under Patent Owner's non-MPF position

305. Ely also discloses element 6 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Ely's control

circuit 134 runs software to accomplish the function of element 6. *See also* EX1020, 4:1-8, 6:37-47, 7:12-8:12. Ely thus discloses element 6 under Patent Owner's MPF position.

306. ***Petitioner's Construction:*** Ely discloses the corresponding structure identified by Petitioner: "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, Fig. 4E, 9:48-50, 9:62-10:5."

307. As explained for Petitioner's corresponding structure for elements 3 and 4 of claim 1, Ely discloses a recorder (camera unit 114) with memory and control circuit 134 that runs software to accomplish functions, consistent with the '901 patent's disclosure at 2:33-39, 2:46-64, 4:67-5:2, 5:38-50, 7:48-59, 9:62-10:5, and Fig. 3. EX1020, 4:1-8, 6:37-47, 7:12-8:12. The operation of Ely's control circuit 134 is also consistent with the '901 patent's disclosure at Fig. 4E (described at 9:48-50):

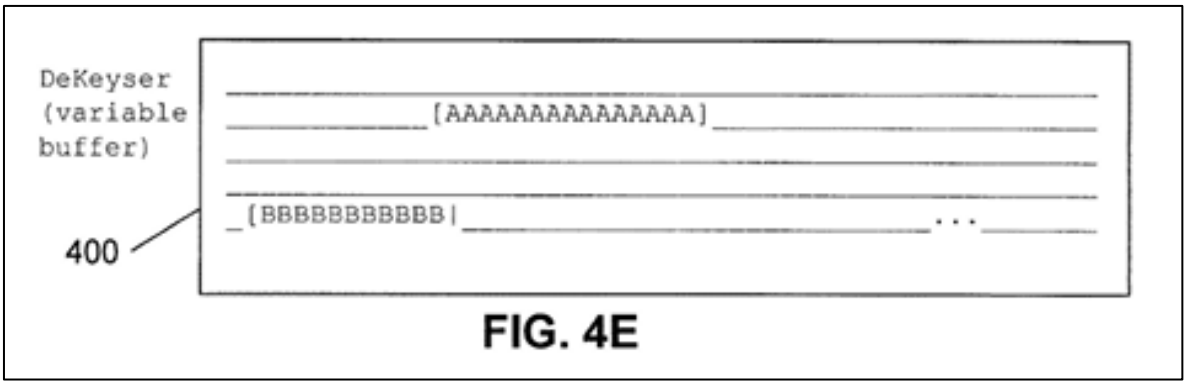


FIG. 4E

308. Ely's control circuit 134 is configured to protect a portion of the second data stream in the ring buffer associated with a second alarm event based on a second alarm command (start signal) generated by sensor 120. EX1020, 4:7-8, 7:48-55, 10:11-

23, 10:59-11:2. Like the protected portion for the first data stream, the protected portion of the second data stream includes a period of the second data stream preceding the second alarm command. *Id.*, 7:48-55, 10:11-23. As with the first data stream, the control circuit 134 stops protection of the second data stream in the ring buffer based on a stop signal. *Id.*, 7:48-55, 10:11-23.

h) Element 7: automatically overwrite portions of the sensor data that were recorded in the first memory that were not designated for saving.

309. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

310. ***Patent Owner's Constructions:*** Ely's control circuit 134 performs the function of element 7, under Patent Owner's non-MPF position. EX1056, 008-019. Ely's control circuit 134 controls memory addressing and writing of data into the memory so that memory 150 "serves as a ring buffer, in which currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150." EX1020, 7:28-34. Ely's control circuit 134 records into the ring buffer on an "ongoing," continuous basis and thus automatically overwrites sensor data recorded in the memory and not designated for saving. *Id*., Fig. 4, 7:45-48, 7:56-8:6, 10:11-23. Ely thus discloses element 7 under Patent Owner's non-MPF position.

311. Ely also discloses element 7 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Ely's control

circuit 134 runs software to accomplish the function of element 7. *See also* EX1020, 4:1-8, 6:37-47, 7:12-8:12. Ely thus discloses element 7 under Patent Owner's MPF position.

312. ***Petitioner's Construction:*** Ely discloses the corresponding structure identified by Petitioner: "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:33-39, 4:67-5:2, 5:38-50, Fig. 3, 7:48-59, Fig. 4A, 7:60-65" This structure is the same as that identified by Petitioner for element 3 of claim 1, and Ely thus discloses Petitioner's corresponding structure for element 7 for the reasons in Section VIII.E.2.d.

3. Dependent Claims 7-14 And 19-25

313. ***Claim 7:*** Claim 7 depends from claim 1 and recites "including with the first designated portion, another portion of the sensor data that was captured after occurrence of the first trigger signal." Ely discloses these limitations. Ely discloses protecting from overwriting video data "corresponding to a time interval beginning at a predetermined time prior to receipt of the alarm command, and continuing for a predetermined time *after* receipt of the alarm command." EX1020, 7:45-55; *see also id.*, 10:1-23, Fig. 4 (block 160).

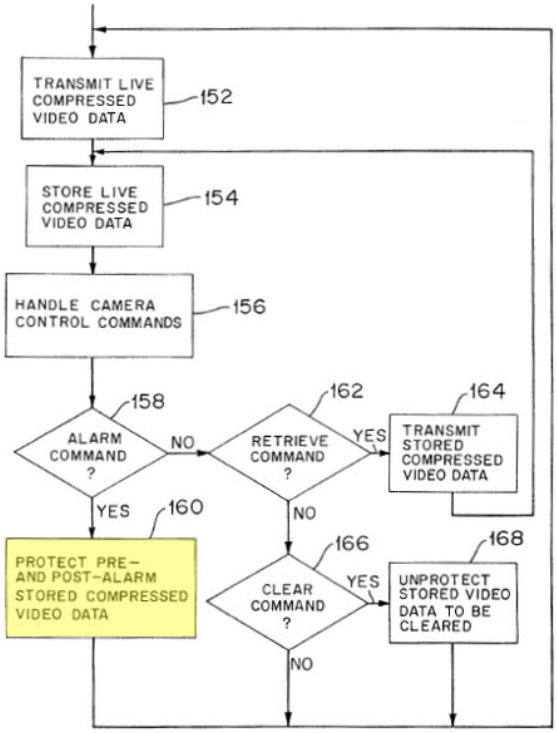


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4 (color added). The pre- and post-event data comprise an indexed, identifiable collection of data in the circular buffer.

314. ***Claim 8:*** Claim 8 depends from claim 1, reciting "wherein the computer processor is further configured to transmit, via a wireless transmitter, the first designated portion to a remote memory." Campbell discloses the limitations added in claim 8 for the reasons stated in Section VIII.B.3. Additionally, a POSITA would have been motivated to use Campbell's wireless transmitter to transmit a first portion designated for write protection to a remote memory in the Ely/Campbell system. Doing so would have enabled the alarm data to be preserved in in the remote memory, thus freeing up space in the memory for other important alarm data without needing to establish a physical (wired) connection.

315. ***Claim 9:*** Claim 9 depends from claim 1 and recites "wherein the sensor data comprises at least one of the following: image data and video data." Ely discloses these limitations. Ely discloses a camera 130 that records video data. EX1020, 6:21-28. Additionally, video data includes by necessity a sequence of images.

316. ***Claim 10:*** Claim 10 depends from claim 1, reciting "wherein the first memory comprises a circular buffer." Ely discloses these limitations. Ely's camera unit 114 includes a video camera 130 and memory board 136. EX1020 at 6:17-21, 6:48-51. The memory board 136 includes a memory device 150 that "functions as a buffer for the video signal generated by the camera 130, and is controlled by the control circuit 134." *Id*. at 6:51-53, 6:61-65. Ely states that the buffer is preferably a "ring buffer," in which "currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150." *Id*. at 7:28-34. A POSITA would have understood the "ring buffer" to mean a "circular buffer" of the type disclosed in the '901 patent.

317. ***Claims 11 and 12:*** Claims 11 and 12 depend from claim 1 and recite "wherein the first designated portion is stored using time compression" (claim 11) or "frame compression" (claim 12). These limitations would have been obvious in view of Ely. Ely's video surveillance system includes processing circuitry that compresses video data stored in the ring buffer. EX1020, 2:65-3:5, 3:56-67, 4:49-56, 6:48-65. Further, it would have been obvious to a POSITA to select either time compression or frame compression in the Ely/Campbell video recording system. Various compression

techniques were well-known in the art as of the claimed June 2007 priority date, including time compression and frame compression. Selecting these conventional techniques for use in the Ely/Campbell system would have been obvious to a POSITA. Before the purported June 2007 priority date of the challenged patents, image and video data, by necessity, was almost always compressed to save storage as well as I/O and network bandwidth requirements. Cameras and video encoders before June 2007 already had the ability to change the frame rate and bitrate. MPEG-1, released in 1991, used a combination of spatial and temporal compression. Appx NN (included in EX1041), a set of lecture notes entitled "Video Compression," discuss this (downloaded from https://www.cs.ucf.edu/courses/ cap5015/Video_compression_ 2005.pdf, last accessed July 21, 2024).

318. ***Claims 13 and 14:*** Claim 13 depends from claim 1, reciting "comprising a camera that includes the sensor interface, the first memory, and the computer processor." Claim 14 depends from claim 13, reciting "wherein the camera comprises a security camera." Ely discloses these limitations.

319. For claim 13, Ely's camera unit 114 includes (i) the sensor interface between the camera 130 and memory board 136, (ii) memory device 150, and (iii) control circuit 134:

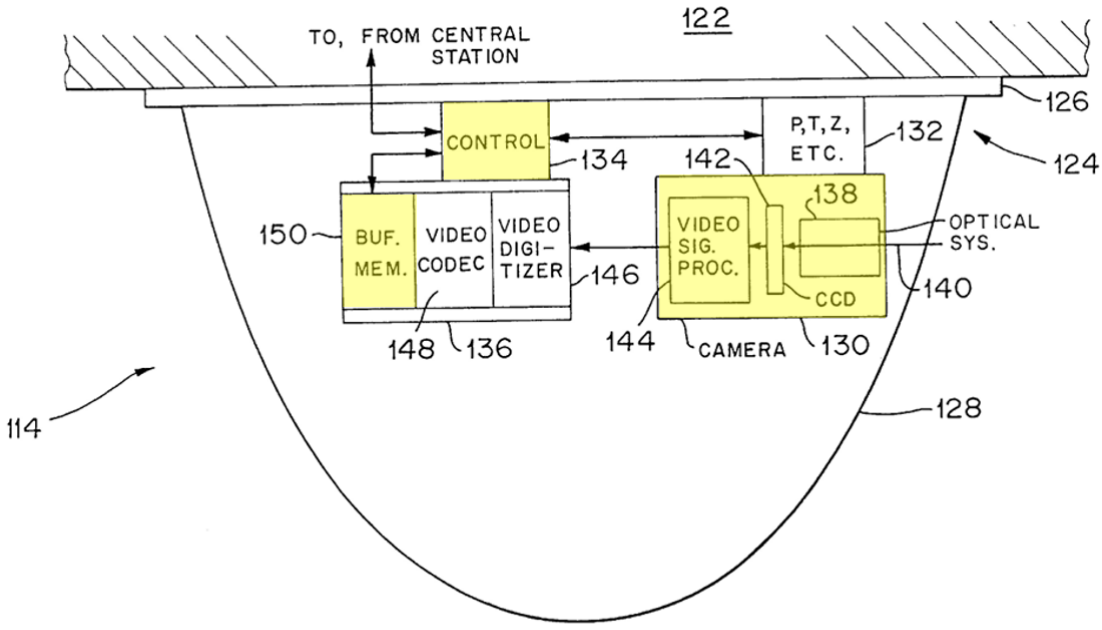


FIG. 3

EX1020, Fig. 3 (color added); *see also id.*, 6:4-6. A POSITA would have understood camera unit 114 as being a "camera."

320. For claim 14, Ely's "video surveillance system" includes "sensors for advising the system of alarm conditions." *Id.*, 1:5-8. These alarm conditions include "unauthorized opening of doors, windows and display cases and the like." *Id.*, 5:50-55. Thus, Ely discloses the "security camera."

321. ***Claim 19:*** Claim 19 depends from claim 1, reciting "wherein the first trigger signal represents detection of at least one of the following: a motion, a sound, an image, content in a data stream, a pattern in the sensor data, a person, a human face, a computer screen, an event, a verbal command, operation of switch, and operation of a button." Ely discloses these limitations. Ely's video surveillance system comprises one or more sensor devices 120, which "are preferably of conventional types that detect,

for example, unauthorized opening of doors, windows and display cases and the like and generate alarm signals indicative of these occurrences." EX1020, 5:50-53. "The sensors 120 may also include conventional motion and/or heat sensing devices." *Id.*, 5:54-55. "Alarms or other events that trigger protection of buffered video data may be initiated by techniques in addition to those discussed above. For example, in addition to or in place of sensor-generated alarms, an alarm condition can be generated by a system operator via the user interface, or an alarm condition can be detected by machine analysis of the content of live video signals generated by one or more of the camera units." *Id.,* 11:40-47.

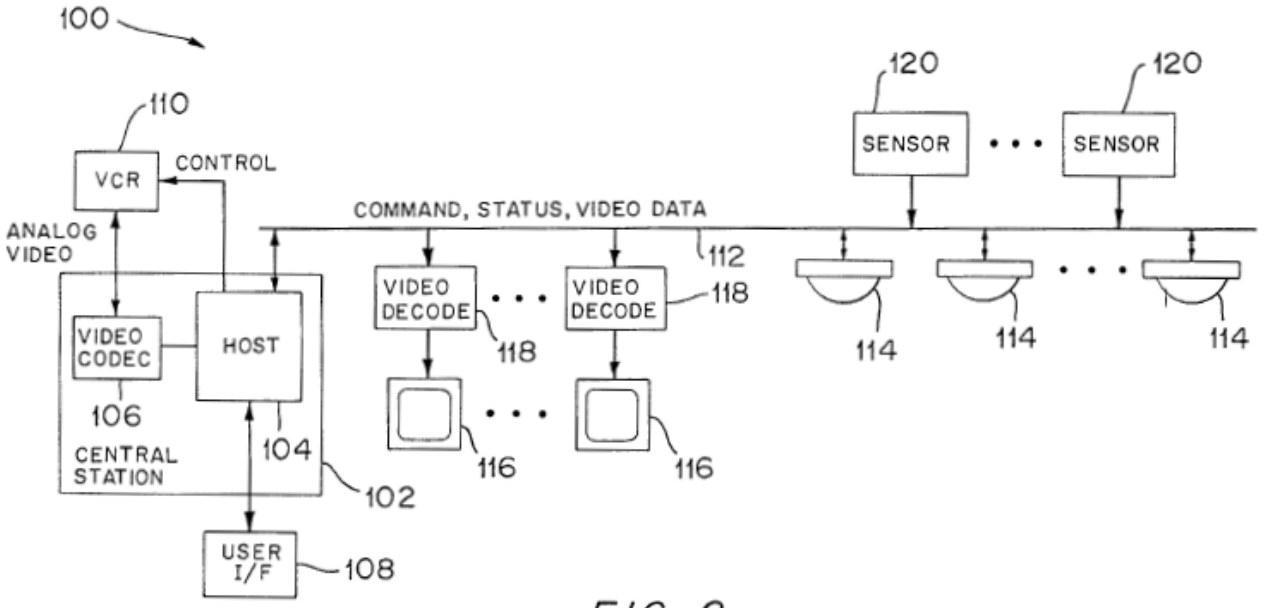


FIG. 2

322. ***Claims 20 and 21:*** Claim 20 depends from claim 1, reciting "wherein the computer processor is further configured to write-protect the first designated portion as a write-protected portion in the first memory." Claim 21 depends from claim 20,

reciting "wherein the computer processor is further configured to free the write-protected portion following a transmission of the designated portion." Ely discloses these limitations.

323. For claim 20, Ely discloses the limitations added in this claim for the reasons explained above in Sections IV.E.2.e with respect to claim 1, element 4 ("in response to a first trigger signal, designate for saving a first portion of the sensor data that was captured prior to occurrence of the first trigger signal, wherein the portion of the sensor data occupies a portion of the first memory that is less than the entirety of the first memory and corresponds to a length of time prior to the first trigger signal").

324. For claim 21, Ely's control circuit 134 is conditioned to receive commands relating to the previously stored compressed video data including "clear" commands, "in response to which the control circuit removes a previously protected block of stored video data from protection, thereby permitting 'live' video data to be written over the now-unprotected stored video data." EX1020, 8:7-12. The clear command may be sent after write-protected alarm data is retrieved. *Id.*, 7:56-59, 10:24-43, 10:51-55.

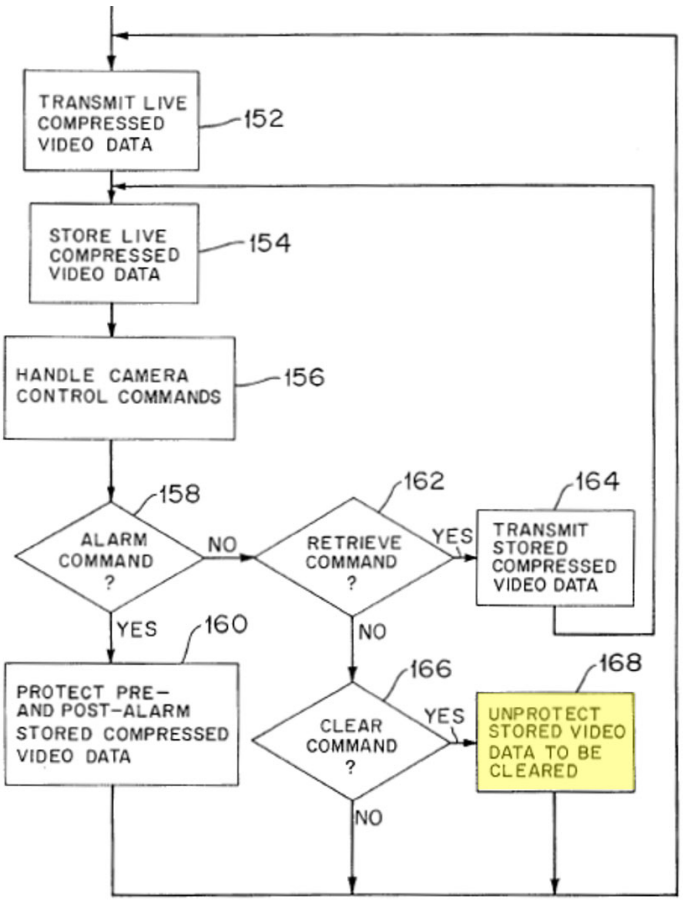


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4 (color added); *see also id.*, Fig. 5B (block 190).

325. ***Claims 22 and 23:*** Claim 22 depends from claim 1, reciting "wherein the computer processor is further configured to index in the first memory the first designated portion." Claim 23 depends from claim 1, reciting "wherein the computer processor is further configured to index the first designated portion while the recording facility is still recording the sensor data into the first memory."

326. Ely discloses or would have rendered obvious these limitations. Ely's "control circuit 134 is conditioned "to receive commands calling for reading-out and

transmission to the central station of previously-stored compressed video data." EX1020, 7:56-59. "The transmission of the compressed video data that was read out from the memory 150 may be in place of, or virtually in parallel with, continued transmission of 'live' compressed video data." *Id*., 7:66-8:2. Preferably, transmission "does not interrupt ongoing storage of 'live' video data." *Id*., 8:3-6. A POSITA would have understood the selective retrieval and transmission of alarm data without interrupting ongoing storage of "live" video data necessitates that the control circuit 134 be configured to index the alarm data ("first designated portion") while continuing to record sensor data into the first memory.

327. ***Claim 24:*** Claim 24 depends from claim 1, reciting "wherein the computer processor is configured to record the sensor data continuously, from before the first trigger signal, through a pre-designated time period, and after the pre-designated time period." Ely discloses these limitations. Ely discloses protecting from overwriting video data previously stored in the memory "corresponding to a time interval beginning at a predetermined time prior to receipt of the alarm command, and *continuing* for a predetermined time after receipt of the alarm command." EX1020, 7:45-55; *see also id.*, 10:1-23, Fig. 4 (block 160).

328. ***Claim 25:*** Claim 25 depends from claim 1, reciting "wherein the first portion of the sensor data also corresponds to a pre-determined length of time after the trigger signal." Ely discloses these limitations for the reasons discussed above for claim 7.

F. Ground 2b: Claims 2-6 Of The '901 Patent Would Have Been Obvious Over Ely In View Of Campbell, In Further View Of Yerazunis

329. Claims 2-6 would have been obvious over the combination of Ely (EX1020), Campbell (EX1059), and Yerazunis (EX1017). Claim 2 depends from claim 1 and recites "where in [sic] the computer processor is further configured to copy the first designated portion to a second memory." Claims 3-6 depend from claim 2 and add limitations "wherein the second memory comprises a different part of the first memory" (claim 3), "wherein the first designated portion is stored in the second memory using compression" (claim 4), "wherein the computer processor is further configured to copy, to the second memory, another portion of the sensor data that was captured after occurrence of the first trigger signal" (claim 5), and "wherein the computer processor is further configured to copy, to the second memory, another portion the sensor data that was captured during occurrence of the first trigger signal" (claim 6).

330. To the extent Ely and Campbell do not disclose the limitations added in claims 2, 3, 5, and 6, these limitations would have been obvious in view of Yerazunis. As explained in Section VIII.B.3, Yerazunis discloses the limitations requiring copying the first designated portion to a second memory. A POSITA would have been motivated to apply Yerazunis's teachings of copying protected data to a second memory to the Ely/Campbell system, *e.*g., to "provide fully non-volatile data storage without battery drainage" (EX1017, 18:4-28) and to provide redundancy.

331. Ely discloses the limitations added in claim 4, which depends from claim 2. Ely's video surveillance system includes "processing circuitry disposed within the housing for applying a data compression algorithm to the digital video signal to form compressed video data, the compressed video data being stored in the storage device," said storage device comprising a ring buffer. EX1020, 2:65-3:5, 3:56-67, 4:49-56. In one embodiment, the processing circuitry compresses video data according to the H.261 standard. *Id.*, 6:48-65.

G. Ground 2c: Claims 15 And 16 Of The '901 Patent Would Have Been Obvious Over Ely In View Of Campbell, In Further View Of Lewellen

332. Claims 15 and 16 would have been obvious over the combination of Ely (EX1020), Campbell (EX1059), and Lewellen (EX1019).

333. Claim 15 depends from claim 1, reciting "comprising a cell phone including the sensor interface, the first memory, and the computer processor." Claim 16 depends from claim 1, reciting "a personal area network coupled with the computer processor and including at least two of the following: the sensor interface, the first memory, and the computer processor." To the extent Ely and Campbell do not disclose the limitations added in claims 15 and 16, Lewellen does for the reasons explained above in Section VIII.C.

334. A POSITA would have been motivated to apply Lewellen's teachings to the Ely/Campbell system. All three disclose recording systems for security/surveillance applications. EX1019, [0002]-[0009], [0024]-[0026], [0042]; EX1020, Abstract, 5:34-

59; EX1059, 6:16-20. A POSITA would have recognized the advantages of modifying the Ely/Campbell system to implement Lewellen's teachings regarding personal area networks for transmitting alarm data preserved with the file-based circular buffer approach of the Ely/Campbell system. Ely discloses it is an "object of the invention to provide a video surveillance system which requires less cabling than conventional systems." EX1020, 2:52-54. Lewellen teaches the "benefit of providing the local wireless interface 390 is that digital information recorded by the digital video recorder 370 may be automatically transmitted and received to and from compatible devices." EX1019, [0043]. A POSITA would have been motivated to implement the Ely/Campbell system with Lewellen's wireless interface to further reduce the amount of cabling required, by enabling wireless—rather than wired—transmission of signals and data.

335. A POSITA would have also been motivated to implement the Ely/Campbell system or component thereof (e.g., camera unit 114) using a cell phone comprising a sensor interface, memory, and computer processor. EX1019, [0010], [0031], [0037], [0041]. Bluetooth-compatible mobile phones were ubiquitous as of June 2007 and carried by many security professionals on a daily basis. A POSITA would have recognized that using these mobile phones (including sensor interface, memory, and computer processor) as the video recording device would have been a simple and low-cost means to enable security guards to record from their person on, e.g., a casino floor, thus providing more portability and additional angles/viewpoints

compared to fixed cameras. Lewellen expressly recognizes the significant advantages of Bluetooth technology, including that it is "very inexpensive." EX1019, [0032], [0034], [0042].

336. A POSITA would have had a reasonable expectation of success in implementing the Ely/Campbell system with Lewellen's wireless interface and related techniques Lewellen describes. Local wireless interfaces (including Bluetooth-compatible interfaces) were well-known and commercially available as of June 2007, and the addition of such an interface in the Ely/Campbell system would have been routine and well within a POSITA's skill.

H. Ground 2d: Claims 17 And 18 Of The '901 Patent Would Have Been Obvious Over Ely In View Of Campbell, In Further View Of Fiore

337. Claims 17 and 18 would have been obvious over the combination of Ely (EX1020), Campbell (EX1059), and Fiore (EX1009).

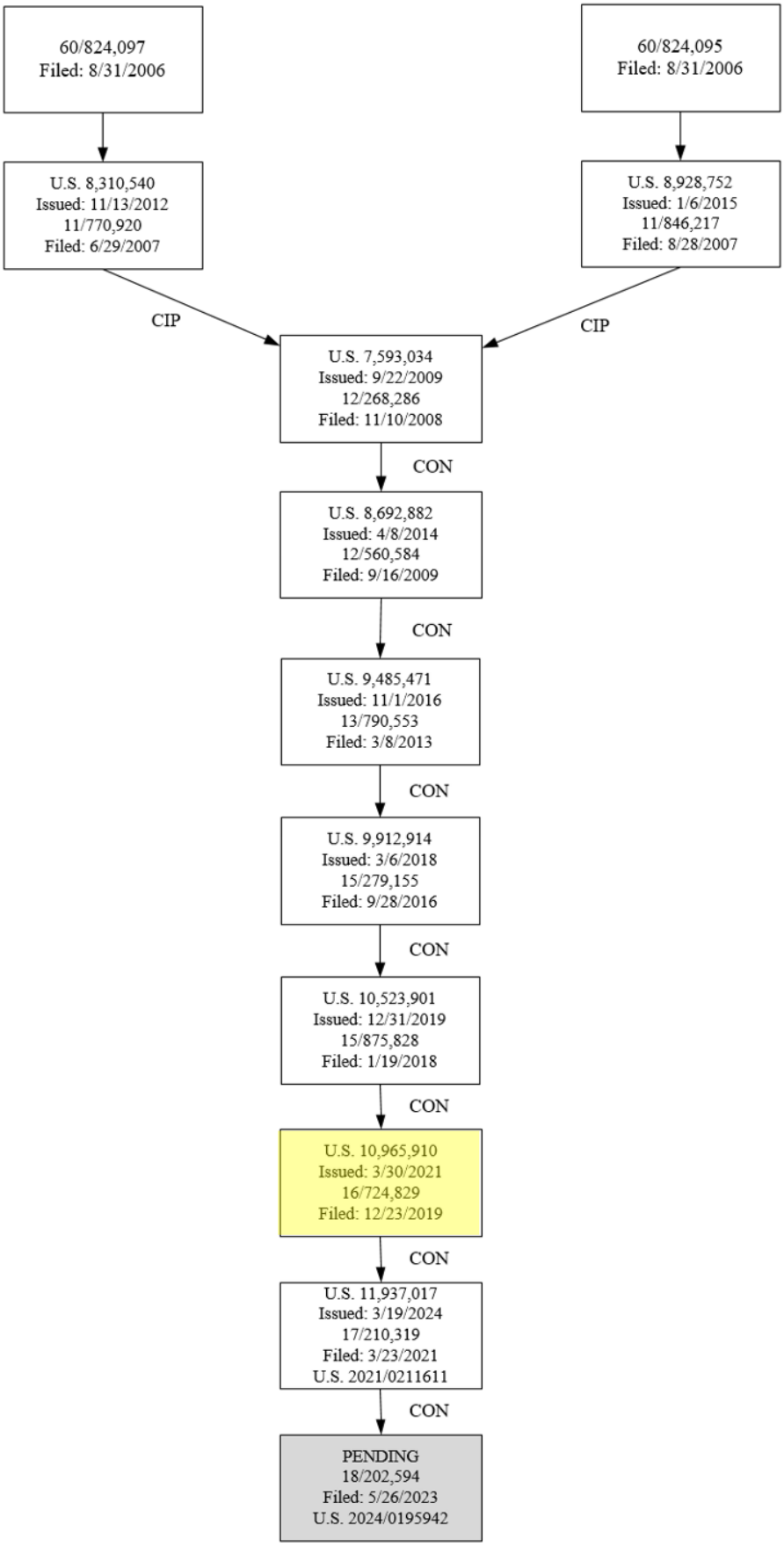
338. Claim 17 depends from claim 1, reciting "wherein the first memory is configured to record the first designated portion of the sensor data in a file." Claim 18 depends from claim 1 and recites "wherein the first memory is configured to record the first designated portion of the sensor data in a single file."

339. Ely discloses these limitations. As explained in Section VIII.E.2.e, a POSITA would have understood the selective retrieval of alarm data from Ely's ring buffer necessitates an ability to locate the alarm data as a single file within the buffer, such that Ely necessarily discloses the limitations of claims 17 and 18.

340. To the extent a POSITA wanted further guidance as to particular methods for implementing Ely's ring buffer and recording sensor data into the buffer as a file, a POSITA would have been motivated to turn to Fiore. Fiore discloses the limitations added in claims 17 and 18 (*see* Section VIIID), and a POSITA would have been motivated to apply Fiore's teachings to the Ely/Campbell system. Ely and Fiore describe similar technologies and solve similar problems. *See* EX1020, 6:51-53, 6:61-65, 7:28-39, 7:48-55; EX1009, Abstract, [0048]. Moreover, Fiore describes numerous benefits of its file-based indexing approach. *See, e.g.*, EX1009, [0065], [0067]-[0068], [0072], *see also* Sections VII.C and VIII.D. A POSITA implementing the Ely/Campbell system would have been motivated to utilize Fiore's teachings regarding indexing within the memory-mapped file at least in view of these exemplary benefits. A POSITA would have had a reasonable expectation of success because Fiore provides a detailed disclosure of its file-based approach, and applying those techniques to the Ely/Campbell system would have been routine and well within a POSITA's skill.

IX. ’910 Patent: Claims 1-20

341. The ’910 patent of the Stellar patent family is highlighted below:


60/824,097
Filed: 8/31/2006
60/824,095
Filed: 8/31/2006
U.S. 8,310,540
Issued: 11/13/2012
11/770,920
Filed: 6/29/2007
U.S. 8,928,752
Issued: 1/6/2015
11/846,217
Filed: 8/28/2007
CIP
CIP
U.S. 7,593,034
Issued: 9/22/2009
12/268,286
Filed: 11/10/2008
CON
U.S. 8,692,882
Issued: 4/8/2014
12/560,584
Filed: 9/16/2009
CON
U.S. 9,485,471
Issued: 11/1/2016
13/790,553
Filed: 3/8/2013
CON
U.S. 9,912,914
Issued: 3/6/2018
15/279,155
Filed: 9/28/2016
CON
U.S. 10,523,901
Issued: 12/31/2019
15/875,828
Filed: 1/19/2018
CON
U.S. 10,965,910
Issued: 3/30/2021
16/724,829
Filed: 12/23/2019
CON
U.S. 11,937,017
Issued: 3/19/2024
17/210,319
Filed: 3/23/2021
U.S. 2021/0211611
CON
PENDING
18/202,594
Filed: 5/26/2023
U.S. 2024/0195942

342. As shown above, the ’910 patent claims priority back to USP 7,593,034 (the ’034 patent, EX1010), filed November 10, 2008, as a continuation application. The ’034 patent claims priority as a continuation-in-part to U.S. App. No. 11/770,920 (the ’920 application, EX1011), filed on June 29, 2007, and U.S. App. No. 11/846,217 (the ’217 application, EX1012), filed August 28, 2007. As noted above, I have been asked to apply the June 29, 2007 filing date of the ’920 application as the priority date for the challenged claims of the ’910 patent.

A. Summary Of The ’910 Patent File History

343. I understand that Application No. 16/724,829, which eventually issued as the ’910 patent, was filed on December 23, 2019 with 20 claims. EX1061, 1-41. The Office rejected claims 1 and 20 on the basis of non-statutory double patenting over the ’901 patent in view of U.S. 6,351,798 to Aono (EX1064). EX1061, 48-54. Applicant submitted a terminal disclaimer and amended claims 1 and 20 to recite “upon reaching at least one of the first portion and the second portion while continuing to record the sensor data in the at least one memory, excluding from overwriting the at least one of the first portion and second portion” (*id.*, 387-392, 397-404), after which the claims were allowed (*id*., 405-413).

B. Ground 1a: Claims 1-10 And 14-20 Of The ’910 Patent Would Have Been Obvious Over Yerazunis

344. Claims 1-10 and 14-20 would have been obvious over Yerazunis (EX1017).

1. Independent Claim 1

a) Preamble: A recording system for saving a sequence of clips comprising:

345. Yerazunis discloses the preamble of claim 1. Yerazunis discloses "a video recording device" that "is contained within a compactly sized housing" and captures video images for, e.g., security purposes. EX1017, 2:12-14; *see also id.*, 1:17-43. Yerazunis's video recording device saves sequences of clips. *Id.*, 14:45-64; 15:9-13.

b) Element 1: at least one memory communicatively coupled with a sensor; and

346. Yerazunis discloses this element. Yerazunis discloses a sensor that captures sensor data. Yerazunis's video recording device includes camera 40 that discloses the "sensor that captures sensor data":

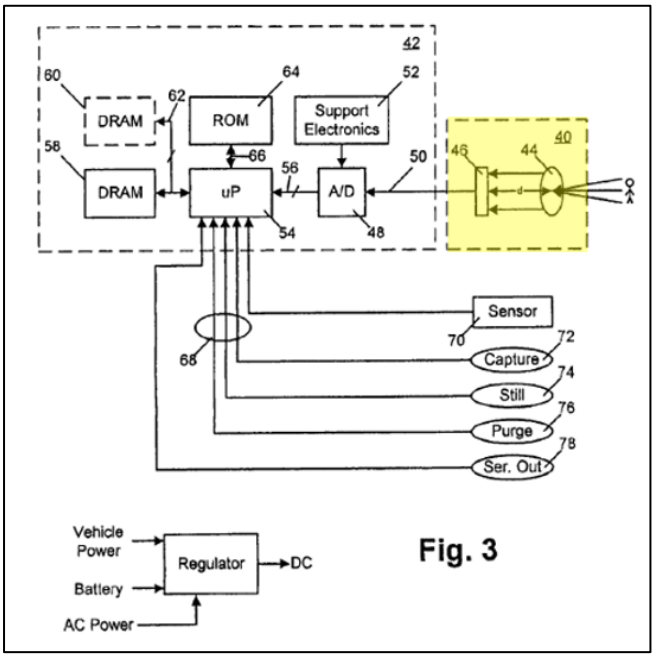


Fig. 3

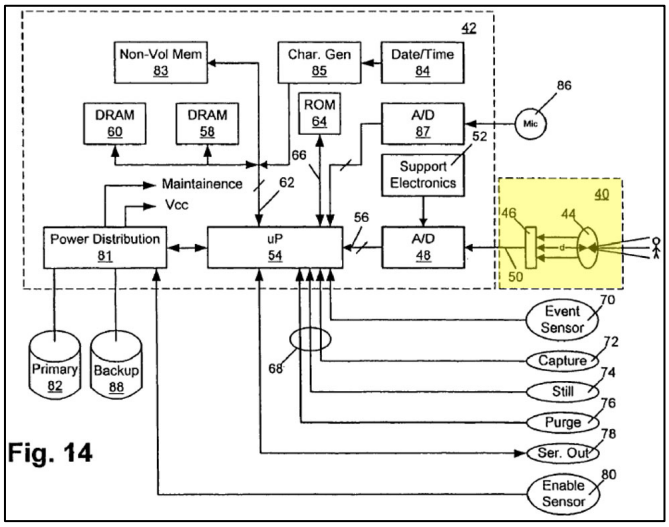


Fig. 14

EX1017, Figs. 3, 14 (color added); *see also id.*, 2:33-41.

347. The camera 40 is "comprised of a lens 44 which is disposed a predetermined distance d from the surface of an image sensor 46." *Id.*, 5:43-45. "The image sensor 46, as described above, may comprise a [CCD] array, an artificial retina, or any other suitable image sensor operative to provide an output signal representative of a video image which impinges upon the sensor." *Id.*, 5:45-49. The output signal is "an analog signal which is coupled to one or more A/D converters" that "generate a digital representation of the video image." *Id.*, 2:37-41. The camera 40 thus discloses the "sensor" because it has an image sensor 46 that captures video images impinging on it ("sensor data").

348. Yerazunis's camera 40 also discloses the "sensor that captures sensor data" because its disclosure is similar to that of the '910 patent referring to cameras as being sensing devices. EX1060, 4:19-46.

349. Yerazunis also discloses at least one memory communicatively coupled with camera 40 (*i.e.*, the "sensor"). Yerazunis's video recording device includes video electronics 42 with semiconductor memory comprising DRAMs 58, 60 that disclose the "at least one memory communicatively coupled with a sensor" (EX1017, 5:40-43, 6:24-36):

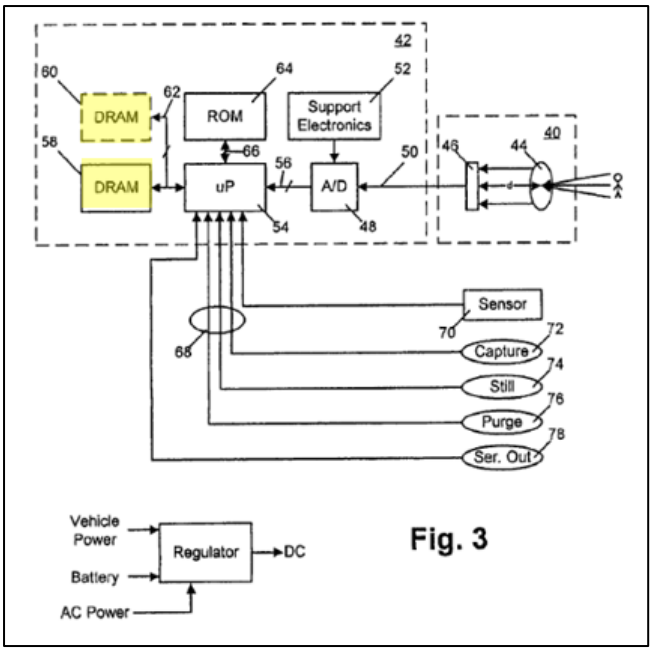


Fig. 3

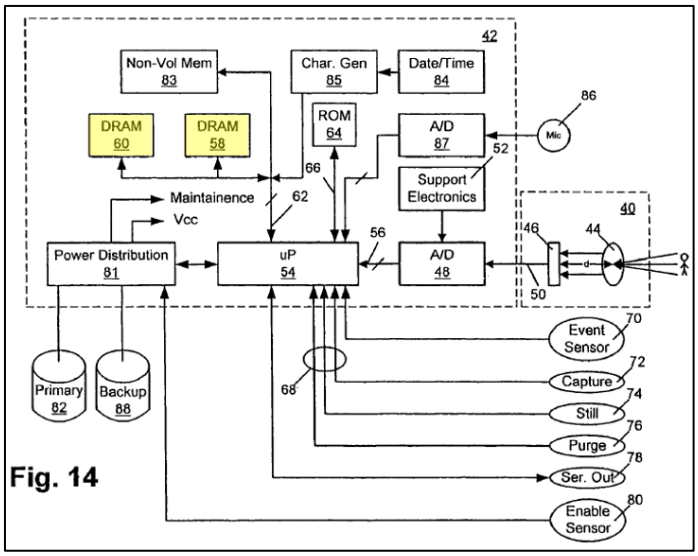


Fig. 14

Id., Figs. 3, 14 (color added).

350. As seen above, DRAMs 58, 60 are coupled to camera 40. Microprocessor 54 and DRAM 58 "may be obtained as a single integrated circuit [IC]" (*id.*, 6:24-29), meaning their connection would be via physical connectors on the IC (*e.g.*, conductive lines and/or vias, etc.). DRAM 60 is "coupled to the microprocessor 54 via a bus 62." *Id.*, 6:30-36. Microprocessor 54, in turn, is coupled to analog-to-digital converter (ADC) 48 "via signal path 56 which comprises a parallel signal bus." *Id.*, 6:14-23. Finally, ADC 48 is coupled to camera 40 "via signal path 50" to enable ADC 48 to sample the output of image sensor 46 at predetermined intervals. *Id.*, 5:40-67. Accordingly, DRAMs 58, 60 are "communicatively coupled with the sensor."

c) Element 2: a computer processor configured to: record sensor data obtained by the sensor in the at least one memory;

351. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

352. ***Patent Owner's Constructions:*** I understand Patent Owner's position is that the claimed "computer processor configured to" claim limitations are not MPF limitations and broadly cover any "computer processor" configured to perform the claimed functions. Yerazunis discloses microprocessor 54 (a computer processor) that records sensor data obtained from the camera 40 in the DRAM 58 (at least one memory). Specifically, Yerazunis's video recording device under control of microprocessor 54 "records video frames successively in at least one circular buffer memory organized as a continuous loop." EX1017, 2:19-23, 17:9-20, 17:50-59.

Camera 40 captures video, and one or more ADCs 48 convert the captured video into a digital signal. *Id.*, 5:40-67. The digital signal is provided to microprocessor 54, which "compresses the digitized frame data and stores the compressed frame data in the next sequential location of [a] circular buffer" formed in DRAM 58. *Id.*, 2:45-47, 6:24-26, 6:52-7:6, 10:55-67, 11:50-14:44, 17:50-59, and Figs. 3, 4a, 4b, 6-8, 14.

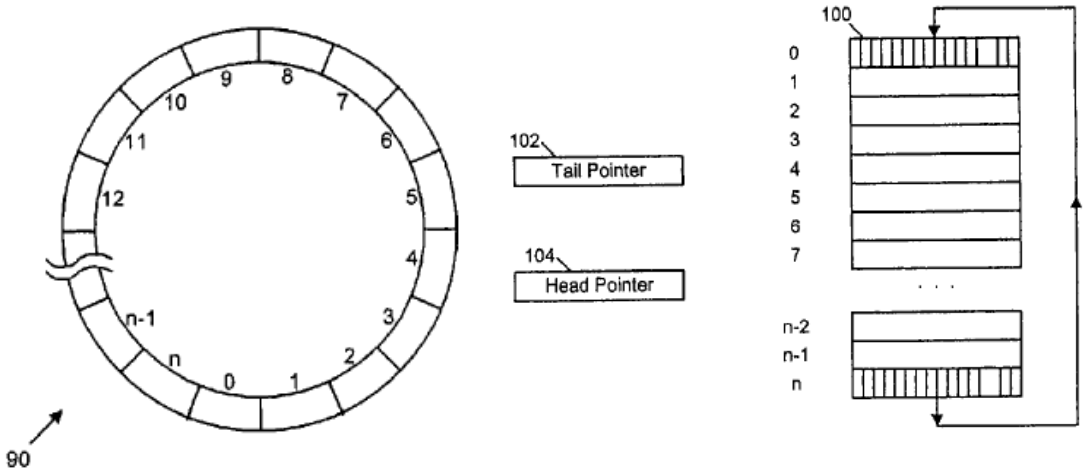


Fig. 4a Fig. 4b

Id., Figs. 4a, 4b.

353. Figure 5 illustrates aspects of Yerazunis's process for "record[ing] sensor data obtained by the sensor in the at least one memory" at least at steps 122, 124, 126, and 130.

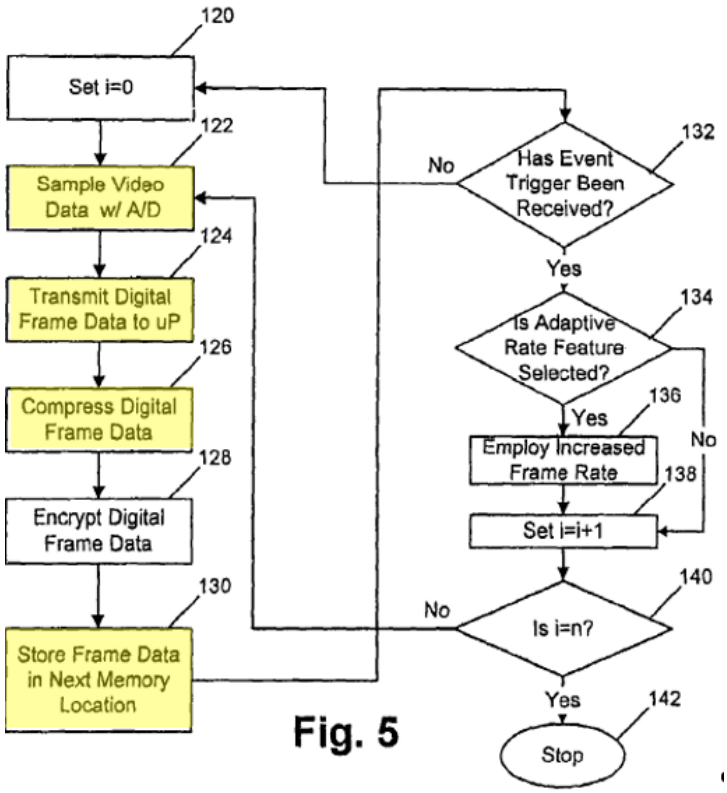


Fig. 5

Id., Fig. 5 (color added); *see also id.*, 10:55-11:7.

354. Yerazunis thus describes a "computer processor" (microprocessor 54) that is "configured to: record sensor data obtained by the sensor in the at least one memory," disclosing element 2 under Patent Owner's non-MPF position.

355. Yerazunis also discloses element 2 under Patent Owner's MPF position. Owner contends that the corresponding structure for element 2 broadly encompasses any "component of a recording device including software or hardware that accomplishes the functions described" (referred to herein as Patent Owner's "MPF position"). EX1057, 008-014. As explained above for Patent Owner's non-MPF position, Yerazunis's microprocessor 54 (computer processor) runs software to accomplish the claimed function of "record sensor data obtained by the sensor in the at

least one memory." *See also* EX1017, 6:17-23, 6:37-51. Yerazunis thus discloses element 2 under Patent Owner's MPF position.

356. ***Petitioner's Construction:*** Yerazunis discloses the corresponding structure identified by Petitioner, *i.e.*, "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 5:3-5, 5:40-52, Fig. 3, 7:48-59, Fig. 4A, 7:60-65."

357. Yerazunis discloses a recorder with a memory that runs software to accomplish functions, consistent with the '910 patent's disclosure at 5:3-5. Specifically, Yerazunis discloses video electronics 42 (a recorder) having microcontroller 54 that runs software for performing instructions. EX1017, 6:17-23, 6:37-51. The video electronics 42 include DRAM 58, 60 (memory), and microprocessor 54 records sensor data from the camera 40 in the circular buffer formed in the memory, consistent with the '910 patent's disclosure at 2:36-42, Fig. 3, 7:48-59, 7:60-65, and Figure 4A:

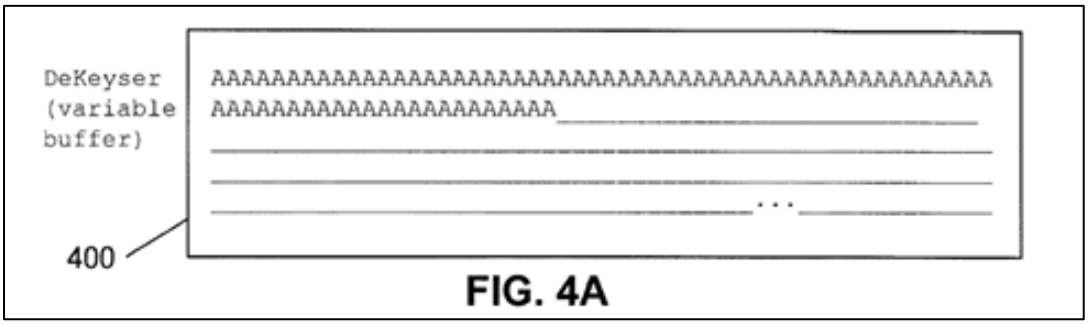


FIG. 4A

358. In Figure 4A, a recording facility records data stream "A" into circular buffer 400. EX1060, 7:60-65.

359. In Yerazunis's gun-camera embodiment, microprocessor 54 stores a first digital data stream generated by one or more ADCs 48 in a circular buffer formed in DRAM 58, 60 (memory). EX1017, 2:19-23, 2:45-47, 6:24-26, 6:52-7:6, 10:55-67, 11:50-14:44, 17:9-20, 17:50-59, and Figs. 3, 5 (*e.g.*, steps 122, 124, 126, 130), 6-8, 14. A POSITA would have understood the digital output of Yerazunis's ADCs 48 as including data streams because the output is a continuous sequence of data. EX1017, 2:33-52, 5:49-67, 6:52-56, 7:23-32; Appx MM (included in EX1041) at 109.

360. Additionally, in recording the sensor data in the circular buffer formed in the memory, Yerazunis's microcontroller 54 skips over write-protected matter, consistent with the '910 patent's disclosure at 2:36-42. EX1017, 3:28-33, 17:45-61. Further, Yerazunis's recorder (video electronics 42) records the sensor data "in digital [or analog] format," consistent with the '910 patent's disclosure at 5:40-52. EX1017, 2:37-47, 5:49-67, 6:14-16, 6:52-57.

d) Element 3: in response to a first trigger signal, designate for write-protecting a first portion of the sensor data that was captured prior to occurrence of the first trigger signal, wherein the first portion of the sensor data occupies a portion of the at least one memory that is less than the entirety of the at least one memory and corresponds to a length of time prior to the first trigger signal;

361. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

362. ***Patent Owner's Constructions:*** Yerazunis's microprocessor 54 is a "computer processor" that performs the function of element 3, under Patent Owner's non-MPF position. EX1056, 008-019. In embodiments, Yerazunis's microprocessor 54 comprises "a number of inputs 68 which permit activation of the video recording device and control of the device by a user." EX1017, 6:40-42, Figs. 3, 14. Inputs include still button 74, the activation of which causes a video frame to be "stored within a frame location within the circular buffer," with the "frame [being] protected from overwriting while video capture within the circular buffer continues." *Id.*, 9:27-31, 9:34-42.

363. In Yerazunis's gun-camera embodiment, event sensor 70 generates a "gun firing signal" "upon discharge of the gun." *Id.*, 3:20-33, 8:8-25, 14:55-61. Upon detecting the gun-firing signal, microprocessor 54 causes "specified frame data associated with [the] firing event both *before* and after the event" to be "preserved," such that it "cannot be overwritten as a result of further use of the gun or subsequent firing events." *Id.*, 3:25-38, 8:26-30, 15:9-13. With the specified frame data write-protected, "[f]rame data associated with each subsequent firing event[] is stored within an unused portion of the circular buffer memory." *Id.*, 3:31-33. Thus, Yerazunis's microprocessor 54 performs the claimed function "in response to a first trigger signal, designate for write-protecting a first portion of the sensor data that was captured prior to occurrence of the first trigger signal."

364. Yerazunis also discloses "wherein the first portion of the sensor data occupies a portion of the at least one memory that is less than the entirety of the at least one memory." Yerazunis discloses its "circular buffer memory may be subdivided evenly to accommodate a predetermined number of firings of the gun," such that the first firing event occupies less than the full buffer. *Id.*, 17:9-20. Yerazunis thus discloses element 3 under Patent Owner's non-MPF position.

365. Yerazunis also discloses element 3 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Yerazunis's microprocessor 54 runs software to accomplish the function of element 3. *See also* EX1017, 6:17-23, 6:37-51. Yerazunis thus discloses element 3 under Patent Owner's MPF position.

366. ***Petitioner's Construction:*** Yerazunis discloses the corresponding structure identified by Petitioner, *i.e.*, "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 2:49-67, 5:3-5, 5:40-52, Fig. 4B, 8:10-40, Fig. 4C, 8:55-9:3, 9:65-10:8."

367. As explained for Petitioner's corresponding structure for element 2 of claim 1, Yerazunis discloses a recorder (video electronics 42) with memory and microcontroller 54 that runs software to accomplish functions consistent with the '910 patent's disclosure at 2:36-42, 5:3-5, 5:40-52, 7:48-59, and Fig. 3. The operation of Yerazunis's microprocessor 54 is also consistent with the '910 patent's disclosure at 2:49-67, Fig. 4B (described at 8:10-40), and Fig. 4C (described at 8:54-67):

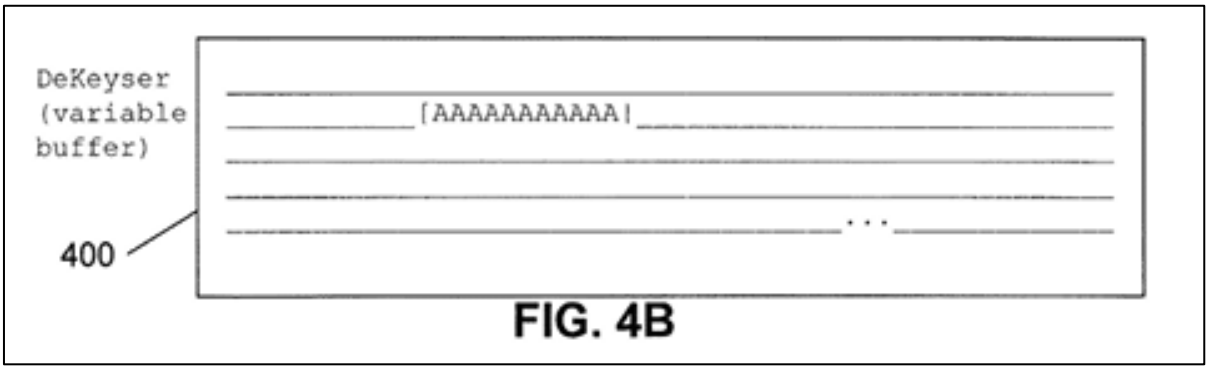


FIG. 4B

368. In Figure 4B, the protecting facility has protected a recent period of data stream "A" as a function of a "start" signal. In protecting recent data, the system can protect a historical time period preceding the "start" signal. EX1060, 8:10-40.

369. In Yerazunis's gun-camera embodiment, microprocessor 54 protects a recent period of the first data stream recorded in the circular buffer based on a first trigger signal (a start signal) generated by event sensor 70 or capture button 72. EX1017, 2:1-4, 2:19-33, 3:20-38, 4:45-49, 8:8-30, 9:17-26, 9:34-38, 14:55-61, 15:9-13, 17:45-61. The protected portion of the first data stream in the circular buffer is associated with a first event, *e.g.*, a first firing of a gun (*id.*, 3:20-38, 8:26-30, 15:9-13, 16:66-17:4, 17:45-61), and includes a period of the first data stream preceding the first trigger signal. *Id.*, 3:20-38, 14:55-64.

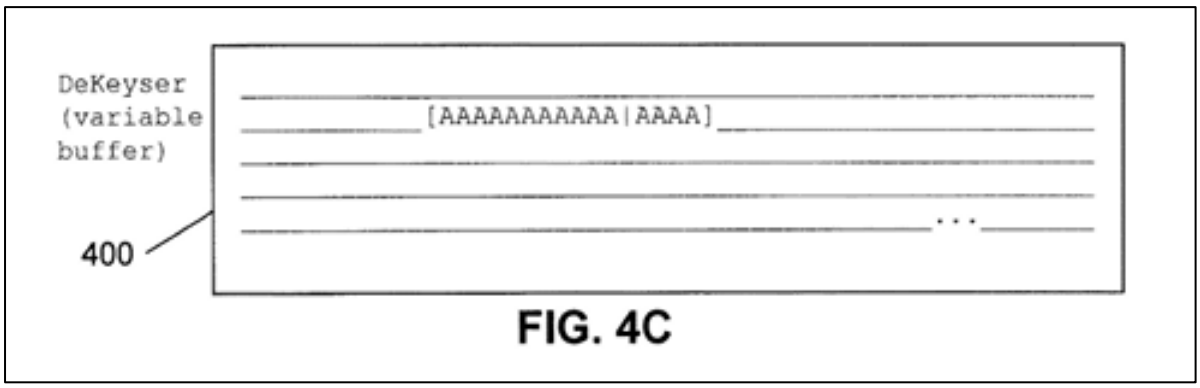


FIG. 4C

370. In Figure 4C, the protecting facility has received a "stop" signal sometime after receiving the start signal, thereby lengthening the protected portion of the "A" data stream. EX1060, 8:55-9:3.

371. In Yerazunis's gun-camera embodiment, the video recording device responds to a signal from a user, and the user's signal includes a stop signal. EX1017, 3:20-38, 8:8-30, 14:55-61, 15:9-13. Specifically, Yerazunis's signal from the user tells the video recording device when to (i) start recording, *i.e.*, upon detection of the signal (EX1017, 3:25-38, 8:26-30, 15:9-13), and when to (ii) stop recording by designating an end of a write-protected portion, *i.e.*, when a predetermined number of frames subsequent to the trigger event have been write protected (*id.*, 2:53-64, 4:35-56, 8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:38).

372. Yerazunis also write protects sensor data in the circular buffer by indexing it in an electronic index, consistent with Petitioner's corresponding structure for element 3 at 9:65-10:8 of the '910 patent ("segments of recorded data are 'write-protected' by being indexed in an electronic index"). Specifically, Yerazunis discloses that the write protecting microprocessor 54 performs may include storing pointers that define areas of the circular buffer that are not to be overwritten. EX1017, 17:45-61. A POSITA would have understood Yerazunis's use of pointers to identify a sensor data for write protection and storage of such pointers in a table "to allow later retrieval" of video data for gun-firing events (id.) to be indexing in an electronic index. A POSITA would have understood that retrieving video data for gun-firing events necessitates an

ability to locate the video data within the buffer, such that Yerazunis necessarily uses indexing. Thus, while Yerazunis does not expressly refer to "indexing" write-protected portions, a POSITA would have understood Yerazunis as describing (or at least rendering obvious) such indexing. *Id.*, 6:1-13, 6:33-36, 7:23-32, 10:37-39, 10:63-67, 11:31-43.

373. A POSITA would have recognized indexing as being one of a finite number of identified solutions for storing and retrieving data in Yerazunis, further evidencing its obviousness. A POSITA would have recognized that the Yerazunis's event data must be stored and retrieved in some way, and indexing such data was a well-known approach for doing so. Storing and retrieving event data using this conventional approach was not innovative but rather a straightforward application of ordinary skill or common sense.

e) Element 4: continuing to record the sensor data in the at least one memory while the first portion of the sensor data is designated for write-protecting;

374. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

375. ***Patent Owner's Constructions:*** Yerazunis's microprocessor 54 ("computer processor") performs the function of element 4, under Patent Owner's non-MPF. EX1056, 008-019. Yerazunis stresses that recording occurs "continuously" in embodiments, such that designating the first portion for write-protecting necessarily occurs while "continuing to record the sensor data in the at least one memory." Indeed,

Yerazunis expressly discloses that frame data is "protected from overwriting while video capture within the circular buffer continues. EX1017, 9:34-38; *see also id.*, 2:1-4, 2:19-23, 4:45-49, 17:45-61.

376. Yerazunis also teaches that when its video recording device is employed with a gun, "it may be desirable to generate a video record which is associated with each firing of the gun." *Id.*, 16:66-17:4. "To accommodate this objective, after the conclusion of data storage associated with one firing event, the head pointer 104 and the tail pointer 102 … defining the area(s) of the circular buffer memory, are stored in a table to allow later retrieval of the video data pertaining to each firing of the gun," and the pointers "are then reset to allow continued recording into another portion of the circular buffer memory without over writing the previously stored and preserved data." *Id.*, 17:50-59. Thus, while designating the first portion for write-protecting, "recording of data continues since a subsequent firing event may occur." *Id.*, 17:45-50. Yerazunis thus discloses element 4 under Patent Owner's non-MPF position.

377. Yerazunis also discloses element 4 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Yerazunis's microprocessor 54 runs software to accomplish the function of element 4. *See also* EX1017, 6:17-23, 6:37-51. Yerazunis thus discloses element 4 under Patent Owner's MPF position.

378. ***Petitioner's Construction:*** Yerazunis discloses the corresponding structure identified by Petitioner, *i.e.*, "hardware and/or software programmed to

perform the circular buffer algorithm disclosed at 2:36-42, 2:49-67, 5:3-5, 5:40-52, Fig. 3, 7:48-59, Fig. 4D, 9:24-29, Fig. 4B, 8:10-40, Fig. 4C, 8:55-9:3, 9:65-10:8."

379. As explained for Petitioner's corresponding structure for elements 3 and 4 of claim 1, Yerazunis discloses a recorder (video electronics 42) with memory and microcontroller 54 that runs software to accomplish functions consistent with the '910 patent's disclosure at 2:36-42, 2:49-67, 5:3-5, 5:40-52, 7:48-59, 9:65-10:8, Fig. 3, Fig. 4B (described at 8:10-40), and Fig. 4C (described at 8:54-67). The operation of Yerazunis's microprocessor 54 is also consistent with the '910 patent's disclosure at Fig. 4D (described at 9:24-29):

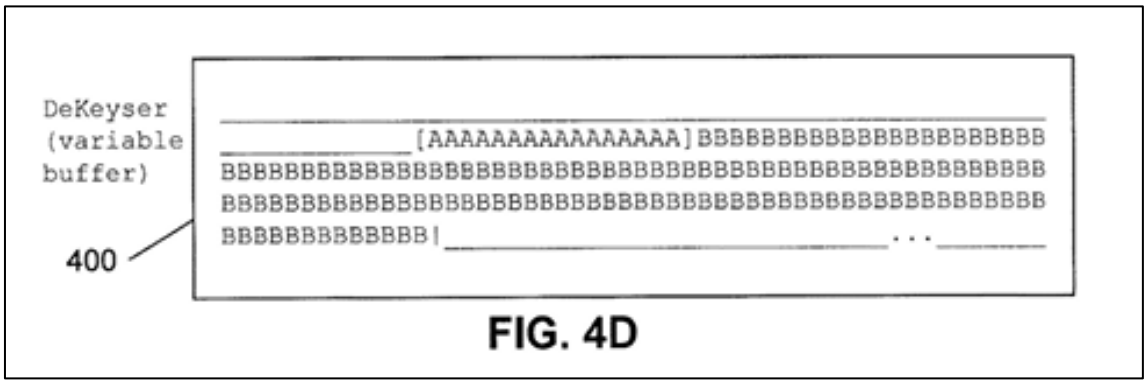


FIG. 4D

380. In Figure 4D, the system has finished protecting the desired portion of the "A" data stream, and the recording facility continues to store a "B" data stream. The "B" data stream may be contiguous with the "A" data stream, "so that differentiation of 'A' and 'B' streams is merely an artifact of how the data is being stored." EX1060, 9:24-29.

381. In Yerazunis's gun-camera embodiment, the video recording device under control of microprocessor 54 records into the circular buffer continuously, such that

storing of a second data stream in the circular buffer continues after protecting a portion of the first data stream. EX1017, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 17:45-61. Further, the second data stream is continuous with the write-protected portion of the first data stream, with the second data stream being recorded in a non-protected portion of Yerazunis's circular buffer immediately following the write-protected portion of the first data stream. *Id.*, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 17:45-61.

f) Element 5: in response to a subsequent second trigger signal, designate for write-protecting a second portion wherein the second portion occupies less than the remaining entirety of the at least one memory not designated for write-protecting and corresponds to a length of time prior to the second trigger signal; and

382. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

383. ***Patent Owner's Constructions:*** In embodiments, Yerazunis's microprocessor 54 comprises "a number of inputs 68 which permit activation of the video recording device and control of the device by a user" (EX1017, 6:40-42, Figs. 3, 14), including a still button 74 that causes a video frame in the circular buffer to be "protected from overwriting." *Id.*, 9:27-31, 9:34-42. And in Yerazunis's gun-camera embodiment, microprocessor 54 is configured to protect a second portion of sensor data in the circular buffer associated with a second event, *e.g.*, a second firing of the gun, based on a second trigger signal generated by event sensor 70 or capture button 72 that is subsequent to the first trigger signal described for element 3 of claim 1. *Id.*, 4:35-56,

8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:61. Like the first portion designated for write-protecting, the second portion designated for write-protecting includes a period of the sensor data preceding the second trigger signal. *Id.*, 3:20-38, 14:55-64. Thus, Yerazunis's microprocessor 54 performs the claimed function: "in response to a subsequent second trigger signal, designate for write-protecting a second portion." I further note that saving of video data for multiple events in a circular buffer was also well-known in the art, as evidenced by, for instance, EX1008 (Kawasaki), Abstract, 4:30-5:11, Figs. 4, 5; and EX1009 (Fiore), [0022]-[0023], [0051], [0059], [0060].

384. Yerazunis also discloses "wherein the second portion occupies less than the remaining entirety of the at least one memory not designated for write-protecting and corresponds to a length of time prior to the second trigger signal." Yerazunis discloses its "circular buffer memory may be subdivided evenly to accommodate a predetermined number of firings of the gun," such that first and second firing events each occupy less than the full buffer. EX1017, 17:9-20. Yerazunis thus discloses element 5 under Patent Owner's non-MPF position.

385. Yerazunis also discloses element 5 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Yerazunis's microprocessor 54 runs software to accomplish the function of element 5. *See also* EX1017, 6:17-23, 6:37-51. Yerazunis thus discloses element 5 under Patent Owner's MPF position.

386. ***Petitioner's Construction:*** Yerazunis discloses the corresponding structure identified by Petitioner, i.e., "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 2:49-67, 5:3-5, 5:40-52, Fig. 4E, 9:51-53, 9:65-10:8."

387. As explained for Petitioner's corresponding structure for elements 3 and 4 of claim 1, Yerazunis discloses a recorder (video electronics 42) with memory and microcontroller 54 that runs software to accomplish functions consistent with the '910 patent's disclosure at 2:36-42, 2:49-67, 5:3-5, 5:40-52, 7:48-59, 9:65-10:8, and Fig. 3, Fig. 4B (described at 8:10-40), and Fig. 4C (described at 8:54-67). The operation of Yerazunis's microprocessor 54 is also consistent with the '910 patent's disclosure at Fig. 4E (described at 9:48-50):

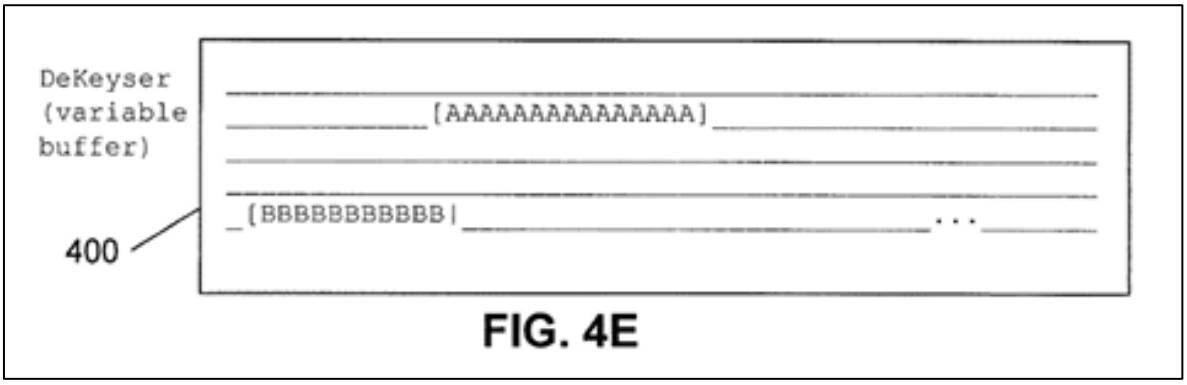


FIG. 4E

388. Figure 4E illustrates protection of a portion of the "B" data stream based on receipt of a start signal. EX1060, 9:48-50.

389. In Yerazunis's gun-camera embodiment, microprocessor 54 is configured to protect a portion of the second data stream in the circular buffer associated with a second event, e.g., a second firing of the gun, based on a second trigger signal generated

by event sensor 70 or capture button 72. EX1017, 4:35-56, 8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:61. Like the protected portion of the first data stream, the protected portion of the second data stream includes a period of the second data stream preceding the second trigger signal. *Id.*, 3:20-38, 14:55-64.

g) Element 6: upon reaching at least one of the first portion and the second portion while continuing to record the sensor data in the at least one memory, excluding from overwriting the at least one of the first portion and second portion.

390. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

391. ***Patent Owner's Constructions:*** Yerazunis discloses a computer processor (microprocessor 54) that performs the function of element 6, under Patent Owner's non-MPF position. EX1056, 008-019. As explained above for element 2 of claim 1, in recording sensor data in the circular buffer formed in the memory, Yerazunis's microcontroller 54 skips over write-protected matter (*see*, *e.g.*, EX1017, 3:25-38, 8:26-30, 15:9-13) and records the sensor data "within an unused portion of the circular buffer memory (*id*., 3:31-33, 15:56-16:3, 18:4-12). Yerazunis thus discloses element 6 under Patent Owner's non-MPF position.

392. Yerazunis also discloses element 6 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Yerazunis's microprocessor 54 runs software to accomplish the function of element 6. *See also*

EX1017, 6:17-23, 6:37-51. Yerazunis thus discloses element 6 under Patent Owner's MPF position.

393. ***Petitioner's Construction:*** Yerazunis discloses the corresponding structure identified by Petitioner, *i.e.*, "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 5:3-5, 5:40-52, Fig. 3, 7:48-59, Fig. 4A, 7:62-65, Fig. 4G, 9:56-60."

394. As explained for Petitioner's corresponding structure for elements 3 and 4 of claim 1, Yerazunis discloses a recorder (video electronics 42) with memory and microcontroller 54 that runs software to accomplish functions consistent with the '910 patent's disclosure at 2:36-42, 2:49-67, 5:3-5, 5:40-52, 7:48-59, 9:65-10:8, Fig. 3, and Fig. 4A (described at 7:62-65). The operation of Yerazunis's microprocessor 54 is also consistent with the '910 patent's disclosure at Fig. 4G (described at 9:56-60):

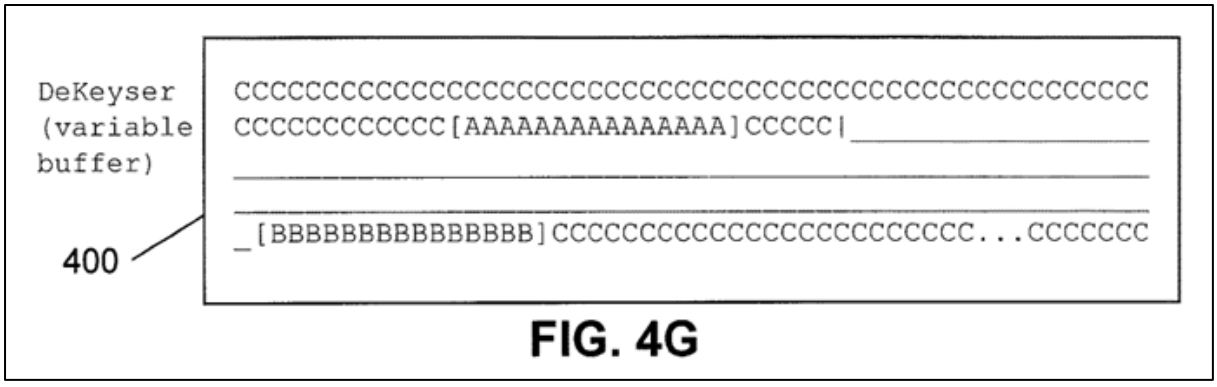


FIG. 4G

395. In Figure 4G the system has continued to record data, which is now depicted as data stream "C" because it follows data stream "B". This figure "is particularly significant in that recordation of the 'C' data stream skips over the protected portion of the 'A' data stream." EX1060, 9:56-60.

396. In Yerazunis's gun-camera embodiment, after protecting the portion of the second data stream, the video recording device under control of microprocessor 54 continues to record video data to the circular buffer as a third data stream. EX1017, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 17:45-61. Recordation of the third data stream would skip over the protected portion of the first data stream in the circular buffer. *Id.*, 3:28-33, 17:45-61.

2. Independent Claim 20

397. Claim 20 is independent and claims "[a] recording system for saving a sequence of clips." EX1060, 14:12-38. Claim 20 has a scope similar to that of claim 1, except that claim 1's recitations regarding "designating" for write protection have been removed. EX1065. In view of these similarities, Yerazunis would have rendered obvious claim 20 for the reasons explained above for claim 1. As detailed above, Yerazunis discloses or at minimum would have rendered obvious all of the limitations common to claims 1 and 20. As further detailed in the section for claim 1, Yerazunis performs the "write protecting" required by claim 20, in addition to the "designating for write protecting" required by claim 1.

3. Dependent Claims 2-10 and 14-19

398. ***Claim 2:*** Claim 2 depends from claim 1, reciting "including with the first portion of the sensor data, another portion of the sensor data that was captured after occurrence of the first trigger signal." Yerazunis discloses these limitations. Yerazunis's video recording device write-protects video data "before and after" an

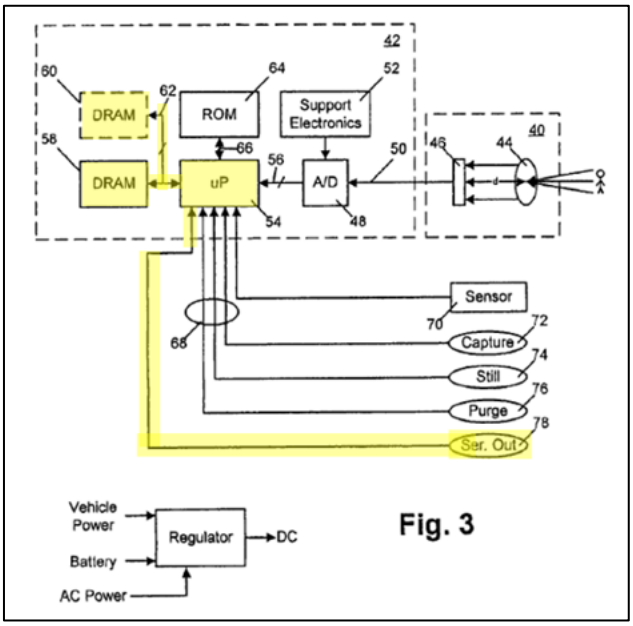
event. EX1017, Abstract, 3:9-35, 8:51-55, 14:45-64, 19:52-56. The pre- and post-event data comprise an indexed, identifiable collection of data in the circular buffer. *Id*., 17:9-20, 17:45-61; *see also* 6:1-13, 6:33-36, 7:23-32, 10:37-39, 10:63-67, 11:31-43.

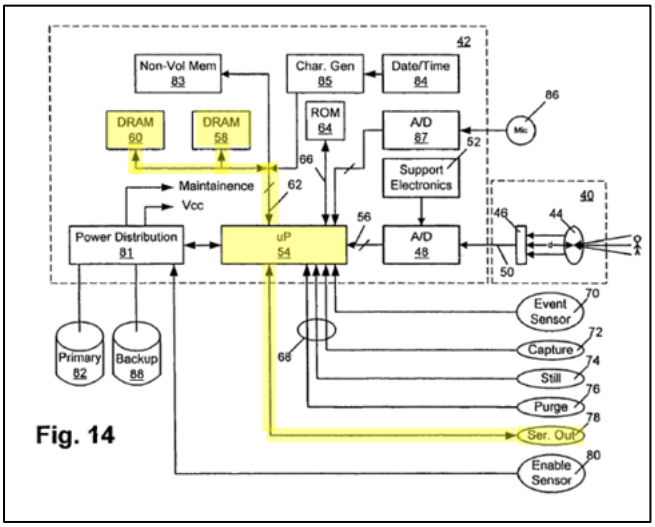
399. ***Claim 3:*** Claim 3 depends from claim 2, reciting "wherein the computer processor is further configured to, in response to an end signal, end the first portion of the sensor data captured after the occurrence of the first trigger signal that is designated as write-protected." Yerazunis discloses these limitations. Yerazunis's video recording device responds to a trigger signal that results in the write protection of data in the circular buffer (*see* Section IX.B.1 addressing claim 1), and the trigger signal includes an end signal. EX1017, 3:20-38, 8:8-30, 14:55-61, 15:9-13. Specifically, Yerazunis's trigger signal tells the video recording device when to (i) start write protection, *i.e*., upon detection of the trigger signal (EX1017, 3:25-38, 8:26-30, 15:9-13), and when to (ii) end write protection, *i.e*., when a predetermined number of frames subsequent to the trigger event have been write protected (*id.*, 2:53-64, 4:35-56, 8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:38).

400. ***Claim 4:*** Claim 4 depends from claim 3, reciting "where in the end signal comprises at least one of: an expiration of a pre-defined length of time; an audio command; a stop button signal; a stop switch signal; or a recognized object within the sensor data." Yerazunis discloses or at minimum would have rendered obvious this limitation. As explained for claim 3, Yerazunis's end signal comprises a predetermined number of frames subsequent to a trigger event. A POSITA would have understood

that for a given frame rate, the predetermined number of frames is equivalent to a predefined length of time (*e.g.*, for video having a frame rate of 30 frames per second, protection of 150 frames is equivalent to a pre-defined length of time of 5 seconds). Yerazunis further discloses that the pre-defined length of time is a matter of design choice: "the number of frames that are recorded before and after [the detection of the trigger event] are a matter of design choice." EX1017, 8:51-55. Yerazunis thus discloses "where in the end signal comprises … an expiration of a pre-defined length of time."

401. ***Claim 5:*** Claim 5 depends from claim 1, reciting "wherein the computer processor is further configured to transmit, via a wireless transmitter, the first portion of the sensor data to a remote memory." Yerazunis discloses these limitations. Yerazunis's microprocessor 54 includes a serial output channel 78 "employed to download captured and stored video images" from the circular buffer of DRAM 58 "to an external Personal Computer (PC)" or to "a radio transmitter to transmit RF signals to a base station." EX1017, 3:1-2, 6:45-51, 9:60-10:3, 18:60-66.





Id., Figs. 3, 14 (color added). A POSITA would have recognized Yerazunis's radio transmitter is a "wireless transmitter."

402. ***Claim 6:*** Claim 6 depends from claim 1, reciting "wherein the sensor data comprises at least one of the following: image data and video data." Yerazunis discloses these limitations. Yerazunis's video recording device includes camera 40

with a sensor that captures video data. EX1017, 2:33-41, 5:43-49, Figs. 3, 14. Additionally, video data includes by necessity a sequence of images.

403. ***Claim 7:*** Claim 7 depends from claim 1, reciting "wherein a portion of the at least one memory comprises a circular buffer." Yerazunis discloses these limitations. Yerazunis's video recording device "records video frames successively in at least one circular buffer memory organized as a continuous loop overwriting the oldest frame within the respective buffer memory with a more recently received frame." EX1017, 2:19-23, 7:7-61, 17:9-20, 17:50-59, 18:7-12.

404. ***Claim 8:*** Claim 8 depends from claim 1, reciting "wherein the first portion of the sensor data is stored using at least one of time compression or frame compression." These limitations would have been obvious in view of Yerazunis. Yerazunis discloses that various compression techniques were well-known in the art as of the purported June 2007 priority date. EX1017, 6:55-7:6; *id.*, 10:63-67 (compression "permit[s] a greater number of frames to be stored within the circular buffer memory than would otherwise be possible absent such compression"). "Further compression could be used before transmitting the data if wireless bandwidth is an issue. Either DCT or wavelet transformed data on native sensor formats could be used." *Id.*, 7:41-43. These known compression techniques as of June 2007 included time compression and frame compression, and it would have been obvious to a POSITA to select either conventional compression technique in the Yerazunis video recording device.

405. Before the purported June 2007 priority date of the challenged patents, image and video data, by necessity, was almost always compressed to save storage as well as I/O and network bandwidth requirements. Cameras and video encoders before June 2007 already had the ability to change the frame rate and bitrate. MPEG-1, released in 1991, used a combination of spatial and temporal compression. Appx NN (included in EX1041), a set of lecture notes entitled "Video Compression," discuss this (downloaded from https://www.cs.ucf.edu/courses/cap5015/Video_compression_2005.pdf, last accessed July 21, 2024).

406. ***Claims 9 and 10:*** Claim 9 depends from claim 1, reciting "a camera that includes the sensor, the at least one memory, and the computer processor." Claim 10 depends from claim 9, reciting "wherein the camera comprises a security camera." Yerazunis discloses these limitations.

407. For claim 9, Yerazunis's video recording system includes camera 40 (*i.e.*, the sensor), DRAMs 58, 60, and microprocessor 54 (EX1017, 5:40-53, 6:24-36):

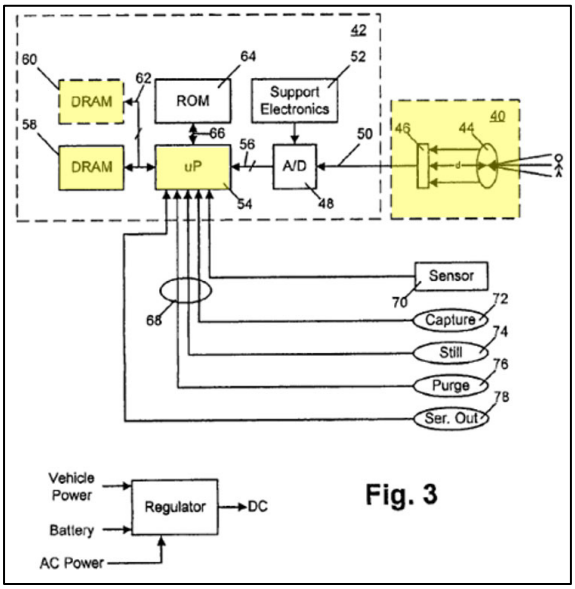


Fig. 3

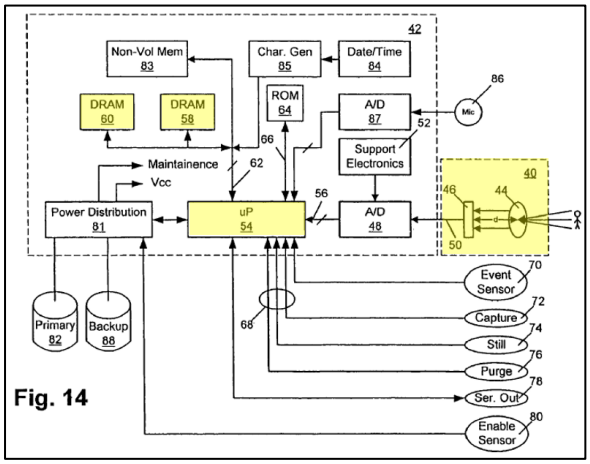


Fig. 14

Id., Figs. 3, 14 (color added).

408. Although Yerazunis refers to lens 44 and image sensor 46 as components of "camera 40," a POSITA would have understood Yerazunis's video recording systems (including video electronics 42 and camera 40) as being a camera. In June 2007, the term "camera" was often used in referring to systems with imaging components, microprocessor controllers, and memory for storing image and video data, like the systems depicted in Figures 3 and 14 of Yerazunis.

409. For claim 10, Yerazunis's video recording device is suitable "in security applications" (*id.*, 1:22-31), and trigger events include "a signal indicative of a security or fire alarm condition," such as "movement, glass breakage, or unauthorized entry" (*id*., 2:53-64, 8:8-25). Thus, Yerazunis discloses a "security camera."

410. ***Claim 14:*** Claim 14 depends from claim 1, reciting "wherein the first trigger signal represents detection of at least one of the following: a motion, a sound, an image, content in a data stream, a pattern in the sensor data, a person, a human face, a computer screen, an event, a verbal command, operation of switch, and operation of a button." Yerazunis discloses these limitations. In Yerazunis, "the event sensor 70 is operative to generate a trigger signal in response to the discharge of the gun," and preferably comprises "a microphone, or any other suitable sensor which can detect a characteristic associated with the firing of the gun." EX1017, 16:43-50. "In the case of a microphone, the event sensor 70 is operative to detect the sound associated with the firing of the gun." *Id.*, 16:53-55. Thus, Yerazunis discloses "wherein the trigger signal represents detection of at least … a sound." Additionally, "[t]he event sensor 70 may comprise any sensor which provides a trigger output signal in response to a condition which is desired to initiate the capture of the video image or images occurring prior to and following the occurrence of the trigger output signal. For example, the sensor 70 may comprise an accelerometer, an air bag deployment sensor of the type normally used in automobiles to initiate the deployment of an air-bag, a security or fire alarm alert condition sensor such as are used to detect movement, glass breakage, or

unauthorized entry. The trigger output signal may also be an acoustic signal characteristic of a specific event such as gunshots, or any other signal indicative of a specified event. Moreover, while a single sensor 70 is illustrated for simplicity, it should be appreciated that plural sensors may be employed to activate the capture of video images by the present video recording device and that video image capture may be initiated by any one of such sensors or a combination of such sensors." *Id.*, 8:8-25.

411. ***Claims 15 and 16:*** Claim 15 depends from claim 1, reciting "wherein the computer processor is further configured to write-protect the first portion of the sensor data as a write-protected portion in the at least one memory." Claim 16 depends from claim 15, reciting "wherein the computer processor is further configured to free the write-protected portion following a transmission of the first designated portion." Yerazunis discloses these limitations. Yerazunis discloses the limitations of claim 15 as discussed in Section IX.B.1.d, with respect to element 3 of claim 1 ("in response to a first trigger signal, designate for write-protecting a first portion of the sensor data that was captured prior to occurrence of the first trigger signal, wherein the first portion of the sensor data occupies a portion of the at least one memory that is less than the entirety of the at least one memory and corresponds to a length of time prior to the first trigger signal").

412. For claim 16, Yerazunis discloses purge button 76 electronically coupled to microprocessor 54. EX1017, 9:47-48. "Upon activation of the purge button, the contents of the circular buffer and any still images that have been captured are erased,"

including any the "user does not desire to retain." *Id.*, 9:48-53. Accordingly, write-protection is removed from a write-protected portion of the circular buffer. It would have been obvious one reason the "user does not desire to retain" captured images is when they have been offloaded, as disclosed by Yerazunis and with respect to claim 5 above.

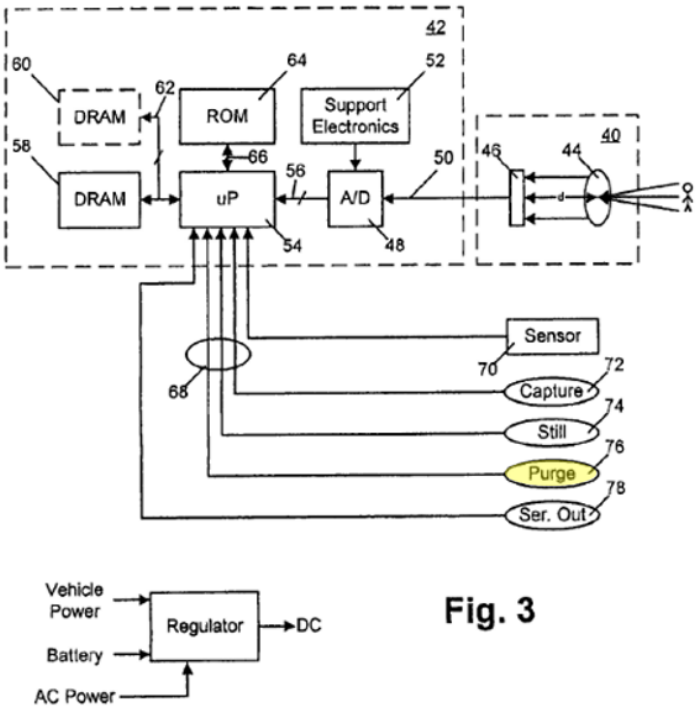


Fig. 3

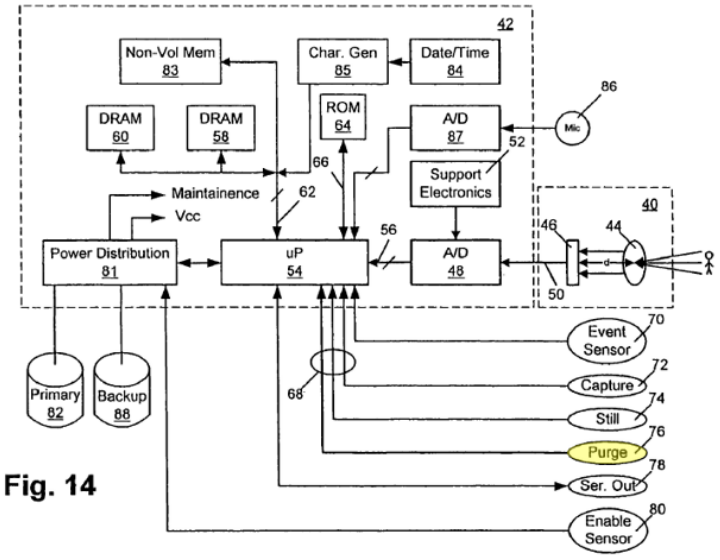


Fig. 14

EX1017, Figs. 3, 14 (color added); *id.*, 19:30-34.

413. ***Claim 17:*** Claim 17 depends from claim 1, reciting "wherein the computer processor is further configured to index the first designated portion while the recording facility is still recording the sensor data into the at least one memory." Yerazunis discloses these limitations. When Yerazunis's video recording device is used with a gun, "recording of data continues [during and after a first firing event] since a subsequent firing event may occur." EX1017, 17:45-50. This is achieved by indexing, as discussed in Section IX.B.1.d, with respect to element 3 of claim 1. *Id.*, 2:19-23, 4:45-49, 7:7-61, 9:34-38, 17:45-61.

414. ***Claim 18:*** Claim 18 depends from claim 1, reciting "wherein the computer processor is configured to record the sensor data continuously, from before the first trigger signal, through a pre-designated time period, and after the pre-designated time period." Yerazunis discloses these limitations. Because Yerazunis discloses write-

protecting video data "before and after" an event and records continuously, Yerazunis necessarily discloses recording sensor data "continuously, from before the first trigger signal, through a pre-designated time period, and after the pre-designated time period." EX1017, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 15:56-16:3, 16:66-17:61, 18:4-12.

415. ***Claim 19:*** Claim 19 depends from claim 1, reciting "wherein the computer processor is configured to automatically overwrite portions of the sensor data that were recorded in the at least one memory that were not designated for saving." Yerazunis discloses these limitations. Yerazunis's microprocessor 54 (a computer processor) runs software to "record[] video frames successively in at least one circular buffer memory organized as a continuous loop overwriting the oldest frame within the respective buffer memory with a more recently received frame." EX1017, 2:19-23. This occurs automatically "absent receipt of some trigger event from the sensor 54 or activation of other input by the user." *Id*., 7:11-22. This is also true of Yerazunis's gun-mounted devices, which likewise record continuously into the circular buffer memory and thus automatically overwrite sensor data recorded in the memory that were not designated for saving. *Id*., 15:56-16:3, 18:4-12. Additionally, Yerazunis's disclosure is consistent with that of the '910 patent at 2:36-42, 5:3-5, 5:40-52, Fig. 3, 7:48-59, Fig. 4A, 7:60-65 (*see* Section IX.B.1.c discussing element 2 of claim 1), which discloses the circular buffer algorithm corresponding to the "automatically overwrite" function of claim 19.

C. Ground 1b: Claims 11 And 12 Of The '910 Patent Would Have Been Obvious Over Yerazunis In View Of Lewellen

416. Claims 11 and 12 would have been obvious over the combination of Yerazunis (EX1017) and Lewellen (EX1019). Claim 11 depends from claim 1, reciting "a cell phone including the sensor, the at least one memory, and the computer processor." Claim 12 depends from claim 1, reciting "a personal area network coupled with the computer processor and including at least two of the following: the sensor, the at least one memory, and the computer processor." To the extent Yerazunis does not disclose the limitations added in claims 11 and 12, these limitations would have been obvious in view of Lewellen. Figure 3 of Lewellen depicts a video system 300 having long-distance and local wireless interfaces (380, 390, respectively):

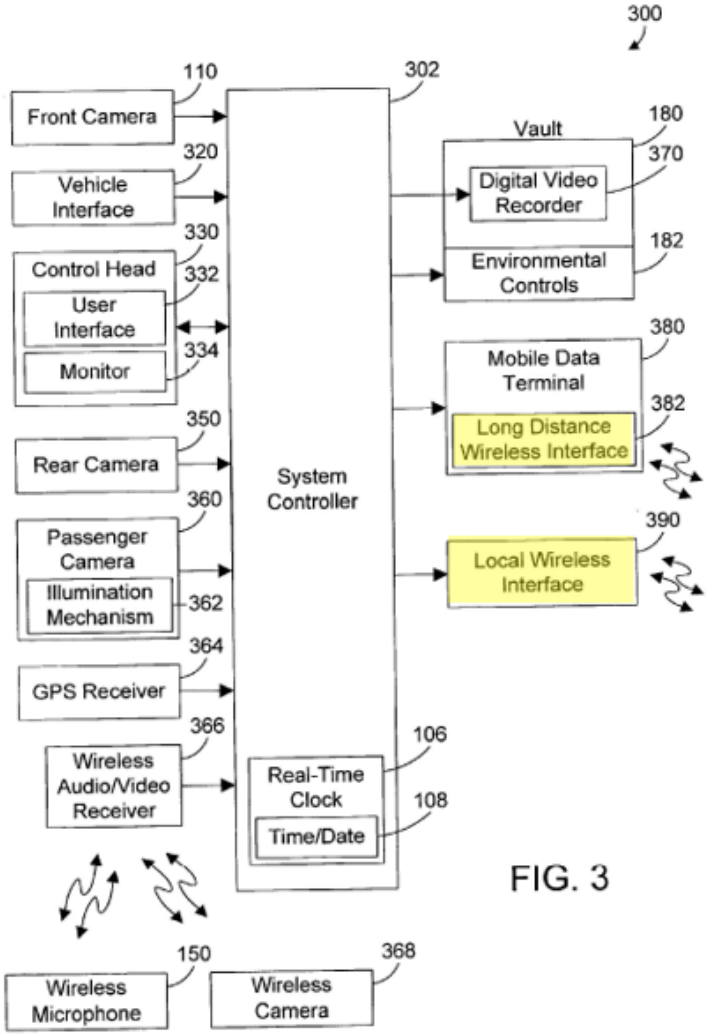


FIG. 3

EX1019, Fig. 3 (color added).

417. The long-distance wireless interface 382 enables communication with police headquarters, whereas the local wireless interface 390 enables communication with devices nearby via short-range wireless communications. *Id.*, [0030]-[0031].

418. "The local wireless interface of the vehicle video system … allows other devices, such as a handheld device or a vehicle video system in a different vehicle, to access the stored digital video information." *Id.*, Abstract. Local wireless interface 390

may be "low power" and "inexpensive" "Bluetooth-compatible interface, which can communicate with other Bluetooth-compatible devices," including mobile phones. *Id.*, [0031], [0037], [0041]-[0043].

419. Lewellen discloses the limitations added in claims 11 and 12. For claim 11, Lewellen discloses a cell phone including an interface that communicatively couples various sensors (*e.g.*, cameras) to other portions of the cell phone, including a memory and a computer processor. EX1019, [0041]-[0043]. Cell phones as of June 2007 included cameras, memory, and microprocessor components.

420. Lewellen discloses the "personal area network" of claim 12. The '910 patent provides minimal disclosure on the "personal area network," stating it can be (i) implemented with a Bluetooth wireless interface or other suitable interface, and (ii) used to couple the disclosed recording system to other Bluetooth-compatible components. EX1060, 6:32-36, 7:22-28, 10:20-52. Lewellen likewise discloses the use of a Bluetooth wireless interface for coupling to Bluetooth-compatible devices. EX1019, [0022], [0031], [0042]-[0048].

421. A POSITA would have been motivated to apply Lewellen's teachings of a personal area network to Yerazunis's video recording device. Both references disclose recording systems, for law enforcement or security applications. EX1017, 1:32-43, 9:60-10:11; EX1019, [0002]-[0009], [0024]-[0026], [0042]. In an embodiment, Yerazunis describes using a radio transmitter, "such as found in a police cruiser," to "transmit RF signals to a base station for viewing." EX1017, 3:1-4, 6:45-

51, 9:60-10:3, 18:60-66. A POSITA would recognize, however, that radio transmitters (like that disclosed in Yerazunis) may not be available at all times. For example, when a police officer is using Yerazunis's gun-camera out in the field, away from his police cruiser or a computer, the radio transmitter is unavailable, and the police officer would not be able to offload critical video evidence for safe storage on another device. Accordingly, a POSITA would have been motivated to apply Lewellen's teachings of a personal area network to Yerazunis to enable offloading of data in such scenarios.

422. A POSITA would have also been motivated to implement Yerazunis's video recording device using a cell phone comprising a sensor, memory, and computer processor, as disclosed in Lewellen. EX1019, [0010], [0031], [0037], [0041]. Bluetooth-compatible mobile phones were ubiquitous as of June 2007 and carried by many police officers on a daily basis. A POSITA would have recognized that using these mobile phones (including sensor, memory, and computer processor) as the video recording device would have been a simple and low-cost method for preserving important video. Lewellen expressly recognizes the significant advantages of Bluetooth technology, including that it is "very inexpensive." EX1019, [0032], [0034], [0042].

423. A POSITA would have had a reasonable expectation of success in implementing Yerazunis's video recording device with Lewellen's local wireless interface 390 and related techniques Lewellen describes. Local wireless interfaces were

well-known and commercially available as of June 2007, and adding such an interface in Yerazunis's system would have been routine and well within a POSITA's skill.

D. Ground 1c: Claim 13 Of The '910 Patent Would Have Been Obvious Over Yerazunis In View Of Fiore

424. Claim 13 would have been obvious over the combination of Yerazunis (EX1017) and Fiore (EX1009). Claim 13 depends from claim 1, reciting "wherein the at least one memory is configured to record the first portion of the sensor data in a file." As explained in Section VI.A above, the term "file" in this claim should be interpreted as "an identifiable collection of data."

425. Yerazunis discloses the limitations added in claim 13. The write protecting performed by Yerazunis's microprocessor 54 includes storing pointers that define areas of the circular buffer not to be overwritten, thus providing an electronic index to each write-protected segment—a single identifiable collection of data in the buffer, *i.e.*, "a single file" in the buffer—"to allow later retrieval." EX1017, 17:45-61.

426. To the extent a POSITA wanted further guidance as to particular methods for implementing Yerazunis's circular buffer and recording image data into the buffer, a POSITA would have been motivated to turn to Fiore (EX1009). Fiore discloses "data recording and playback systems for monitoring processes or occurrences of events which allows the replay and/or analysis of a time sampled signal." EX1009, [0003]. Fiore's circular storage buffer 15 stores data frames of an input signal from a monitoring device 6 (which may be a video camera, *id.*, [0040]):

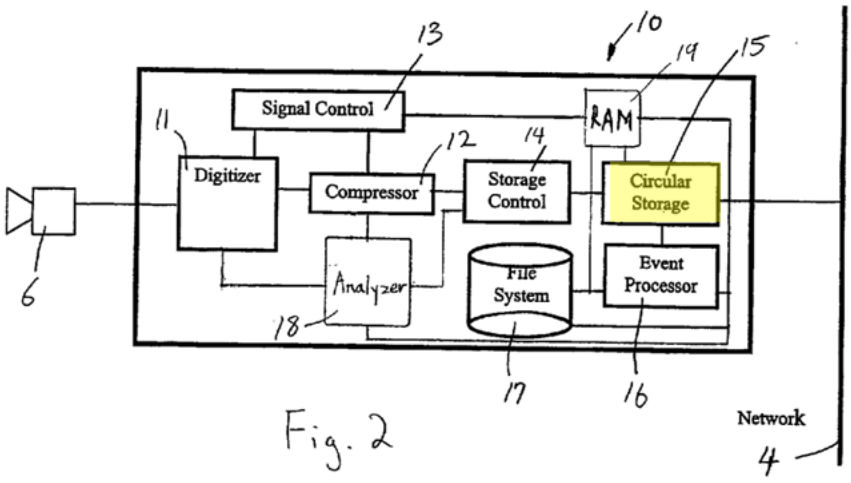


Fig. 2

Id., Fig. 2 (color added); *see also id.*, [0048].

427. Circular storage buffer 15 "may be implemented as a reserved area in memory, a disk file, or as a storage in a looped media." *Id.*, [0065]. Fiore also discloses that circular storage buffer 15 is implemented as a memory-mapped file (*id.*, [0047], [0068]), and Fiore teaches indexing data frames associated with events within circular storage buffer 15. Fiore's Background section describes conventional approaches that do not differentiate event data as files in the circular buffer. *Id.*, [0005]-[0006]. In contrast, Fiore describes indexing collections of data for respective events in circular storage buffer 15. *Id.*, [0022]-[0023], [0051], [0059], [0060]. "One embodiment of the data recording and playback system also includes an event controller that provides an event signal associated to time of an event. An event database is provided for storing event signal data, and an event processor is provided that copies a plurality of data frames stored in the circular storage buffer that have time stamps proximate to the time

of the event into additional secondary memory mapped files, each containing a single event, indexed from the event database." *Id.*, [0022].

428. A POSITA would have been motivated to apply Fiore's teachings to the Yerazunis video recording device. Yerazunis and Fiore disclose data recording systems that store data in a circular buffer and preserve data associated with an event—before and after an event trigger—such that a POSITA would have been aware of and motivated to combine the two references. As another example, a POSITA would have been motivated to implement the video recording device of Yerazunis with Fiore's indexing of event data within a memory-mapped file. Fiore describes numerous benefits of its approach to indexing within a memory mapped file, including that it "combines the access speed of the RAM memory with large storage capacity of a disk file" (EX1009, [0065]), "mak[es] the indexing of data in the memory mapped file 110 transparent to the circular storage buffer's 15 access objects" (*id.*, [0067]), and "avoid[s] issues of switching between Random Access Memory (RAM) and disk files" (*id*., [0068]; *id*., [0072] (describing approach as providing "significant performance gains" and allowing "playback from the circular storage buffer without interrupting recording into the circular storage buffer")).

429. In view of these exemplary benefits, a POSITA implementing Yerazunis's video recording device would have been motivated to utilize Fiore's teachings regarding indexing within the memory mapped file. The resulting video recording device discloses the limitations added in claim 13. A POSITA would have had a

reasonable expectation of success because Fiore provides a detailed disclosure of its file-based approach, and applying those techniques to Yerazunis's device would have been routine and well within a POSITA's skill.

E. Ground 2a: Claims 1-4, 6-10, And 14-20 Of The '910 Patent Would Have Been Obvious Over Ely

430. Claims 1-4, 6-10, and 14-20 would have been obvious over Ely (EX1020).

1. Independent Claim 1

a) Preamble: A recording system for saving a sequence of clips comprising:

431. Ely discloses the preamble of claim 1. Ely discloses a "video surveillance system" and method in which a "camera unit or units respond to the alarm command by protecting buffered video data which corresponds to a predetermined pre- and post-alarm time period," with multiple "blocks of alarm data" being saved. EX1020, 10:10-15, 10:59-11:8. Ely therefore discloses a "recording system for saving a sequence of clips."

b) Element 1: at least one memory communicatively coupled with a sensor; and

432. Ely discloses this element. Ely's video surveillance system includes a camera 130 with the "sensor that captures sensor data":

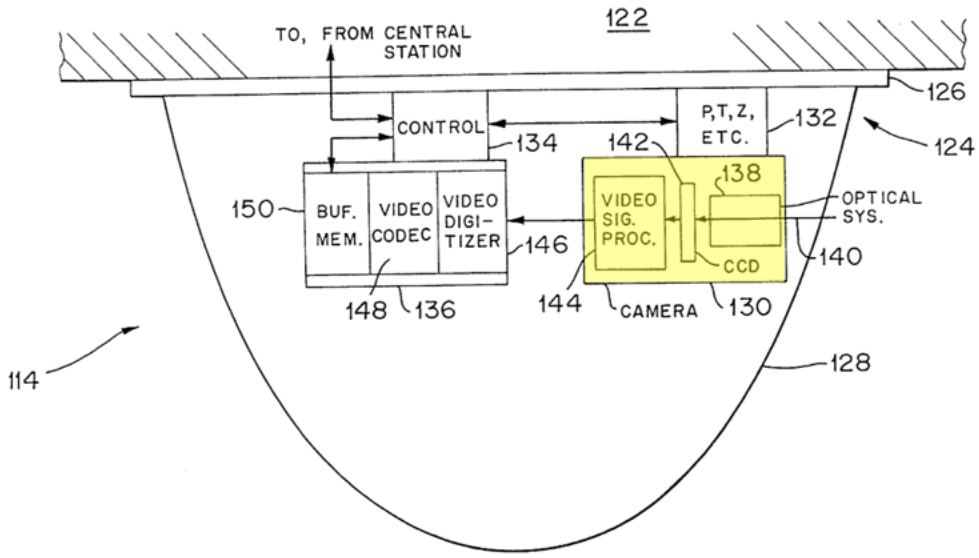


FIG. 3

EX1020, Fig. 3 (color added).

433. In the camera 130, an "image formed by the optical system 138 is converted into an electrical signal at CCD 142 and the resulting signal is subjected to conventional analog signal processing at video signal processing circuit 144." *Id.*, 6:21-28. The camera 130 thus discloses the "sensor" because it has a CCD 142 that captures video images impinging on it ("sensor data").

434. Ely also discloses at least one memory communicatively coupled with the camera 130 (*i.e.*, the "sensor"). Ely's video surveillance system includes a memory board 136 having a memory device 150 that discloses the "memory" (EX1020, 6:17-21, 6:48-53, 6:61-65):

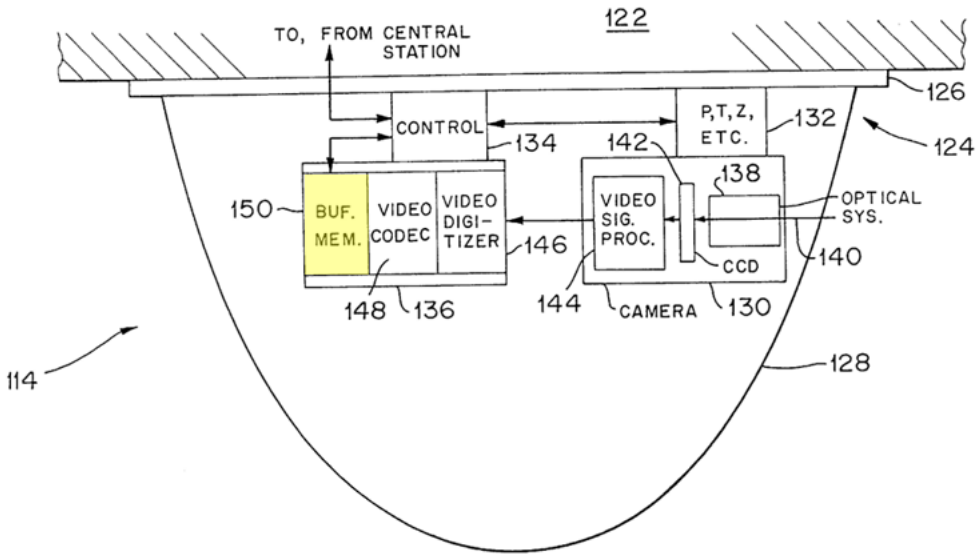


FIG. 3

Id., Fig. 3 (color added).

435. As seen above, the camera 130 is coupled to the memory board 136, with the memory board 136 being configured "to receive an analog video signal output from the camera 130 and to digitize, compress and store the video signal" in the memory device 150. EX1020, 6:48-65.

c) Element 2: a computer processor configured to: record sensor data obtained by the sensor in the at least one memory;

436. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

437. ***Patent Owner's Constructions:*** Ely discloses a computer processor that performs the function of element 2, under Patent Owner's non-MPF position. EX1056, 008-019. Specifically, Ely's camera unit 114 includes control circuit 134 ("computer

processor") "for controlling the storage device to operate as a ring buffer in which digital data representative of a video signal currently formed by the video camera is written over oldest digital data stored in the storage device." EX1020, 4:1-7.

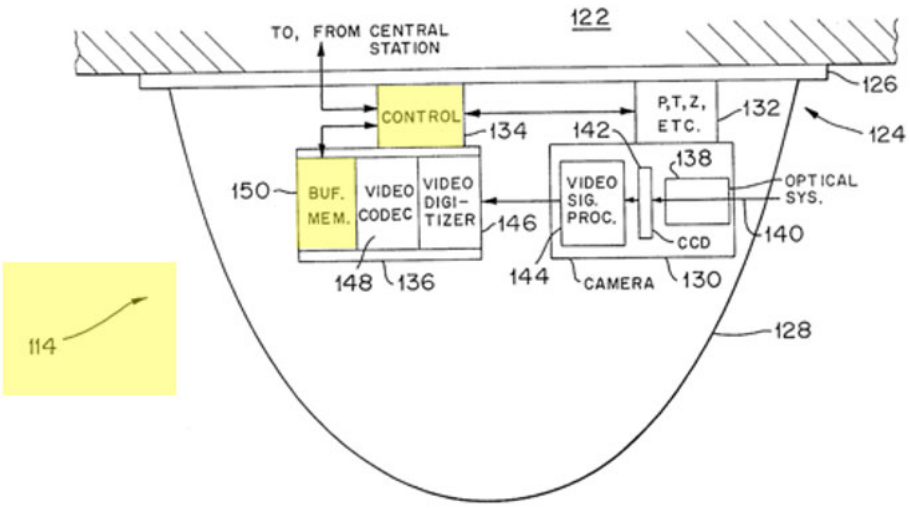


FIG. 3

Id., Fig. 3 (color added).

438. Memory device 150 "functions as a buffer for the video signal generated by the camera 130, and is controlled by the control circuit 134." *Id.*, 6:48-65. More particularly, "the memory 150 serves as a ring buffer, in which currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150." *Id.*, 7:28-34.

439. Control circuit 134 "may be a conventional microcontroller," and is "programmed, according to practices of the present invention, to carry out memory control, as well as data storage and retrieval functions" (EX1020, 6:37-47), as Figure 4

illustrates. *Id.*, 5:25-26. One such function is to record sensor data in the memory device 150:

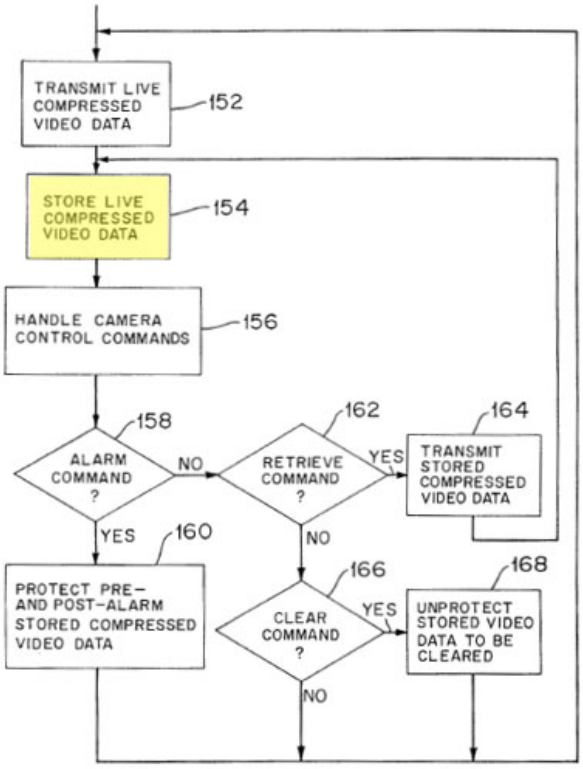


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4 (color added); *see also id.*, 7:27-35. Ely thus discloses element 2 under Patent Owner's non-MPF position.

440. Ely also discloses element 2 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Ely's control circuit 134 runs software to accomplish the function of element 2. *See also* EX1020, 4:1-8, 6:37-47, 7:12-8:12. Ely thus discloses element 2 under Patent Owner's MPF position.

441. ***Petitioner's Construction:*** Ely discloses the corresponding structure identified by Petitioner, *i.e.*, "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 5:3-5, 5:40-52, Fig. 3, 7:48-59, Fig. 4A, 7:60-65."

442. Ely discloses a recorder with a memory that runs software to accomplish functions, consistent with the '910 patent's disclosure at 5:3-5. Specifically, Ely's camera unit 114 comprises control circuit 134 that runs software for performing instructions. EX1020, 4:1-8, 6:37-47, 7:12-8:12. Camera unit 114 also includes memory device 150, and control circuit 134 records sensor data from the camera 130 in the ring buffer formed in the memory device 150, consistent with the '910 patent's disclosure at 2:36-42, Fig. 3, 7:48-59, 7:60-65, and Figure 4A:

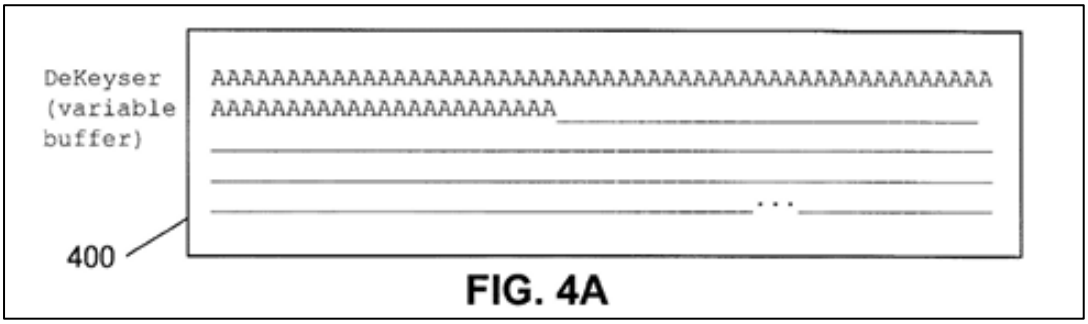


FIG. 4A

443. In Figure 4A, a recording facility records data stream "A" into circular buffer 400. EX1060, 7:60-65.

444. Ely discloses that control circuit 134 stores a first digital data stream generated by video digitizer 146 in a ring buffer formed in memory device 150. EX1020, 7:17-38. A POSITA would have understood the digital output of Ely's video

digitizer 146 as including data streams because the output is a continuous sequence of data. EX1020, 6:48-65, 7:17-8:6, 10:1-23, Fig. 4; Appx MM (included in EX1041) at 109.

445. Additionally, in recording the sensor data in the ring buffer formed in the memory, Ely's control circuit 134 skips over write-protected matter, consistent with the '910 patent's disclosure at 2:36-42. *Id.*, 7:34-38, 10:11-23. Further, Ely's camera unit 114 records the sensor data "in digital [or analog] format," consistent with the '910 patent's disclosure at 5:40-52. *Id.*, 2:55-3:5, 4:1-8, 6:48-7:11.

d) Element 3: in response to a first trigger signal, designate for write-protecting a first portion of the sensor data that was captured prior to occurrence of the first trigger signal, wherein the first portion of the sensor data occupies a portion of the at least one memory that is less than the entirety of the at least one memory and corresponds to a length of time prior to the first trigger signal;

446. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

447. ***Patent Owner's Constructions:*** Ely's control circuit 134 is a "computer processor" that performs the function of element 3, under Patent Owner's non-MPF position. EX1056, 008-019. Ely discloses that the camera system responds to an "alarm command by protecting buffered video data which corresponds to a predetermined pre- and post-alarm time period," and the "protected data is then available for subsequent retrieval, display, and permanent recording." EX1020, 10:11-

17. In Ely, "[a]fter the compressed video data stored at one of the camera units has been protected pursuant to an alarm command, the data (which will sometimes be referred to as 'alarm data') can be selectively retrieved in response to user instruction either for display (block 180) or directly for taperecording (block 182)." *Id.*, 10:17-23.

448. "When an alarm command is received, a process (indicated by block 160) is carried out in which the control circuit 134 protects from over-writing compressed digital video data previously stored in the memory 150." *Id.*, 7:48-55. The alarm data "correspond[s] to a time interval beginning at a predetermined time *prior to* receipt of the alarm command, and continuing for a predetermined time after receipt of the alarm command." *Id.* Thus, Ely's control circuit 134 performs the claimed function: "in response to a first trigger signal, designate for write-protecting a first portion of the sensor data that was captured prior to occurrence of the first trigger signal."

449. Ely also discloses "wherein the first portion of the sensor data occupies a portion of the at least one memory that is less than the entirety of the at least one memory." Ely discloses its camera unit's buffer memory may contain multiple blocks of event data, such that the first event occupies less than the full buffer. *Id.*, 10:56-11:8. Ely thus discloses element 3 under Patent Owner's non-MPF position.

450. Ely also discloses element 3 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Ely's control circuit 134 runs software to accomplish the function of element 3. *See also* EX1020,

4:1-8, 6:37-47, 7:12-8:12. Ely thus discloses element 3 under Patent Owner's MPF position.

451. ***Petitioner's Construction:*** Ely discloses the corresponding structure identified by Petitioner, *i.e.*, "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 2:49-67, 5:3-5, 5:40-52, Fig. 4B, 8:10-40, Fig. 4C, 8:55-9:3, 9:65-10:8."

452. As explained for Petitioner's corresponding structure for element 2 of claim 1, Ely discloses a recorder (camera unit 114) with memory and control circuit 134 that runs software to accomplish functions, consistent with the '910 patent's disclosure at 2:36-42, 5:3-5, 5:40-52, 7:48-59, and Fig. 3. EX1020, 4:1-8, 6:37-47, 7:12-8:12. The operation of Ely's control circuit 134 is also consistent with the '910 patent's disclosure at 2:49-67, Fig. 4B (described at 8:10-40), and Fig. 4C (described at 8:54-67):

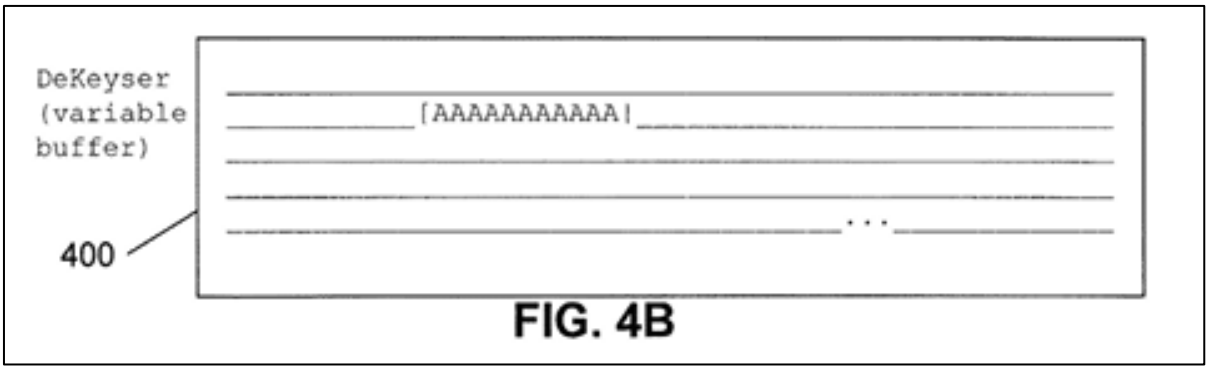


FIG. 4B

453. Ely's control circuit 134 protects a recent period of the first data stream recorded in the ring buffer based on a first alarm command (a start signal) generated by sensor 120. EX1020, 4:7-8, 7:48-55, 10:11-23. The protected portion of the first data

stream in the ring buffer is associated with a first alarm event (*id.*, 4:7-8, 7:48-55, 10:11-23), and includes a period of the first data stream preceding the first alarm command. *Id.*, 7:48-55, 10:11-23.

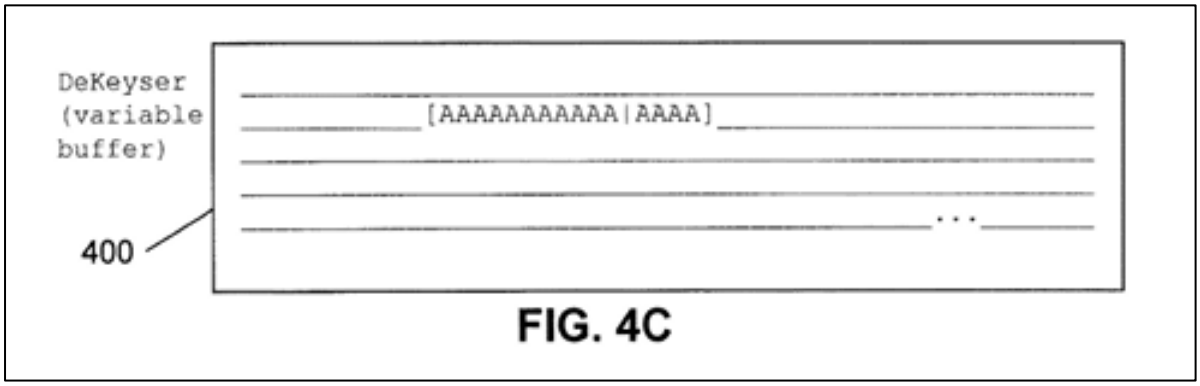


FIG. 4C

454. Ely's control circuit 134 stops protection of the first data stream in the ring buffer based on a stop signal. EX1020, 7:48-55, 10:11-23. Specifically, Ely's system responds to a signal from a user to save a recording, and this signal includes a "stop signal." *Id.*, 7:48-55, 10:11-23. Ely's alarm command tells the video recording device when to (i) start recording, *i.e.*, upon receipt of the alarm command, and when to (ii) stop recording, *i.e.*, when a predetermined amount of time has passed after receipt of the alarm command. *Id.*

455. Additionally, Ely write protects sensor data in the circular buffer by indexing it in an electronic index, consistent with Petitioner's corresponding structure for element 3 at 9:65-10:8 of the '910 patent ("segments of recorded data are 'write-protected' by being indexed in an electronic index"). Specifically, Ely discloses that "[a]fter the compressed video data stored at one of the camera units has been protected pursuant to an alarm command, the data (which will sometimes be referred to as 'alarm

data') can be selectively retrieved in response to user instruction either for display (block 180) or directly for taperecording (block 182)." *Id*., 10:17-23. A POSITA would have understood that selectively retrieving alarm data associated with an alarm command necessitates an ability to locate the alarm data within the buffer by indexing the alarm data in a table/index corresponding to the buffer. Thus, a POSITA would have understood Ely as describing (or at least rendering obvious) indexing alarm data in a table/index corresponding to the buffer.

456. Further, a POSITA would have recognized indexing in an electronic index as being one of a finite number of identified solutions for preserving alarm data in Ely, further evidencing its obviousness. A POSITA would have recognized that Ely's alarm data must be preserved in some way, and indexing data to be preserved in an electronic index was a well-known approach for doing so, as explained in Section IV.B.6 above. Preserving event data using this conventional approach was not innovative but rather a straightforward application of ordinary skill or common sense.

e) Element 4: continuing to record the sensor data in the at least one memory while the first portion of the sensor data is designated for write-protecting;

457. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

458. ***Patent Owner's Constructions:*** Ely's control circuit 134 ("computer processor") performs the function of element 4, under Patent Owner's non-MPF position. EX1056, 008-019. Control circuit 134 protects alarm data while "continuing

to record the sensor data in the at least one memory." As Figure 4 illustrates, protection of alarm data (at block 160) loops back to the beginning of a process including, at block 154, "stor[ing] live compressed video data":

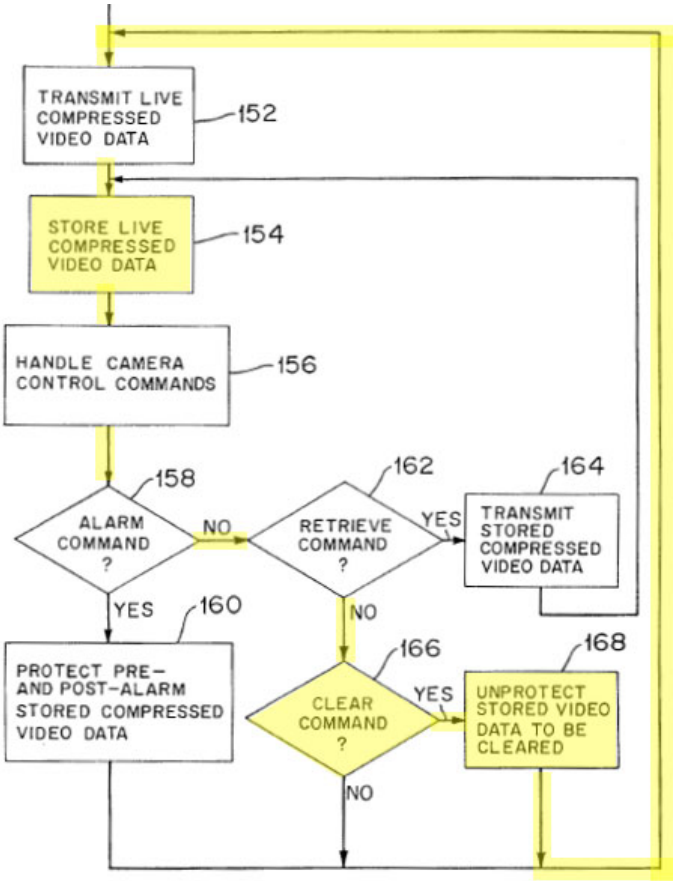


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4 (color added); *see also id.*, 7:45-48, 8:3-6.

459. Further, because the recording of live video data is "ongoing" (*i.e.*, continuous), the protection alarm data necessarily occurs while "continuing to record the sensor data in the at least one memory." *See id.*, Fig. 4, 7:45-48, 7:56-8:6. Ely thus discloses element 4 under Patent Owner's non-MPF position.

460. Ely also discloses element 4 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Ely's control circuit 134 runs software to accomplish the function of element 4. *See also* EX1020, 4:1-8, 6:37-47, 7:12-8:12. Ely thus discloses element 4 under Patent Owner's MPF position.

461. ***Petitioner's Construction:*** Ely discloses the corresponding structure identified by Petitioner, *i.e.*, "hardware and/or software programmed to perform the circular buffer algorithm disclosed at 2:36-42, 2:49-67, 5:3-5, 5:40-52, Fig. 3, 7:48-59, Fig. 4D, 9:24-29, Fig. 4B, 8:10-40, Fig. 4C, 8:55-9:3, 9:65-10:8."

462. As explained for Petitioner's corresponding structure for elements 3 and 4 of claim 1, Ely discloses a recorder (camera unit 114) with memory and control circuit 134 that runs software to accomplish functions consistent with the '910 patent's disclosure at 2:36-42, 2:49-67, 5:3-5, 5:40-52, 7:48-59, 9:65-10:8, Fig. 3, Fig. 4B (described at 8:10-40), and Fig. 4C (described at 8:54-67). The operation of Ely's control circuit 134 is also consistent with the '910 patent's disclosure at Fig. 4D (described at 9:24-29):

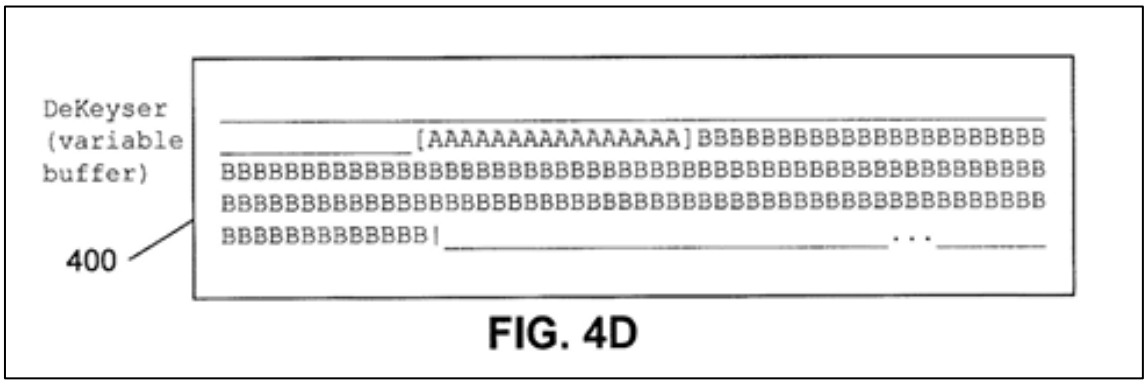


FIG. 4D

463. Ely's camera unit 114 under control of control circuit 134 records into the ring buffer on an "ongoing," continuous basis, such that storing of a second data stream in the ring buffer continues immediately after protecting a portion of the first data stream. EX1020, Fig. 4, 7:45-48, 7:56-8:6, 10:11-23. Further, the second data stream is continuous with the write-protected portion of the first data stream, with the second data stream being recorded in a non-protected portion of Ely's ring buffer immediately following the write-protected portion of the first data stream. *Id.*

f) Element 5: in response to a subsequent second trigger signal, designate for write-protecting a second portion wherein the second portion occupies less than the remaining entirety of the at least one memory not designated for write-protecting and corresponds to a length of time prior to the second trigger signal; and

464. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

465. ***Patent Owner's Constructions:*** As explained above for element 2 of claim 1, when an alarm command is received, Ely's control circuit 134 "protects from over-writing compressed digital video data previously stored in the memory 150." EX1020, 7:48-55. The alarm data "correspond[s] to a time interval beginning at a predetermined time prior to receipt of the alarm command, and continuing for a predetermined time after receipt of the alarm command." *Id.*

466. Ely's control circuit 134 is also configured to designate for protecting a second portion of the sensor data in the ring buffer associated with a second alarm event

based on a second alarm command generated by sensor 120. *Id.*, 4:7-8, 7:48-55, 10:11-23, 10:59-11:2. Like the first portion designated for saving, the second portion designated for saving includes a period of the sensor data preceding the second trigger signal. *Id.*, 7:48-55. Thus, Ely's control circuit 134 performs the claimed function: "in response to a subsequent second trigger signal, designate for write-protecting a second portion." Saving of video data for multiple events in a circular buffer was also well-known in the art, as evidenced by, for instance, EX1008 (Kawasaki), Abstract, 4:30-5:11, Figs. 4, 5; and EX1009 (Fiore), [0022]-[0023], [0051], [0059], [0060].

467. Ely also discloses "wherein the second portion occupies less than the remaining entirety of the first memory not designated for saving and corresponds to a length of time prior to the second trigger signal." Ely discloses its camera unit's buffer memory may contain multiple blocks of event data, such that first and second events each occupy less than the full buffer. EX1020, 10:56-11:8. Ely thus discloses element 5 under Patent Owner's non-MPF position.

468. Ely also discloses element 5 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Ely's control circuit 134 runs software to accomplish the function of element 5. *See also* EX1020, 4:1-8, 6:37-47, 7:12-8:12. Ely thus discloses element 5 under Patent Owner's MPF position.

469. ***Petitioner's Construction:*** Ely discloses the corresponding structure identified by Petitioner, *i.e.*, "hardware and/or software programmed to perform the

circular buffer algorithm disclosed at 2:36-42, 2:49-67, 5:3-5, 5:40-52, Fig. 4E, 9:48-50, 9:65-10:8."

470. As explained for Petitioner's corresponding structure for elements 3 and 4 of claim 1, Ely discloses a recorder (camera unit 114) with memory and control circuit 134 that runs software to accomplish functions consistent with the '910 patent's disclosure at 2:36-42, 2:49-67, 5:3-5, 5:40-52, 7:48-59, 9:65-10:8, and Fig. 3, Fig. 4B (described at 8:10-40), and Fig. 4C (described at 8:54-67). The operation of Ely's control circuit 134 is also consistent with the '910 patent's disclosure at Fig. 4E (described at 9:48-50):

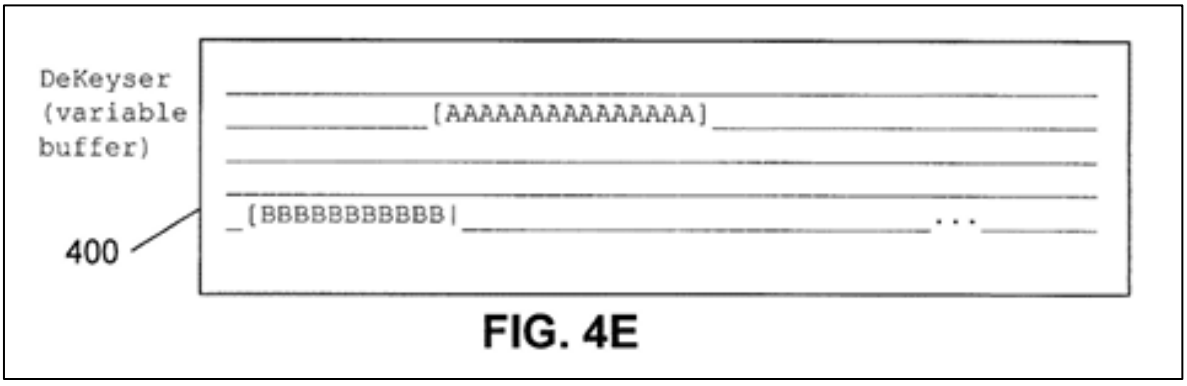


FIG. 4E

471. Ely's control circuit 134 is configured to protect a portion of the second data stream in the ring buffer associated with a second alarm event based on a second alarm command (start signal) generated by sensor 120. EX1020, 4:7-8, 7:48-55, 10:11-23, 10:59-11:2. Like the protected portion for the first data stream, the protected portion of the second data stream includes a period of the second data stream preceding the second alarm command. *Id.*0, 7:48-55, 10:11-23. As with the first data stream, control

circuit 134 stops protection of the second data stream in the ring buffer based on a stop signal. *Id*.

g) Element 6: upon reaching at least one of the first portion and the second portion while continuing to record the sensor data in the at least one memory, excluding from overwriting the at least one of the first portion and second portion.

472. For purposes of this declaration, I have applied the constructions argued by Patent Owner, as well as Petitioner's constructions.

473. ***Patent Owner's Constructions:*** Ely discloses a computer processor (control circuit 134) that performs the function of element 6, under Patent Owner's non-MPF position. EX1056, 008-019. As explained above for element 2 of claim 1, in recording sensor data in the ring buffer formed in memory, Ely's control circuit 134 skips over write-protected matter. *See*, *e.g.*, EX1020, 7:34-38, 10:11-23. Ely thus discloses element 6 under Patent Owner's non-MPF position.

474. Ely also discloses element 6 under Patent Owner's MPF position. EX1057, 008-014. As explained for Patent Owner's non-MPF position, Ely's control circuit 134 runs software to accomplish the function of element 6. *See also* EX1020, 4:1-8, 6:37-47, 7:12-8:12. Ely thus discloses element 6 under Patent Owner's MPF position.

475. ***Petitioner's Construction:*** Ely discloses the corresponding structure identified by Petitioner, *i.e.*, "hardware and/or software programmed to perform the

circular buffer algorithm disclosed at 2:36-42, 5:3-5, 5:40-52, Fig. 3, 7:48-59, Fig. 4A, 7:62-65, Fig. 4G, 9:56-60."

476. As explained for Petitioner's corresponding structure for elements 3 and 4 of claim 1, Ely discloses a recorder (camera unit 114) with memory and control circuit 134 that runs software to accomplish functions consistent with the '910 patent's disclosure at 2:36-42, 2:49-67, 5:3-5, 5:40-52, 7:48-59, 9:65-10:8, Fig. 3, and Fig. 4A (described at 7:62-65). The operation of Ely's control circuit 134 is also consistent with the '910 patent's disclosure at Fig. 4G (described at 9:56-60):

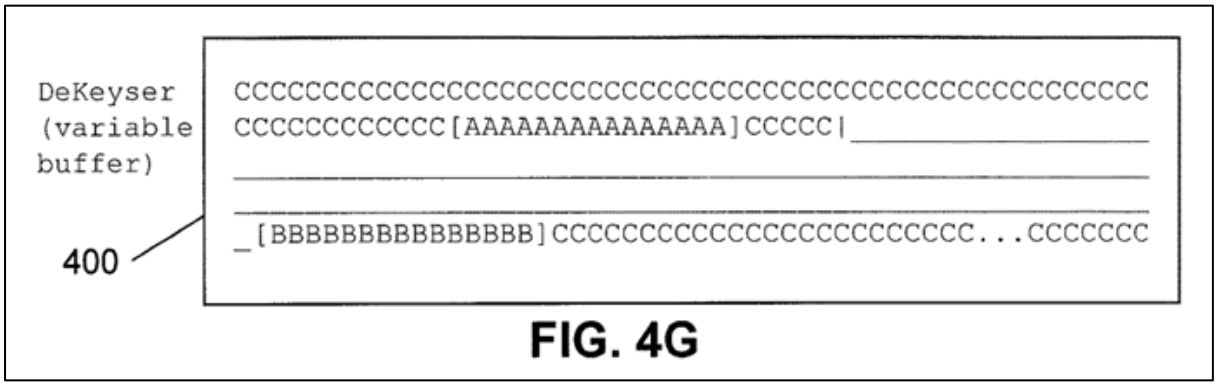


FIG. 4G

477. Ely discloses that after protecting the portion of the second data stream, the camera unit 114 under control of control circuit 134 continues to record video data to the ring buffer as a third data stream. EX1020, Fig. 4, 7:45-48, 7:56-8:6. Recordation of the third data stream would skip over the protected portion of the first data stream in the ring buffer. *Id.*, 7:34-39, 10:11-23.

2. Independent Claim 20

478. As explained in Section IX.B.2 above, claim 20 has a scope similar to that of claim 1, except that claim 1's recitations of "designating" for write protection have

been removed and replaced with language requiring the affirmative step of "write protecting." EX1065. Ely would have rendered obvious claim 20 for the reasons presented above for claim 1. As detailed for claim 1, Ely discloses or at minimum would have rendered obvious all of the limitations common to claims 1 and 20. As further detailed in the above section for claim 1, Ely performs the "write protecting" required by claim 20, in addition to the "designating for write protecting" required by claim 1.

3. Dependent Claims 2-4, 6-10, And 14-19

479. ***Claim 2:*** Claim 2 depends from claim 1, reciting "including with the first portion of the sensor data, another portion of the sensor data that was captured after occurrence of the first trigger signal." Ely discloses these limitations. Ely discloses protecting from overwriting video data "corresponding to a time interval beginning at a predetermined time prior to receipt of the alarm command, and continuing for a predetermined time *after* receipt of the alarm command." EX1020, 7:45-55; *see also id.*, 10:1-23, Fig. 4 (block 160).

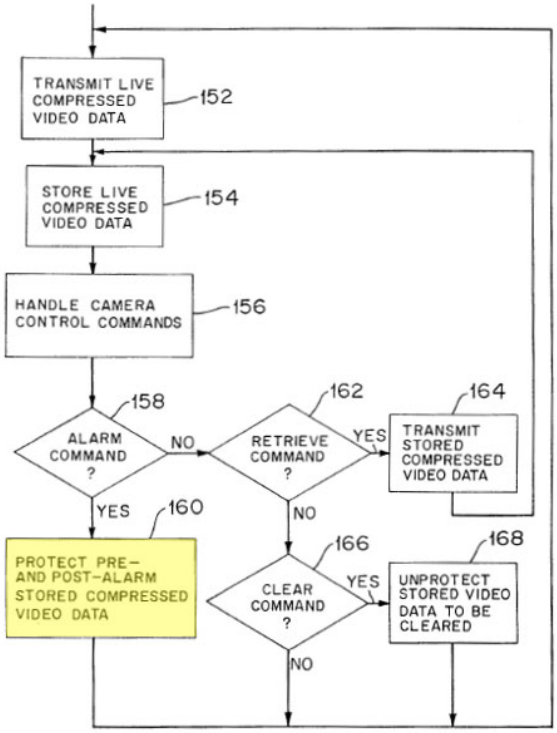


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4 (color added). The pre- and post-event data comprise an indexed, identifiable collection of data in the circular buffer.

480. ***Claim 3:*** Claim 3 depends from claim 2, reciting "wherein the computer processor is further configured to, in response to an end signal, end the first portion of the sensor data captured after the occurrence of the first trigger signal that is designated as write-protected." Ely discloses these limitations. Ely's video recording device responds to a trigger signal that results in the write protection of data in the ring buffer (*see* Section IX.E.1 addressing claim 1), and the trigger signal includes an end signal. EX1020, 7:48-55, 10:11-23. Specifically, Ely's alarm command tells the video recording device when to (i) start recording, *i.e.*, upon receipt of the alarm command, and when to (ii) stop recording, *i.e.*, when a predetermined amount of time has passed

after receipt of the alarm command. *Id.* Ely thus discloses the limitation added in claim 3.

481. ***Claim 4:*** Claim 4 depends from claim 3, reciting "where in the end signal comprises at least one of: an expiration of a pre-defined length of time; an audio command; a stop button signal; a stop switch signal; or a recognized object within the sensor data." Ely discloses these limitations. As explained for claim 3, Ely's end signal comprises an expiration of a pre-defined length of time: "a predetermined time after receipt of the alarm command." EX1020, 7:45-55. Ely thus discloses "where in the end signal comprises … an expiration of a pre-defined length of time."

482. ***Claim 6:*** Claim 6 depends from claim 1, reciting "wherein the sensor data comprises at least one of the following: image data and video data." Ely discloses these limitations. As discussed for claim 1, Ely discloses a camera 130 that records video data. EX1020, 6:21-28. Additionally, video data includes by necessity a sequence of images.

483. ***Claim 7:*** Claim 7 depends from claim 1, reciting "wherein a portion of the at least one memory comprises a circular buffer." Ely discloses these limitations. Ely's video surveillance system includes a memory device 150 that "serves as a ring buffer" in which "currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150." EX1020, Abstract, 6:61-65, 7:28-34. A POSITA would have understood Ely's ring buffer to mean a "circular buffer' like that disclosed in the '910 patent.

484. ***Claim 8:*** Claim 8 depends from claim 1, reciting "wherein the first portion of the sensor data is stored using at least one of time compression or frame compression." These limitations would have been obvious in view of Ely. Ely's video surveillance system includes processing circuitry that compresses video data stored in the ring buffer. EX1020, 2:65-3:5, 3:56-67, 4:49-56, 6:48-65. "Further compression could be used before transmitting the data if wireless bandwidth is an issue. Either DCT or wavelet transformed data on native sensor formats could be used." *Id.*, 7:41-43. It would have been obvious to a POSITA to select either time compression or frame compression in Ely's system. Various compression techniques were well-known in the art as of the claimed June 2007 priority date, including time compression and frame compression. Selecting these conventional techniques for use in Ely's system would have been obvious to a POSITA.

485. Before the purported June 2007 priority date of the challenged patents, image and video data, by necessity, was almost always compressed to save storage as well as I/O and network bandwidth requirements. Cameras and video encoders before June 2007 already had the ability to change the frame rate and bitrate. MPEG-1, released in 1991, used a combination of spatial and temporal compression. Appx NN (included in EX1041), a set of lecture notes entitled "Video Compression," discuss this (downloaded from https://www.cs.ucf.edu/courses/ cap5015/Video_compression_ 2005.pdf, last accessed July 21, 2024).

486. ***Claims 9 and 10:*** Claim 9 depends from claim 1, reciting "a camera that includes the sensor, the at least one memory, and the computer processor." Claim 10 depends from claim 9, reciting "wherein the camera comprises a security camera." Ely discloses these limitations. For claim 9, Ely's surveillance system includes the camera 130 (*i.e.*, the sensor), memory board 136, memory device 150, and control circuit 134:

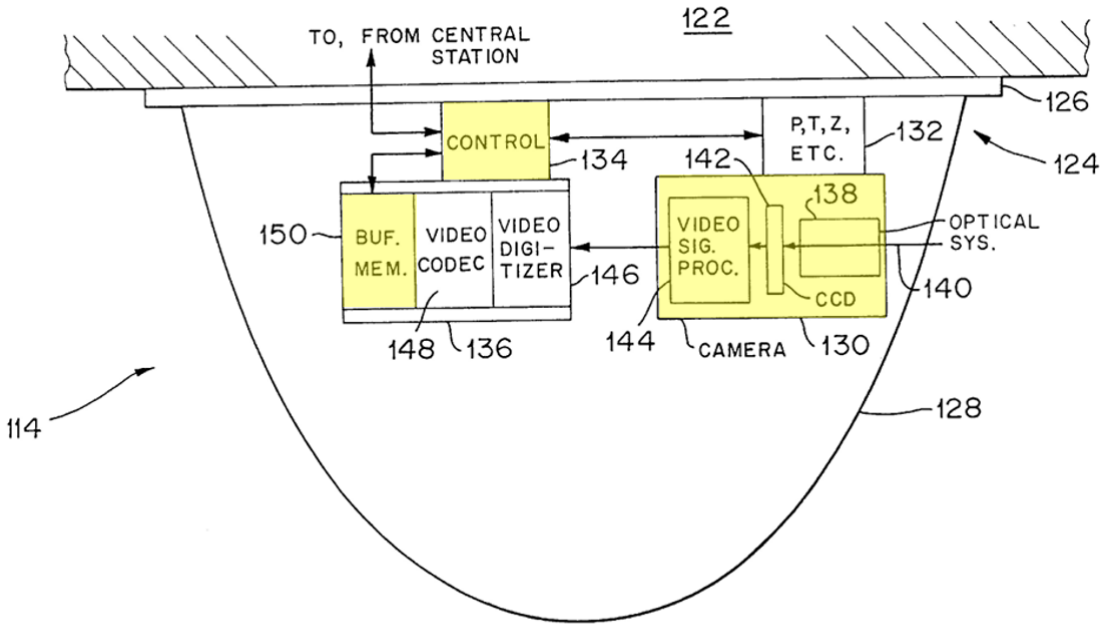


FIG. 3

EX1020, Fig. 3 (color added); *see also id.*, 6:4-6. A POSITA would have understood camera unit 114 as being a "camera."

487. For claim 10, Ely's "video surveillance system" includes "sensors for advising the system of alarm conditions." *Id.*, 1:5-8. These alarm conditions include "unauthorized opening of doors, windows and display cases and the like." *Id.*, 5:50-55. Thus, Ely discloses the "security camera."

488. ***Claim 14:*** Claim 14 depends from claim 1, reciting "wherein the first trigger signal represents detection of at least one of the following: a motion, a sound, an image, content in a data stream, a pattern in the sensor data, a person, a human face, a computer screen, an event, a verbal command, operation of switch, and operation of a button." Ely discloses these limitations. Ely's video surveillance system comprises one or more sensor devices 120, which "are preferably of conventional types that detect, for example, unauthorized opening of doors, windows and display cases and the like and generate alarm signals indicative of these occurrences." EX1020, 5:50-53. "The sensors 120 may also include conventional motion and/or heat sensing devices." *Id.*, 5:54-55.

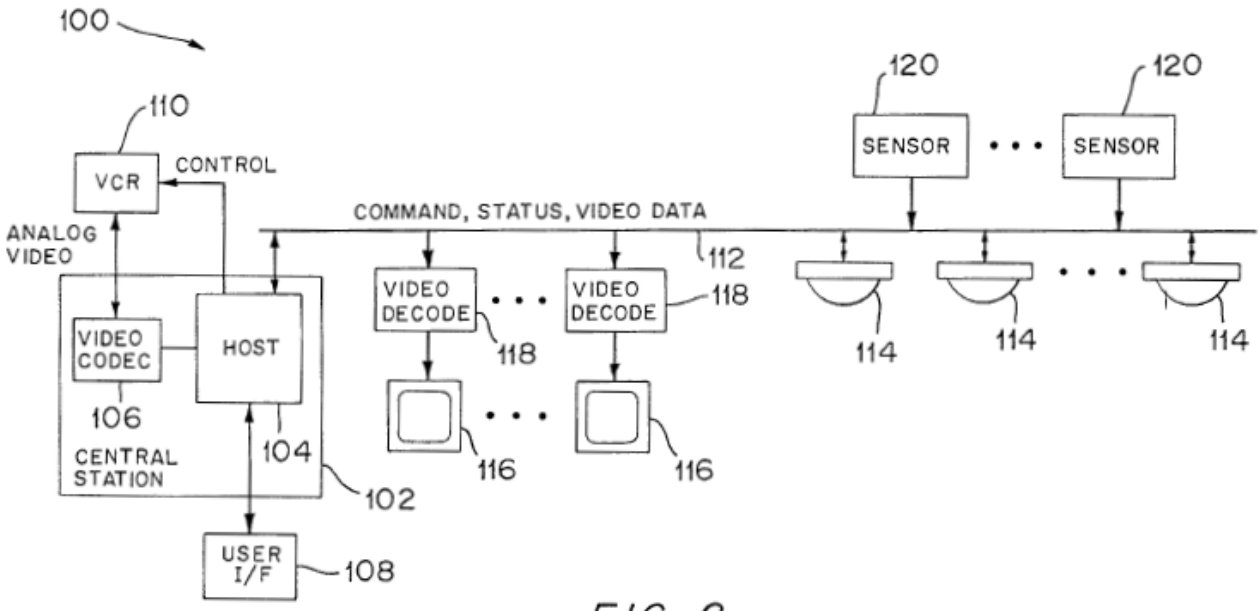


FIG. 2

489. ***Claims 15 and 16:*** Claim 15 depends from claim 1, reciting "wherein the computer processor is further configured to write-protect the first portion of the sensor

data as a write-protected portion in the at least one memory." Claim 16 depends from claim 15, reciting "wherein the computer processor is further configured to free the write-protected portion following a transmission of the first designated portion." Ely discloses these limitations.

490. Ely discloses the limitations of claim 15 as discussed in Section IX.E.1.d.

491. For claim 16, Ely's control circuit 134 is conditioned to receive commands relating to the previously stored compressed video data including "clear" commands, "in response to which the control circuit removes a previously protected block of stored video data from protection, thereby permitting 'live' video data to be written over the now-unprotected stored video data." EX1020, 8:7-12. The clear command may be sent after write-protected alarm data is retrieved. *Id*., 7:56-59, 10:24-43, 10:51-55.

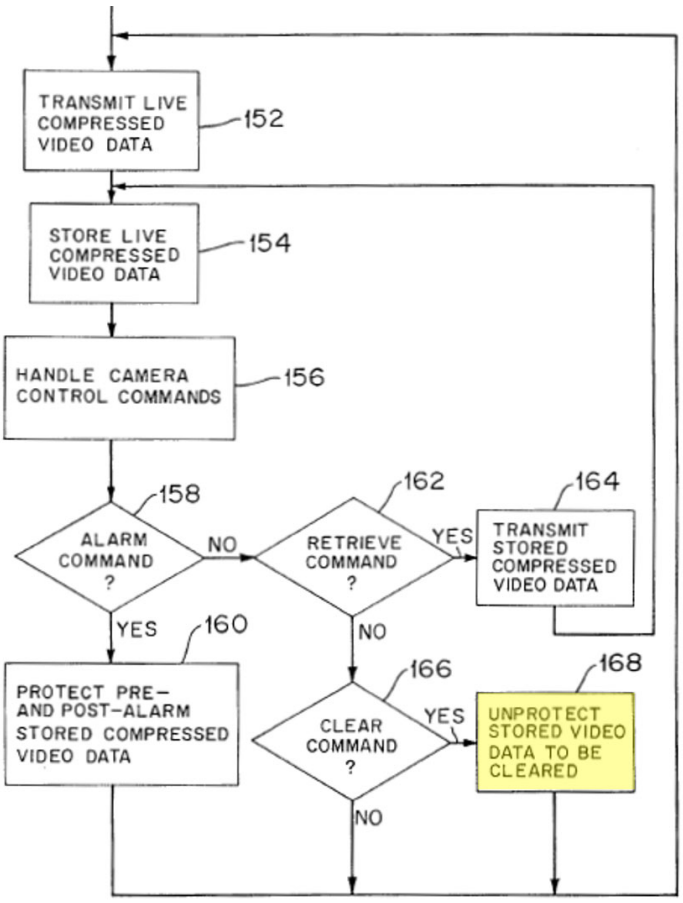


FIG. 4
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Id., Fig. 4 (color added); *see also id.*, Fig. 5B (block 190).

492. ***Claim 17:*** Claim 17 depends from claim 1, reciting "wherein the computer processor is further configured to index the first designated portion while the recording facility is still recording the sensor data into the at least one memory." Ely discloses these limitations. Ely's "control circuit 134 is conditioned "to receive commands calling for reading-out and transmission to the central station of previously-stored compressed video data." EX1020, 7:56-59. "The transmission of the compressed video data that was read out from the memory 150 may be in place of, or virtually in parallel

with, continued transmission of 'live' compressed video data." *Id.*, 7:66-8:2. Preferably, transmission "does not interrupt ongoing storage of 'live' video data." *Id.*, 8:3-6. A POSITA would have understood the selective retrieval and transmission of alarm data without interrupting ongoing storage of "live" video data necessitates that the control circuit 134 be configured to index the alarm data ("first designated portion") while continuing to record sensor data into the first memory.

493. ***Claim 18:*** Claim 18 depends from claim 1, reciting "wherein the computer processor is configured to record the sensor data continuously, from before the first trigger signal, through a pre-designated time period, and after the pre-designated time period." Ely discloses these limitations. Ely discloses protecting from overwriting video data previously stored in the memory "corresponding to a time interval beginning at a predetermined time prior to receipt of the alarm command, and *continuing* for a predetermined time after receipt of the alarm command." EX1020, 7:45-55; *see also id.*, 10:1-23, Fig. 4 (block 160).

494. ***Claim 19:*** Claim 19 depends from claim 1, reciting "wherein the computer processor is configured to automatically overwrite portions of the sensor data that were recorded in the at least one memory that were not designated for saving." Ely discloses these limitations. Ely's control circuit 134 (computer processor) controls memory addressing and writing of data into the memory so that memory 150 "serves as a ring buffer, in which currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150." EX1020,

7:28-34. Further, Ely's control circuit 134 records into the ring buffer on an "ongoing," continuous basis and thus automatically overwrites sensor data recorded in the memory that were not designated for saving. *Id*., Fig. 4, 7:45-48, 7:56-8:6, 10:11-23. Additionally, Ely's disclosure is consistent with that of the '910 patent at 2:36-42, 5:3-5, 5:40-52, Fig. 3, 7:48-59, Fig. 4A, 7:60-65 (*see* Section IX.E.1.c, discussing element 2 of claim 1), which discloses the circular buffer algorithm corresponding to the "automatically overwrite" function of claim 19.

F. Ground 2b: Claims 5, 11, And 12 Of The '910 Patent Would Have Been Obvious Over Ely In View Of Lewellen

495. Claims 5, 11, and 12 would have been obvious over the combination of Ely (EX1020) and Lewellen (EX1019). Claim 5 depends from claim 1, reciting "wherein the computer processor is further configured to transmit, via a wireless transmitter, the first portion of the sensor data to a remote memory." Claim 11 depends from claim 1, reciting "a cell phone including the sensor, the at least one memory, and the computer processor." Claim 12 depends from claim 1, reciting "a personal area network coupled with the computer processor and including at least two of the following: the sensor, the at least one memory, and the computer processor."

496. To the extent Ely does not disclose the limitations added in dependent claims 5, 11, and 12, these limitations would have been obvious in view of Lewellen.

497. For claim 5, Ely discloses that alarm data stored in memory device 150 can be transmitted to a remote memory. EX1020, 9:51-58, 10:24-47. To the extent Ely

does not disclose a "wireless transmitter" to achieve such transmissions, Lewellen does. Lewellen's local wireless interface 390 wirelessly transmits data to Bluetooth-compatible devices, including mobile phones. EX1019, [0022], [0031], [0042]-[0048].

498. For claim 12, Lewellen discloses the limitations added in this claim for the reasons in Section IX.C above.

499. A POSITA would have been motivated to apply Lewellen's teachings to Ely's system. Both references disclose recording systems for security/surveillance applications. EX1019, [0002]-[0009], [0024]-[0026], [0042]; EX1020, Abstract, 5:34-59. A POSITA would have recognized the advantages of modifying Ely's system to implement Lewellen's teachings regarding personal area networks for transmitting alarm data preserved with the file-based circular buffer approach of Ely. Ely discloses it is an "object of the invention to provide a video surveillance system which requires less cabling than conventional systems." EX1020, 2:52-54. Lewellen teaches the "benefit of providing the local wireless interface 390 is that digital information recorded by the digital video recorder 370 may be automatically transmitted and received to and from compatible devices." EX1019, [0043]. A POSITA would have been motivated to implement Ely's system with Lewellen's wireless interface to further reduce the amount of cabling required, by enabling wireless—rather than wired—transmission of signals and data.

500. A POSITA would have also been motivated to implement Ely's system or component thereof *(e.g.*, camera unit 114) using a cell phone comprising a sensor,

memory, and computer processor. EX1019, [0010], [0031], [0037], [0041]. Bluetooth-compatible mobile phones were ubiquitous as of June 2007 and carried by many security professionals on a daily basis. A POSITA would have recognized that using these mobile phones (including sensor interface, memory, and computer processor) as the video recording device would have been a simple and low-cost means to enable security guards to record from their person on, *e.g.*, a casino floor, thus providing more portability and additional angles/viewpoints compared to fixed cameras. Lewellen expressly recognizes the significant advantages of Bluetooth technology, including that it is "very inexpensive." EX1019, [0032], [0034], [0042].

501. A POSITA would have had a reasonable expectation of success in implementing Ely's system with Lewellen's wireless interface and related techniques Lewellen describes. Local wireless interfaces (including Bluetooth-compatible interfaces) were well-known and commercially available as of June 2007, and the addition of such an interface in Ely's system would have been routine and well within a POSITA's skill.

502. For claim 11, Lewellen discloses the limitations added this claim for the reasons in Section IX.C above. A POSITA would have been motivated to implement the Ely system or a component thereof (e.g., camera unit 114) as a cell phone with local wireless interface 390 using the Bluetooth interface disclosed in Lewellen. EX1019, [0010], [0031], [0037], [0041]. Bluetooth-compatible mobile phones were ubiquitous as of June 2007 and carried by many security professionals on a daily basis. A POSITA

would have recognized that using these mobile phones as the video recording device would have been a simple and low-cost means to enable security guards to record from their person on, e.g., a casino floor, thus providing more portability and additional angles/viewpoints compared to fixed cameras. Lewellen expressly recognizes the significant advantages of Bluetooth technology, including that it is "very inexpensive." EX1019, [0032], [0034], [0042].

503. A POSITA would have had a reasonable expectation of success in implementing Ely's surveillance system with Lewellen's local wireless interface 390 and related techniques Lewellen describes. Local wireless interfaces were well-known and commercially available as of June 2007, and adding such an interface in Ely's system would have been routine and well within a POSITA's skill.

G. Ground 2c: Claim 13 Of The '910 Patent Would Have Been Obvious Over Ely In View Of Fiore

504. Claim 13 would have been obvious over the combination of Ely (EX1020) and Fiore (EX1009). Claim 13 depends from claim 1, reciting "wherein the at least one memory is configured to record the first portion of the sensor data in a file."

505. Ely discloses the limitation added in dependent claim 13. As explained in Section IX.E.1.d, a POSITA would have understood the selective retrieval of alarm data from Ely's ring buffer necessitates an ability to locate the alarm data as a single file within the buffer, such that Ely necessarily discloses the limitations of claim 13.

506. To the extent a POSITA wanted further guidance as to particular methods for implementing Ely's ring buffer and recording image data into the buffer, a POSITA would have been motivated to turn to Fiore. Both references describe similar technologies and solve similar problems. Ely describes a surveillance system that uses a ring buffer to continuously record a video signal generated by a camera 130, and portions of the ring buffer are write protected in response to an alarm command. EX1020, 6:48-53, 6:61-65, 7:28-39. The write-protected portions include video data recorded both before and after the alarm command. *Id.*, 7:48-55. Fiore similarly discloses a "data recording and playback system" that uses "a circular storage buffer having a memory mapped file with same address space as the memory device for storing the input signal data." EX1009, Abstract. In Fiore, "data frames before, during, and after [an] event" are preserved, similar to what is disclosed in Ely. *Id.*, [0048].

507. A POSITA would have been motivated to implement Ely's video surveillance system with Fiore's file-based approach for the circular storage buffer and event data stored therein. Fiore's file-based approach includes (i) implementing a circular storage buffer as a memory-mapped file, and (ii) indexing event data for events as respective files within the memory-mapped file. EX1009, [0022]-[0023], [0051], [0059]-[0060]. Fiore also describes numerous benefits of its file-based approach. *Id.*, [0065], [0067]-[0068], [0072].

508. In view of these exemplary benefits, and other reasons herein, a POSITA implementing Ely would have been motivated to utilize Fiore's teachings on the circular

storage buffer implemented as a memory mapped file and the indexing of event data as files within the circular storage buffer. The resulting system discloses the limitations added in claim 13. A POSITA would have had a reasonable expectation of success because Fiore provides a detailed disclosure of its file-based approach, and applying those techniques to Ely's surveillance system would have been routine and well within a POSITA's skill.

APPENDICES

APPENDIX	TITLE
A	*Curriculum Vitae* of Nabil J. Sarhan
B	U.S. Patent No. 2003/0151663 (Lorenzetti)
C	U.S. Patent No. 7,804,426 (Etcheson)
D	U.S. Patent Pub. No. 2002/0131768 (Gammenthaler 1)
E	U.S. Patent Pub. No. 2004/0201765 (Gammenthaler 2)
F	RESERVED
G	RESERVED
H	RESERVED
I	U.S. Patent No. 6,389,340 (Rayner)
J	U.S. Patent No. 6,421,080 (Lambert)
K	U.S. Patent No. 6,088,635 (Cox)
L	U.S. Patent Pub. No. 2004/0252193 (Higgins)
M	U.S. Patent Pub. No. 2004/0150717 (Page)
N	POLICE VIDEO Up Close and Personal, LAW and ORDER, August 1999
O	Sheriff Baca Introduces In-Car Video System and "Cop-Cam," County Digest (Country of Los Angeles), March 2000
P	Deja View Camwear Model 100, CARPE'04, October 15, 2004
Q	U.S. Patent Pub. No. 2005/0088521 (Blanco 2)
R	U.S. Patent No. 8,350,907 (Blanco)
S	RESERVED
T	RESERVED
U	U.S. Patent Pub. No. 2005/0078195 (Van Wagner)
V	U.S. Patent No. 6,995,668 (Junqua)
W	U.S. Patent Pub. No. 2001/0005217 (Hamilton)
X	PCT Patent Pub. No. WO2004/036926 (Pearlson)
Y	U.S. Patent No. 6,690,294 (Zierden)
Z	U.S. Patent No. 6,831,556 (Boykin)
AA	Bing-Fei WU et al., "A Practical Home Security System via Mobile Phones," Proceedings of the 5th WSEAS International Conference on

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BB	S.C. Hui et al., "Remote Video Monitoring Over the WWW," Multimedia Tools and Applications, 21, 173–195, 2003, Kluwer Academic Publishers, The Netherlands
CC	Video Process Monitoring, Steve Rubin, automation.com, Feb. 3, 2003
DD	U.S. Patent No. 6,578,070 (Weaver)
EE	U.S. Patent No. 7,088,387 (Freeman 2)
FF	U.S. Patent No. 7,747,143 (DeKeyser)
GG	U.S. Patent No. U.S. 2007/0071395 A1 (Boone)
HH	U.S. Patent Pub. No. U.S. 2007/0132773 A1 (Plante 2)
II	"Operating Systems" (Third Ed. 2004) by H.M Deitel, P.J. Deitel, and D.R. Choffnes (excerpt)
JJ	SecurityMagazine.com – VIDEOSurveillance: Wireless Mesh Networks
KK	DeepSentinel – A Brief History of Surveillance Cameras
LL	Wireless Video Surveillance: A Survey
MM	Cost-Efficient Mining Techniques for Data Streams
NN	Video Compression – Lecture Notes
OO	U.S. Patent No. 5,465,120 (Schultheiss)
PP	U.S. Patent No. 6,624,611 (Kirmuss)
QQ	U.S. Patent Pub. No. 2006/0077256 ("Silvemail '256")
RR	U.S. Patent Pub. No. 2007/0035632 ("Silvemail '632")
SS	U.S. Patent No. 6,614,408 ("Mann '408")
TT	Steve Mann, WearCam, Digest of Papers, Second International Symposium on Wearable Computers (Cat. No. 98EX215), IEE
UU	RESERVED
VV	U.S. Provisional Application No. 60/403,553 ("Reich '553 provisional")
WW	U.S. Provisional Application No. 60/409,236 ("Reich '236 provisional")
XX	U.S. Provisional Application No. 60/461,674 ("Reich '674

APPENDIX	TITLE
	provisional")
YY	U.S. Provisional Application No. 60/474,269 ("Reich '269 provisional")
ZZ	CARPE '04: Proceedings of the 1st ACM Workshop on Continuous Archival and Retrieval of Personal Experiences, pages 110-111, published October 15, 2004, New York, New York, ACM Press
AAA	Augmenting and Sharing Memory with eyeBlog, CARPE '04: Proceedings of the 1st ACM Workshop on Continuous Archival and Retrieval of Personal Experiences, pages 105-109, published October 15, 2004, New York, New York, ACM Press
BBB	U.S. Patent No. 8,482,488 ("Jannard")
CCC	U.S. Patent No. 6,349,001 ("Spitzer")
DDD	U.S. Patent No. 7,806,525 ("Howell")
EEE	U.S. Patent Pub. 2005/0174470 ("Yamasaki")
FFF	WO2004114654A2 ("Armand")
GGG	U.S. Patent Pub. No. 2005/0036103 ("Bloch")