

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ADOBE INC.,
Petitioner,

v.

JONATHAN E. JAFFE,
Patent Owner.

IPR2024-01352
Patent 6,757,828 B1

**DECLARATION OF KENNETH PARULSKI IN SUPPORT OF
PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE**

I, Kenneth Parulski, declare as follows:

1. I make this declaration based upon my own personal knowledge and, if called upon to testify, would testify competently to the matters stated herein.

2. I have been asked by Adobe Inc. to provide my opinions in response to certain arguments and assertions in the declaration of Bill Davis (EX2005). I have reviewed the declaration and the exhibits discussed by Mr. Davis that I address below. I have also reviewed the declaration of Adobe's expert witness Zixiang Xiong, Ph.D. (EX1003), U.S. Patent No. 6,757,828 (EX1001), Glass (EX1005), and Rieger (EX1006).

I. PERSON OF ORDINARY SKILL IN THE ART

3. I have reviewed the definition of a "person of ordinary skill in the art" (or POSITA) applied by Dr. Xiong. EX1003, ¶¶81-82. For purposes of this declaration, I have been asked to consider the matters discussed below from the perspective of such a person in 2000. I have done so. In addition, I have reviewed the definition of a POSITA adopted by Mr. Davis. EX2005, ¶53. I have considered whether any of my opinions expressed in this declaration would change if I were to adopt Mr. Davis's definition. I have concluded that they would not change.

4. I was a person of more than ordinary skill in the art in 2000 under either definition. Further, I was designing and building digital cameras in the

1990s and 2000, and I worked with numerous engineers and others who would qualify as a POSITA. I will summarize some of my relevant experience.

5. I received a Master of Science degree in Electrical Engineering and a Bachelor of Science degree in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology in 1980.

6. I joined the Kodak Research Labs division of Eastman Kodak Company in 1980, where I began developing and implementing image processing algorithms, including image processing algorithms for use in film-to-video systems and digital cameras. Beginning in 1984, I led a project to develop the world's first color megapixel digital camera system prototype.

7. Beginning in 1987, I led a team which developed a digital image processing VLSI chipset for digital still and video cameras, which processed the output signal from various Kodak color CCD image sensors. This VLSI chipset performed extensive real-time digital image processing. These integrated circuits were sold by Kodak for nearly a decade.

8. From approximately 1990 until my retirement from Kodak in 2012, I was involved in the research and development of Kodak's consumer digital cameras. Beginning in 1992, I served as architect of Kodak's first generation of consumer-oriented digital still cameras, which included the Kodak DC40 camera as well as the Apple QuickTake 100 camera, the first digital camera marketed by

Apple. In my role as digital camera architect at Kodak and through my participation in various projects, I acquired experience in all aspects of digital camera design, including the selection of hardware and software components such as lenses, image sensors, digital image processors, RAM and flash memory and memory cards, and image processing algorithms.

9. Beginning in the late 1990s, I was part of a Kodak team that developed a system using Kodak DC280 digital cameras with enhanced firmware that created a digital signature of the compressed image and metadata using a public/private key pair generated in the camera. The system included PC software that used the camera's public key to decrypt the digital signature contained in the image file to determine if the image had been altered. The system was described in U.S. Patent Application No. 09/473,522 filed December 28, 1999, entitled "Digital Camera with Image Authentication" to Parulski, et al., and a continuation was published as Publication No. US 2006/0036864.

10. From 2001 to 2009, I served as Kodak Research Fellow and Director, IP & Standards in the Consumer Digital Group. In that position, I was the technical leader of Kodak's digital camera patent licensing program, where I analyzed and provided advice on a very large number of patents involving digital cameras and digital photography systems.

11. From 2010 to 2012, I held the position of Kodak Research Fellow and

Chief Scientist in the Digital Cameras and Devices Division. In that role, I invented and prototyped new digital photography systems, including imaging systems using wireless imaging devices and cloud storage and image processing technologies.

12. I am a named inventor on more than 230 issued United States patents. Most of these inventions relate to digital cameras, wireless imaging devices, and digital photography systems and have been licensed by Kodak to more than 40 companies for use in digital cameras, smartphones, and photo sharing services.

13. I am the author or co-author of numerous publications, including chapters in leading treatises in the field of digital imaging technology. Among these, I authored the “Digital Photography” chapter in the Digital Consumer Electronics Handbook published by McGraw-Hill in 1997; the “Color Image Processing for Digital Cameras” chapter in the Digital Color Imaging Handbook published by CRC Press in 2003; and the “Digital Camera Image Storage Formats” chapter in Single-Sensor Imaging: Methods and Applications for Digital Cameras, published by CRC Press in 2008. I have also presented at numerous industry conferences around the world on the subject of digital cameras and digital image processing, including plenary talks at the 2003 PICS Digital Photography Conference and the 2021 Electronic Imaging Symposium.

14. I have received a number of awards in recognition of my

achievements in the field of digital imaging technology. For example, in 2001, I received the Eastman Award, Kodak's top technical honor, for the development of digital cameras. In 2002, I received the Technical Achievement Award from the Photo-Imaging Manufacturing and Distributors Association for "pioneering work in the development of digital imaging technology." I was the first person to be honored by this photographic association for their contributions to digital photography. In 2008, I received the Achievement Award from the International Imaging Industries Association (I3A) for "significant contributions to the advancement and growth of the imaging industry."

II. A POSITA WOULD NOT HAVE UNDERSTOOD GLASS OR RIEGER TO DISCLOSE CONNECTING THE OPTICAL SENSOR TO THE MEMORY USING COAXIAL CABLE

15. I have been asked to respond to certain arguments by Mr. Davis regarding the limitation in claim 1 requiring "a sensor, which is tightly coupled to said memory"—in particular his arguments in paragraphs 72-77 and 94-96 based on Exhibits 2007, 2008, and 2009 in his declaration. Mr. Davis's arguments relate to certain opinions expressed by Dr. Xiong in his declaration.

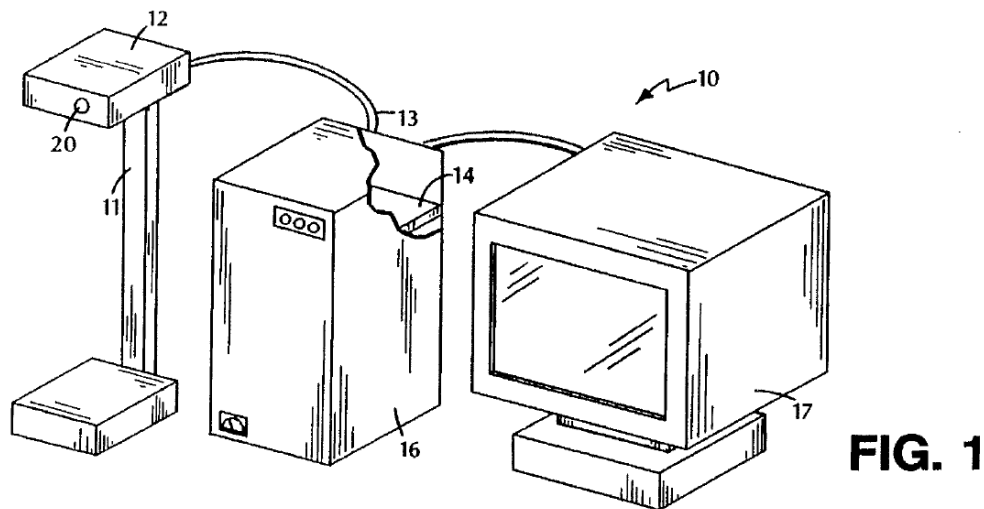
16. Dr. Xiong states in his declaration that Glass's Figure 2 illustrates "imaging system 4 including 'Optics and Camera' 6 (which includes a *sensor*) and 'Digitizer and Frame Store' 8 (which includes *memory*).” EX1003, ¶170. He further states that the "arrow from optics and camera 6 to digitizer and frame

store 8 indicates that they are connected by electronically conductive leads or traces....” EX1003, ¶170. Dr. Xiong also states that Glass’s Figure 3, which is a more detailed illustration of imaging system 4 of Figure 2, “shows ‘Optics’ 41 and ‘Imager & Digitizer’ 42 (which includes a *sensor*) and ‘Frame Store’ (which is or includes *memory*).” EX1003, ¶171. He further states that the “illustrated data path” from element 42 to element 43 in Figure 3 “indicates that the components are electrically connected by conductive leads or traces within imaging system 4.” EX1003, ¶171. I agree that Glass discloses a connection between an optical sensor and memory via leads and traces, which is the standard way to connect such components within a device such as Glass’s imaging system 4.

17. Regarding Rieger, Dr. Xiong cites Figure 3 illustrating Rieger’s digital camera and identifies the CCD-Sensor as the claimed *sensor* and the RAM as the claimed *memory*. He states in this declaration that the “arrows in Figure 3 illustrating a data path from the *sensor* to *memory* indicate that the components are electrically connected by conductive leads and traces within the protected section of Rieger’s manipulation-proof camera.” EX1003, ¶228. I agree that Rieger discloses a connection between an optical sensor and memory via leads and traces, which is the standard way to connect such components within a device such as Rieger’s digital camera.

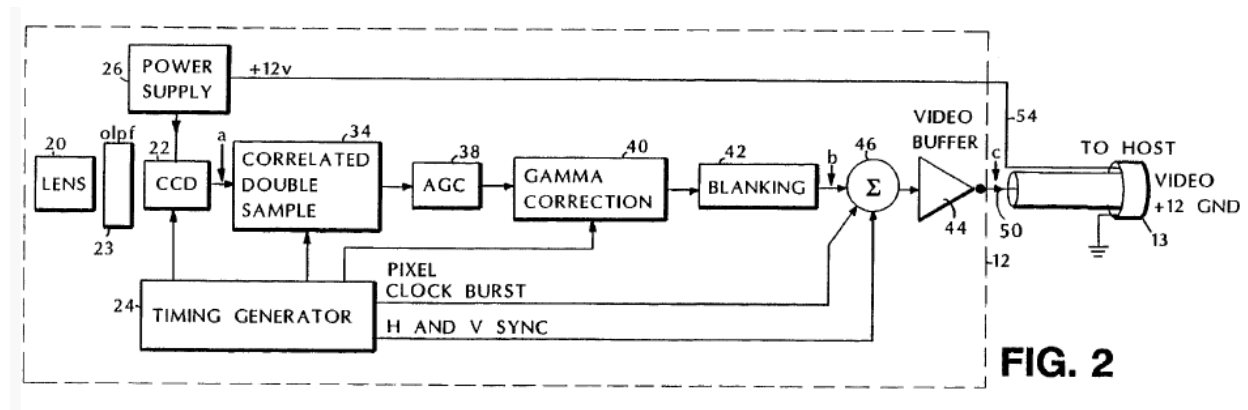
18. Mr. Davis argues in his declaration that the components illustrated in

Glass and Rieger could be connected in some other manner. EX2005, ¶¶72-75, 78, 94-96, 98. First, Mr. Davis cites U.S. Patent No. 5,486,853 (EX2007), which he states discloses “an electrical cable for connecting an electronic camera to a processor.” EX2005, ¶¶72, 94. Mr. Davis disputes Dr. Xiong’s opinion because, according to Mr. Davis, “a POSITA would know that there were many ways to connect a CCD camera to either a processor or memory.” EX2005, ¶¶72, 94. But the cited patent does not disclose an optical sensor and processor/memory connected ***within a single device*** as is illustrated in Glass and Rieger. Instead, as shown in Figure 1 below, the ’853 Patent discloses “a video electronic camera head 12 mounted on a camera stand 11” that “provides analog video signals over an electrical cable 13” to “a video processor card 14, inserted within personal computer 16, where the signals are digitally processed before being displayed on a monitor 17.” EX2007, 5:17-23. In other words, the ’853 Patent discloses an electrical cable 13 that connects the analog video signal output by a first device—camera head 12—to a second, separate device—personal computer 16.



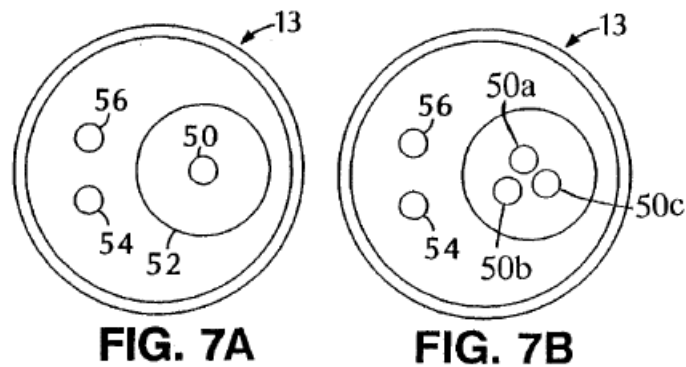
EX2007, Fig. 1.

19. The '853 Patent states that the “analog waveform signal” from the camera “is then conveyed using a video buffer 44 over a coaxial cable 13,” as shown in Figure 2 below. A POSITA would have understood from this disclosure that video buffer 44 is needed when using a coaxial cable to provide an analog video signal to an external device. EX2007, 6:39-42.



EX2007, Fig. 2. The '853 Patent further states that cable 13 is a “coaxial cable” including multiple conductive wires that “includes a conductor 50 for conveying

the video signals surrounded by a shield conductor 52” as shown in Figures 7A and 7B below. EX2007, 6:48-55. The shield conductor 52 surrounds the conductor 50 and shields it from outside noise from other devices that could degrade the analog video signal.



EX2007, Figs. 7A-7B.

20. It was common well before 2000 to use coaxial cables to connect the output of one analog video device, such as a video camera or a video tape recorder, to the input of another analog video device, such as a video monitor, video switcher, or video tape recorder. I personally used such cables in some of my work at Kodak Research Labs beginning in 1980.

21. A POSITA would **not** have understood Glass’s Figures 2 and 3 to illustrate an optical sensor (such as a CCD or CMOS sensor disclosed by Glass) connected to a memory (such as the frame memory disclosed by Glass) using an analog video cable like the one disclosed in the ’853 Patent. Such a coaxial cable is designed for an analog video signal, which can be degraded by small amounts of

noise, rather than for a digital data path as in Glass, which would not be affected by such noise. Using coaxial cables for each digital signal in the digital data path would require unnecessary additional space and would increase the component cost, due to the size and cost of the cables and the video buffers used to drive the cables without providing any benefit. By comparison, connecting the internal components in the standard manner by soldering leads to traces on circuit boards would require far less space, would be less expensive, and would be less likely to fail. Further, there would be no reason to connect components inside Glass's imaging system 4 with a cable like the one in the '853 Patent, since the output of the imager & digitizer is designed to directly interface to the input of the frame store.

22. Similarly, a POSITA would **not** have understood Rieger's Figure 3 to illustrate a CCD sensor connected to RAM, via the CPU processor, using an analog video cable like the one disclosed in the '853 Patent. Again, such cables are designed for an analog video signal, which can be degraded by small amounts of noise, rather than a digital data connection to a CPU or memory, which would not be affected by such noise. Using coaxial cables for each digital signal in a digital data connection would require unnecessary additional space and would increase the cost, due to the size and cost of the cables and the video buffers used to drive the cables. By comparison, connecting the internal components in Rieger's digital

camera in the standard manner by soldering leads to traces on circuit boards would require far less space, would be cheaper, and would be less likely to fail. Further, there would be no reason to connect components inside Rieger's digital camera with a cable like the one in the '853 Patent.

III. A POSITA WOULD NOT HAVE UNDERSTOOD GLASS OR RIEGER TO DISCLOSE CONNECTING THE OPTICAL SENSOR TO THE MEMORY VIA WIRELESS TRANSMISSION

23. Mr. Davis cites U.S. Patent 7,161,622 (EX2008), which he states discloses “an electronic camera with a wireless communication interface for transmitting image information from the camera.” EX2005, ¶¶73, 95. Again, this patent describes a first device—a camera—communicating with a second, separate device. Specifically, it describes a digital camera 1 connected to a communication unit 2, as shown in Figure 2 below, which permits wireless transmission of image data stored on memory card 27 in the camera to a separate device such as a personal computer. EX2008, 2:64-3:1 (“the recorded image file is automatically transferred to, for example, the personal computer in one's own house, the laboratory which is contracted beforehand, or the server of the computer network joined beforehand”), 4:24-32 (“the image data file received from electronic camera 1 is transferred to the personal computer of own house, the laboratory which is contracted beforehand or, and the data server of the computer network service joined beforehand”).

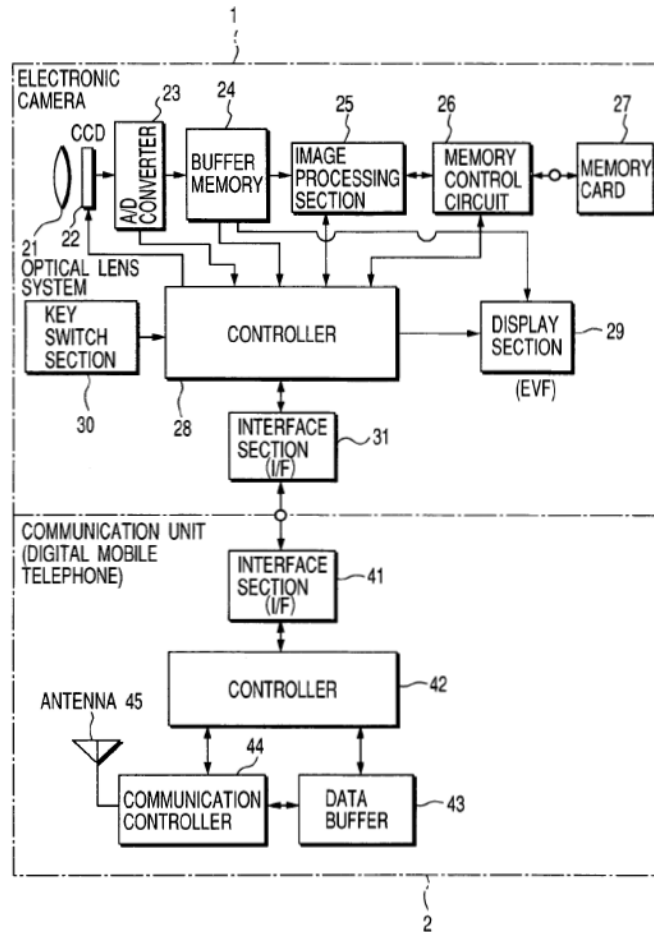


FIG. 2

EX2008, Fig. 2.

24. The '622 Patent does not disclose an image sensor and a memory wirelessly connected *within a single device*. Instead, similar to the disclosure in Figure 3 of Glass, the '622 Patent figure uses a single arrow to depict the connection between a digitizer (A/D converter 23, which digitizes the signal from CCD 22) and a memory (buffer memory 24), as shown in Figure 2 above. A POSITA would have understood that this single arrow indicates that the output of A/D converter 23 is connected to the input of buffer memory 24 using leads and

traces, not by using a wireless transmitter and wireless receiver. A POSITA would have understood this because these two components are part of the same device, so there is no reason whatsoever to use a wireless connection instead of leads and traces.

25. I strongly disagree with Mr. Davis's suggestion that a POSITA would have considered implementing Glass's imaging system 4 or Rieger's digital camera with a connection from the optical sensor going to a transmitter inside the device so that it could send a wireless signal to a wireless receiver connected to the memory in the same device. A POSITA would **not** have understood the arrows in Glass's Figures 2 and 3 or Rieger's Figure 3 to illustrate a wireless connection between the image sensor and the memory. A POSITA would have realized that one could instead (1) directly connect the digital output of the CCD or CMOS sensor disclosed by Glass to the input of frame store memory 43 using leads and traces; and (2) directly connect the sensor, CPU, and RAM disclosed by Rieger using leads and traces. In either case, this would eliminate the wireless transmitter and the wireless receiver, thus reducing the component cost, power consumption, and overall size while improving performance and reliability.

26. Moreover, both Glass and Rieger are concerned with maintaining the security of image data. This is evidenced in Glass at least by the fact that the sensor, digitizer, and memory components are inside a "Tamper

Resistant/Responsive Packaging” and the statements in the background of the invention that a “biometric system can be defrauded if an attacker could substitute the raw image data” and an “attacker could gain access to the inside of the client system’s host and replace the contents of the memory or frame store containing the ‘real’ image data with the memory representation of a previously stored image” EX1005, 1:60-2:1, 2:13-20, 5:13-16, Fig. 3. Similarly, Rieger describes the CCD-Sensor, CPU, and RAM components being inside a “secure compartment” in an “electrical ‘protective shield’.” EX1006, 4. A POSITA would have understood that a wireless connection between an image sensor, such as a CCD or CMOS sensor, and a memory, such as Glass’s frame store or Rieger’s RAM, would be much less secure than the standard manner of connecting these digital components via leads and traces, because an attacker could wirelessly transmit a previously stored image to the wireless receiver connected to the input of the memory.

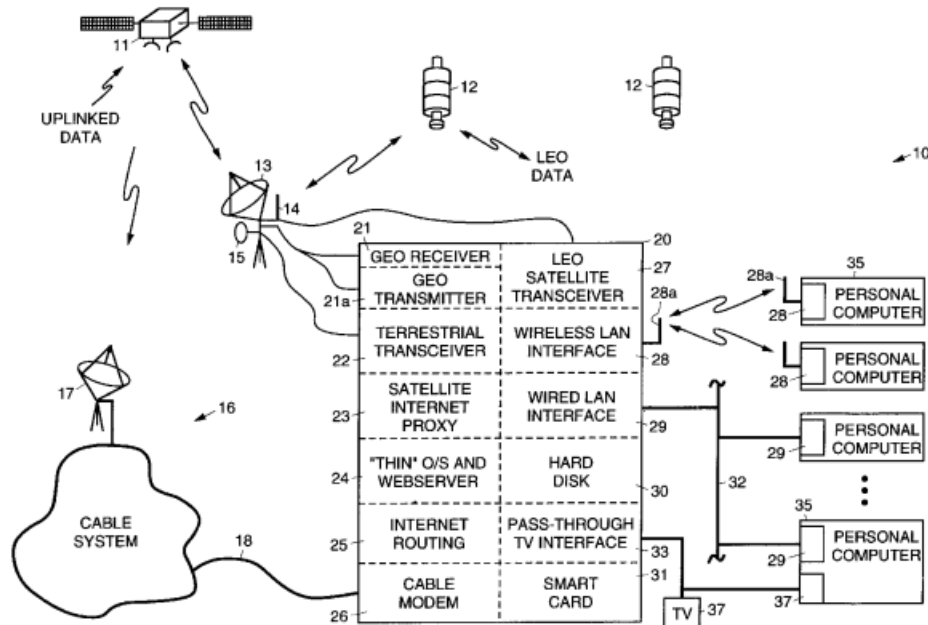
27. In my opinion, a POSITA would not have even considered implementing the connections between the optical sensor and the memory in Glass’s imaging system 4 or Rieger’s digital camera via wireless transmission as a viable option.

28. Further, Mr. Davis mentions certain WiFi standards. EX2005, ¶¶73, 95. The first digital cameras to include WiFi connectivity were introduced by Kodak and Nikon in 2005, several years after the ’828 Patent. These cameras

used WiFi to communicate with another device, such as a personal computer or a printer, not to transmit signals between components inside the same camera. I am not aware of any cameras that used WiFi to connect components inside the same camera.

IV. A POSITA WOULD NOT HAVE UNDERSTOOD GLASS OR RIEGER TO DISCLOSE CONNECTING THE OPTICAL SENSOR TO THE MEMORY VIA SATELLITE

29. Mr. Davis cites U.S. Patent 6,377,981 (EX2009), which he states discloses “a system providing high-speed internet access through satellite communication links.” EX2005, ¶¶74, 96. The figure below from the ’981 Patent depicts a “broadcast and interactive data distribution system 10,” which includes “a geostationary earth orbiting (GEO) satellite 11, and a constellation of low earth orbit (LEO) satellites 12....” EX2009, 2:43-47. The figure also illustrates “cyberstation 20,” which employs antennas 13, 14, and 15 to communicate with the satellites and distributes the data “to personal computers 35 located in residences and businesses.” EX2009, 2:58-3:10.



EX2009, 2 (Figure). The '981 Patent does not disclose or even suggest transmitting information from one component inside a device (such as a personal computer 35) to a satellite, which then transmits the information back to a second component inside the same device.

30. While I find it somewhat hard to believe, Mr. Davis seems to suggest that a POSITA would have considered implementing Glass's imaging system 4 or Rieger's digital camera with such a connection from the optical sensor to a satellite transmitter so that it could send a signal to a satellite which would then retransmit the signal back to a satellite receiver connected to the memory in the same device. A POSITA would **not** have understood Glass's Figures 2 and 3 or Rieger's Figure 3 to illustrate a satellite connection between the image sensor and memory in Glass's imaging system 4 or Rieger's digital camera. Indeed, the suggestion

borders on the absurd.

31. For one thing, it would require Glass's imaging system or Rieger's camera to have a satellite uplink including a first relatively large outdoor antenna and it would also require the imaging system to have a satellite downlink including a second outdoor antenna, which would receive the data that had just been transmitted from the very same device. A POSITA would have realized that one could instead use conductive leads and traces to connect the image sensor and memory to eliminate the satellite transmitter and receiver circuits and antennas, as well as the need for a satellite. This would reduce the component and operational costs and overall size while improving performance.

32. Moreover, as I mentioned above, Glass and Rieger are both concerned with maintaining the security of image data (EX1005, 1:60-2:1, 2:13-20, 5:13-16, Fig. 3; EX1006, 4), and a POSITA would have known that a satellite connection between an optical sensor and a memory would be far less secure than the standard manner of connecting digital components via leads and traces entirely inside the device.

33. In my opinion, a POSITA would not have even considered implementing the connections in Glass's imaging system 4 or Rieger's digital camera via satellite transmission as a viable option.

Acknowledgement of Oath

I declare that all statements made herein of 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 1101 of Title 18 of the United States Code.

Respectfully submitted,



Kenneth Parulski

Dated: September 5, 2025