

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

EARLY WARNING SERVICES, LLC,

Petitioner,

v.

INTELLECTUAL VENTURES II, LLC,

Patent Owner.

Case No. IPR2024-01221

U.S. Patent No. 7,314,167

**DECLARATION OF DR. KEVIN BERISSO
IN SUPPORT OF PATENT OWNER'S RESPONSE**

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	PROFESSIONAL BACKGROUND.....	2
III.	RELEVANT LEGAL STANDARDS	12
IV.	TECHNOLOGY FOR SCANNING BAR CODES AND CAPTURING IMAGES OF BAR CODES	17
	A. One-Dimensional Bar Code Formats.....	17
	B. Bar Code Laser Scanners	18
	C. Image Capture Devices For Scanning One-Dimensional Barcodes.....	22
	D. It Was Well Accepted That Barcode Laser Scanners And Barcode Image Capture Devices Were Different	24
	E. Two-Dimensional Barcode Formats	28
V.	SPECIFICATION OF ‘167 PATENT	30
VI.	CLAIMS OF ‘167 PATENT	33
VII.	PERSON OF ORDINARY SKILL IN THE ART	35
VIII.	CLAIM CONSTRUCTION.....	35
	A. “ <i>image capture device configured to capture an image</i> ” (claims 1 and 19) and “ <i>configuring a portable device to ... capture an image</i> ” (claims 23, 29 and 43)	35
	B. “the image having information embedded therein” (claims 1, 19, 23, 39 and 43)	39
IX.	THE PRIOR ART RELIED ON IN THE PETITION.....	41
	A. Wang	41
	B. Take An Order (TAO).....	43
	C. Drummond	44
	D. Palm Treo Manual (PTM).....	45
X.	GROUND I FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES	45

XI. GROUND II FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES	49
XII. GROUND III FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES	50
XIII. GROUND IV FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES	51
XIV. GROUND V FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES	52
XV. GROUND VI FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES	53
XVI. DECLARATION	55

I, Dr. Kevin Berisso, do hereby declare:

I. INTRODUCTION

1. I am making this declaration at the request of Intellectual Ventures II, LLC (“Intellectual Ventures”) in the matter of the *Inter Partes* Review (“IPR”) proceedings before the United States Patent and Trademark Office (“USPTO”) of U.S. Patent No. 7,314,167 (“the ‘167 Patent”) to provide expert technical opinions with respect to the ‘167 Patent.

2. I am being compensated for my work in this matter at my standard hourly rate for such consulting services. My compensation in no way depends on the outcome of this case, and I have no financial interest in the outcome.

3. In preparing this Declaration, I considered the following materials, the subject matter of which are all within the scope of my education and professional experience:

- The ‘167 Patent, Ex. 1001;
- The Petition for *Inter Partes* Review of U.S. Patent No. 7,314,167 (“Pet.”);
- the Declaration of Thomas Purves (Ex. 1002) filed with the Petition and the First Supplemental Declaration of Thomas Purvis (Ex. 1036);
- U.S. Patent No. Publication No. 2002/0023215 (Ex. 1004)(“Wang”);
- Take an Order (Ex. 1005)(“TAO”);
- Palm Treo Manual (Ex. 1006);

- U.S. Patent No. Publication No. 2003/0217005 (Ex. 1008)(“Drummond”);
- U.S. Patent No. Publication No. 2004/0193538 (Ex. 1009)(“Raines”);
- Patent Owner’s Response;
- the Institution Decision; and
- any other exhibits referred to in my Declaration.

II. PROFESSIONAL BACKGROUND

4. Based on my qualifications, education, knowledge, expertise, experience, and work background, I believe I am qualified to offer opinions relating to the technology described in the ‘167 Patent. Exhibit 2030 is a copy of my current *curriculum vitae* (“CV”), detailing my education and experience. Additionally, the following overview of my background pertains to my qualifications for providing expert testimony in this matter.

5. I received a Bachelor of Science degree in Industrial Technology from Ohio University in 1994. While at Ohio University, I took a number of computer science courses. Computer science courses I took included Introduction to Computing (FORTRAN), Computer Programming I, Computer Programming II and Unix & C in addition to an automatic identification class. A degree in Industrial Technology (now often called Engineering Technology) prepares the graduate to integrate various components to solve problems. Students are introduced to both

manufacturing and business processes, allowing them to quickly internalize current activities and be able to provide value-added improvements.

6. I received a Master of Science in Industrial Technology degree from Indiana State University in 1996. While at Indiana State University, I worked extensively with automation equipment and barcode equipment and continued to develop my programming and database background. A Master of Science in Industrial Technology can be best described as a refinement of the Bachelor of Science in Industrial Technology. The emphasis is on the application of standard manufacturing and business processes. Classes included advanced statistics, creativity and ideation, production planning, and automation integration. For my MS degree, I elected to do a major project which integrated barcoding as a method for the automatic routing of bins on a conveyor line.

7. I received a Doctorate of Philosophy in Technology Management from Indiana State University in 2003. While at Indiana State University, I continued to work with automation equipment, automatic identification equipment, and programming. I developed various small software solutions, worked with various programming environments, and continued to engage in various small consulting projects. A Doctorate of Philosophy in Technology Management with a Manufacturing Systems concentration focuses on the implementation and application of appropriate technologies to a given business challenge.

8. My Ph.D. dissertation addressed the ability of coordinate measuring machines (robotic measuring equipment) to repeatedly obtain measurements from a part that is placed in any orientation within the measurement envelope.

9. From 1996 to 1998, I worked for Applied Tactical Systems (“ATS”) of New Jersey doing barcode systems integration. ATS served Fortune 500 companies, providing them with custom warehouse management software. The software was used to ship, receive, count, move, and process materials within a company, often reporting the aggregate results to backend enterprise wide systems such as SAP. Activities included software programming, project management, system design, database design and management, system testing, technical support, and end-user training. With respect to system design, I was often responsible for converting business processes into functional program and database designs. As a part of this process, I would interact with customer representatives, obtaining needs directly from them in support of the agreements that were signed by both parties. From the database side, I often made recommendations and updates to the database designs, both during development and in the field. In terms of equipment, I would often determine the hardware needs for any changes in deliverables or for new enhancements that were requested.

10. In 1998, I joined Delphi Automotive (then a part of General Motors) as a manufacturing engineer. My job responsibilities included building machines for

manufacturing car batteries. As a part of this job, I was responsible for the evaluation of appropriate technologies, the design and building of the equipment, and the testing and training on the use of the equipment.

11. Over the years I have taught a wide range of topics including automatic identification (barcoding, magnetic stripe, biometrics, radio frequency identification, etc.), facilities layout, computer programming (Visual Basic, C#, Java), database design, data structures, computer usage (computer hardware, MS Word, MS Excel, MS Access, etc.), robotics, industrial automation (programmable logic controllers – PLCs), and industrial organization. During many of these classes I have included barcoding and RFID as topics, going as far back as when I taught the Industrial Organization class while working on my MS from Indiana State University. As a part of the robotics and automation class at Central Missouri State University (now the University of Central Missouri), I began development of an automatic identification lab (where AutoID is the primary research and/or educational objective) obtaining equipment and software from various companies. As can be seen from my CV, I have secured numerous hardware and software donations from a wide variety of companies allowing me to become familiar with a variety of software and products currently used in the industry.

12. In addition to my academic experience, I have a long history of consulting work. Since graduating from Ohio University in 1994, I have been

involved in industrial training and systems development. While working on my master's degree at Indiana State University, I engaged in computer aided design training and contract work. While working on my Ph.D., I engaged in various Automatic Identification and Data Capture ("AIDC") consulting opportunities including the development of custom AIDC based software. I performed computer programming training while working at Delphi Automotive.

13. Beginning when I returned to Ohio University in 2005, I became even more involved in consulting and technology transfer activities with a wider range of companies – providing information on barcode symbology selection, system design, and the integration of barcodes and radio frequency identification with external sensors and actuators.

14. I have authored numerous custom applications including standardized software packages that center on RFID. I wrote a software development kit ("SDK") – the software library that allows programs like Visual Basic and C# to talk to RFID hardware – for Microelectronics Technology Incorporated's ("MTI") RFID ME™ family of readers. As a part of this development, I was required to review and sign a licensing agreement that included both a non-disclosure provision and a derivative works provision. I have also authored custom translation software that allowed older, less sophisticated software that only works with COM objects to access current .NET libraries. More recently, I have developed software to help assign, track, encode, and

print enhanced tribal identification cards for the Native American tribes. As a part of this process, I was required to review and sign a Personal Services Agreement that specifically included a confidentiality agreement.

15. As of the writing of this report, I have developed AIDC solutions using multiple hardware vendors (Intermec, Matrix/Symbol Technology/Motorola Solutions, Alien Technology, MTI, Feig, Zebra, Honeywell) for a wide range of situations that range from simple data collection tools and asset tracking to RFID race management and tag validation. I have developed these solutions in various programming languages, and in some cases have developed solutions for customers in multiple programming languages. These solutions have saved data to databases as well as text and Excel files, and some have had the ability to generate complex reports showing trends and exceptions.

16. I have also written software to convert the GS1 EPCglobal¹ encoded data back to its base GS1 data (GTIN, serial number, etc.) that works in both

¹ GS1 EPCglobal is a suite of RFID based standards that are managed by GS1 (the group that is responsible for assigning UPC codes). This collection of standards includes how the RFID tags communicate, how to format (encode) the data, and how to share the data between business partners. EPCglobal is a collection of standards initially proposed by the Auto-ID Lab at MIT, which has become a driving reason for the low cost passive solutions that are currently available. GS1 owns the EPCglobal standard, which encompasses many of the GS1 standards that are often the key to successful retail and business-to-business relationships. In terms of RFID, the EPCglobal standard encompasses multiple frequencies and other supply chain

Microsoft Excel and in stand-alone applications. My software has been used by GS1 to demonstrate RFID functionality and has been part of a featured hardware demonstration on RFID.NET.

17. Furthermore, I have developed multiple electro-mechanical systems that have incorporated various sensors and vision systems. Specifically, I developed the image capture and motion control system for a 2D matrix symbology verification system that included NIST traceable reflectance and measurement capabilities in 2007 and then developed and programmed a NIST traceable linear barcode scanning verification system that scanned EAN/UPC and Code 128 barcodes in 2016.

18. In 2003, I began my official teaching career (as compared to teaching as a graduate student or short term instructor) at the University of Central Missouri (called Central Missouri State University at the time) where I taught automation and began my efforts at developing an AutoID Lab of my own.

19. In 2005, I returned to Ohio University and took over the Automatic Identification and Data Capture (AIDC) Lab. I was the Director of the AIDC Lab from 2005 until the spring of 2013, when I left Ohio University. The AIDC Lab engaged in education, research and technology transfer activities related to the

related tools, concepts and standards. However, it cannot be emphasized enough that EPCglobal is not a specific technology, but is instead a set of standards.

automatic identification industry. In addition to an automatic identification class and a radio frequency identification class, the AIDC Lab offered a week-long crash course into all of the AIDC technologies. While the director of the AIDC Lab, we conducted multiple barcode and RFID based tests. These tests included performance testing of multiple brands of RFID readers, testing various types of RFID tags, and testing RFID tag performance at -100 F°. Among the tested performed, I conducted testing on QR Code symbols that have been artistically modified to determine if they perform sufficiently such that an average smart phone equipped consumer would still be able to scan the symbol and performance testing on the Interleaved 2 of 5 barcode symbology, looking for the how often the symbology would potentially generate invalid data. Additional topics included a software programming, robotics class, and an industrial automation class.

20. In 2013, I moved to the University of Memphis where I currently teach automation classes, an automatic identification class, an advanced quality class, statistics, and the senior design class. I have also taught a database and data structures class (which includes programming in Java) and basic electronics. I also brought the AIDC lab from Ohio with me. The AutoID Lab at the University of Memphis has the same goals and activities that were done in Ohio. Current research areas have included big data, EPCIS, Bluetooth Low Energy, and the Internet of Things, passive real time locating systems (think in-door GPS), as well as

involvement with the RAIN RFID industry alliance (a group whose goal is to “drive[s] awareness and fosters market adoption of RAIN technology and supports the development of the RAIN brand.”)², the AIM RFID Experts Group (REG), and the AIM Technical Symbology Committee (the group that is involved with barcode standards). As a part of my research agenda, I conducted tests on 2D matrix symboliges, generating more than 23 million scans resulting in over 2.3 billion characters using various 2D barcode imagers. I also conducted work on a newer symbology called DotCode where I scanned over 12.6 million images using 2D barcode imagers as a part of a study that ultimately resulted in an update to the DotCode ISO/IEC specification.

21. In 2012, my work in Auto ID was honored by the automatic identification community as a whole through the presentation of the Ted Williams award. This award is given annually by AIM Global to a professor or student in recognition of innovative and exceptional contributions that can further the growth of the industry through his or her work as a teacher, researcher, and entrepreneur. In 2013, my efforts within the automatic identification industry were again recognized with my induction into the AIDC 100. The AIDC 100 is “a not-for-profit, self-

² RAIN Alliance FAQ. Available <https://rainrfid.org/mission-vision/>, last accessed Oct 15, 2023.

sustaining, non-political, international organization of automatic identification and data capture (AIDC) professionals and others who have significantly contributed to the growth and advancement of the industry.”³ Most of the members of this organization have been involved in the industry for over 30 years – and many have founded their own AIDC companies or developed technologies that are in use today.

22. My AutoID class is a combination of AutoID theory and practice. Lectures range from a technical discussion of how linear barcodes are read, how 2D matrix symbologies are read, how both are verified (graded), to when/where each should be used and how to store the information contained in databases. Lectures then continue onto the topics of radio frequency identification (RFID), biometrics, touch memory, and other AutoID technologies. Class activities include the configuration of various types of bar code scanners (linear, rastering, omnidirectional, imaging), various RFID readers, and the development of applications for the consumption of the data being produced by the hardware that is worked with. As I was able to acquire various pieces of equipment that became surplus (due to age), I was able to add industrial barcode scanning solutions to class that included high-end laser and 2D image scanning solutions that were designed for high-speed object motion (high speed conveyors).

³ <http://www.aidc100.org/>.

23. The automation classes I have taught, going as far back as 1995 during my MS degree work, have included the use of machine vision solutions for the capturing of images for use by the robots or PLCs for anything from metrology to physical location or even the reading of barcodes. As mentioned above, with access to older high-end laser and 2D image scanning solutions, I was able to integrate barcodes into my robotics and automation classes, requiring students to scan box identifiers for tracking and diversion purposes. As a result of this, I often included barcode discussions in my robotics and automation classes, ensuring that the students not only understood the AutoID technology, but how to use it to improve processes and accuracy.

24. I have served as an expert witness in 8 other automatic identification cases, in one industrial automation case, and am involved with various national and international technology committees.

III. RELEVANT LEGAL STANDARDS

25. I have been asked to provide my opinion as to whether: (i) Claims 1, 4, 5, 7, 12, 17, 23, 26, 27, 29, 34, and 43 of the '167 Patent are anticipated by Wang and obvious over Wang in view of Drummond as alleged in Ground 1 of the Petition; (ii) Wang anticipates Claims 1, 2, 4, 7, 12, and 17 of the '167 Patent as alleged in Ground II of the Petition; (iii) Claims 19-21 and 39-41 are obvious over Wang in view of Drummond as alleged in Ground III of the Petition; (iv) Claims 8 and 30 are obvious

over Wang and Denso as alleged in Ground IV of the Petition; (v) Claim 13 is obvious over Wang and Raines as alleged in Ground V of the Petition; and (vi) Claims 1, 4, 5, 7, 23, 26, 27, 29, and 43 are obvious over TAO in view of PTM and Wang as alleged in ground VI of the Petition.

26. The opinions I am expressing in this report involve the application of my knowledge and experience to the evaluation of certain references with respect to the ‘167 patent. My formal knowledge of patent law is no different than that of any lay person. Therefore, I have requested the attorneys from Volpe Koenig, who represent Intellectual Ventures, 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.

27. I understand that an IPR is a proceeding before the USPTO for evaluating the patentability of an issued patent’s claims based on prior-art patents and printed publications.

28. I understand that the claims of a patent are reviewed from the point of view of a hypothetical person of ordinary skill in the art (“POSITA”) at the time of the filing of the patent. The “art” is the field of technology to which a patent relates.

29. I understand that in determining whether a patent claim is anticipated or obvious in view of the prior art, the Patent Office must apply the *Phillips* standard to

construe the claims. Under that standard, the words of a claim are generally given their ordinary and customary meaning, which is the meaning that the term would have to a person of ordinary skill in the art at the time of the invention. I understand that inventors are typically persons skilled in the field of the invention and that patents are addressed to and intended to be read by others of skill in the pertinent art. The person of ordinary skill in the field of the invention through whose eyes the claims are construed is deemed to read the words used in the patent documents with an understanding of their meaning in the field, and to have knowledge of any special meaning and usage in the field. Because the meaning of a claim term as understood by persons of skill in the art may not be immediately apparent, and because patentees frequently use terms idiosyncratically, claim interpretation can involve looking to those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean. Those sources include the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.

30. I understand that, in this proceeding, Petitioners have the burden of proving that the challenged claims of the '167 Patent are unpatentable by a preponderance of the evidence. I understand that "preponderance of the evidence" means that a fact or conclusion is more likely true than not true.

31. I understand that there are two ways in which prior art may render a patent claim unpatentable. First, the prior art can “anticipate” the claim. Second, the prior art can render the claim “obvious” to a POSITA. I understand that for an invention claimed in a patent to be patentable, it must not be anticipated and must not be obvious based on what was known before the invention was made.

32. I understand that a patent claim may be invalid as “anticipated” under 35 U.S.C. § 102 if each and every limitation of the claim as construed by the court is found, either expressly or inherently, in a single prior art reference, such as a publication or patent, that predates the claimed subject matter. I understand that the mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency. Rather, the limitation at issue necessarily must be present in order to be inherently disclosed by the reference. Therefore, inherency cannot be established by the mere fact that something may happen. Instead, to be inherent, the alleged feature must necessarily be present in the cited reference.

33. I also understand that a patent claim may be invalid as obvious under 35 U.S.C. § 103 if the differences between the subject matter claimed and the prior art are such that the claimed subject matter as a whole would have been obvious to a POSITA at the time the invention was made. I also understand that several factual inquiries underlie a determination of obviousness. These inquiries include (1) the scope and content of the prior art, (2) the level of ordinary skill in the field of the

invention, (3) the differences between the claimed invention and the prior art, and (4) any objective evidence of non-obviousness (i.e., “secondary considerations”).

34. I also understand that, when a party alleges obviousness based on a combination of references, that party should identify a reason why a POSITA would have been motivated to combine the asserted references in the manner recited in the claims and to explain why a POSITA would have had a reasonable expectation of success in making such combinations.

35. I understand that an obviousness analysis permits the application of “common sense” in examining whether a claimed invention would have been obvious to a POSITA. For example, I understand that combining familiar elements according to known methods and in a predictable way may suggest obviousness when such a combination would yield nothing more than predictable results. And I understand a party asserting obviousness should still provide a specific motivation to combine the references as recited in the claims and explain why one would have reasonably expected to succeed in doing so.

36. I understand that one indicator of non-obviousness is when a prior art reference leads in a different direction or discourages that combination, recommends steps that would not likely lead to the patent’s result, or otherwise indicates that a seemingly inoperative device would be produced.

IV. TECHNOLOGY FOR SCANNING BAR CODES AND CAPTURING IMAGES OF BAR CODES

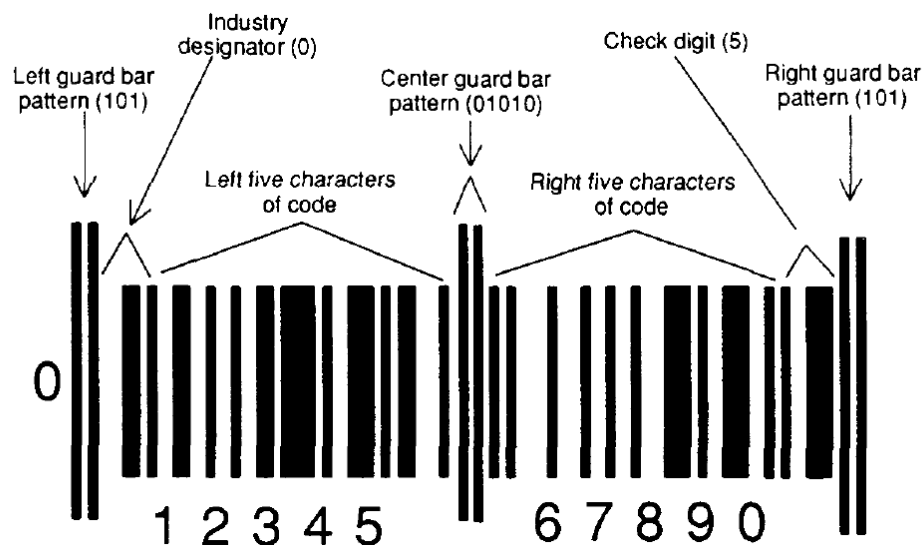
A. One-Dimensional Bar Code Formats

37. The '167 Patent identified two bar code formats including a “one-dimensional barcode, such as a linear barcode, or a multi-dimensional barcode, such as a 2D barcode.” Ex. 1001, 5:25-27. The most well-known one-dimensional (or linear) barcode symbology at the time the '167 Patent was filed (March, 2005) was the Universal Product Code (UPC), which was originally developed in the 1970s to identify retail items, such as items in a supermarket. “The bar code of a supermarket item consists of 11 digits and a check digit, which represent an identifying number but not a description of the product. For example, the price look-up must be accessed in a database keyed to the number in the bar code.” Ex. 2020, 1.

38. A one-dimensional barcode (like the UPC) stores “information along one dimension with intervals of alternating diffuse reflectivity, usually black and white color. The intervals are actually stored as rectangles The term bars denotes the rectangles with the foreground color while the term spaces denotes the intervals with the background color between the bars.” Ex. 2020, 2. In a one-dimensional barcode such as the UPC, the interval occupied by the barcode is subdivided into modules and each module is assigned a 1 or a 0. Modules assigned a 1 are “painted”

(typically in black) and form the bars, while modules assigned a 0 correspond to spaces. Ex. 2020, 2.

39. An exemplary UPC barcode is shown below:

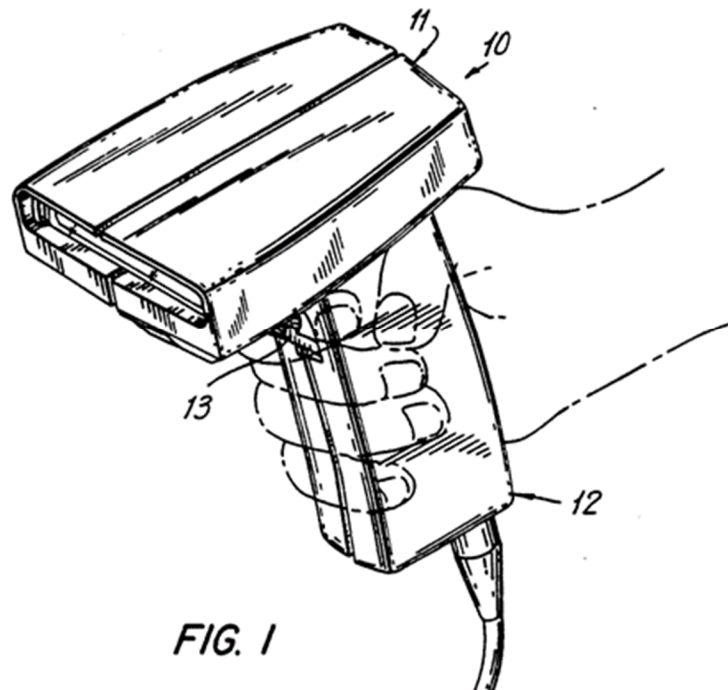


Ex. 2020, 4. The UPC barcode includes a left guard pattern 101, six digits of odd parity (including one digit denoting the industry type such as 0 for grocery or 3 for pharmaceutical), a center guard pattern, and six digits of even parity (including five digits with the item code and one check digit), and a right guard pattern 101. Ex. 2020, 3.

B. Bar Code Laser Scanners

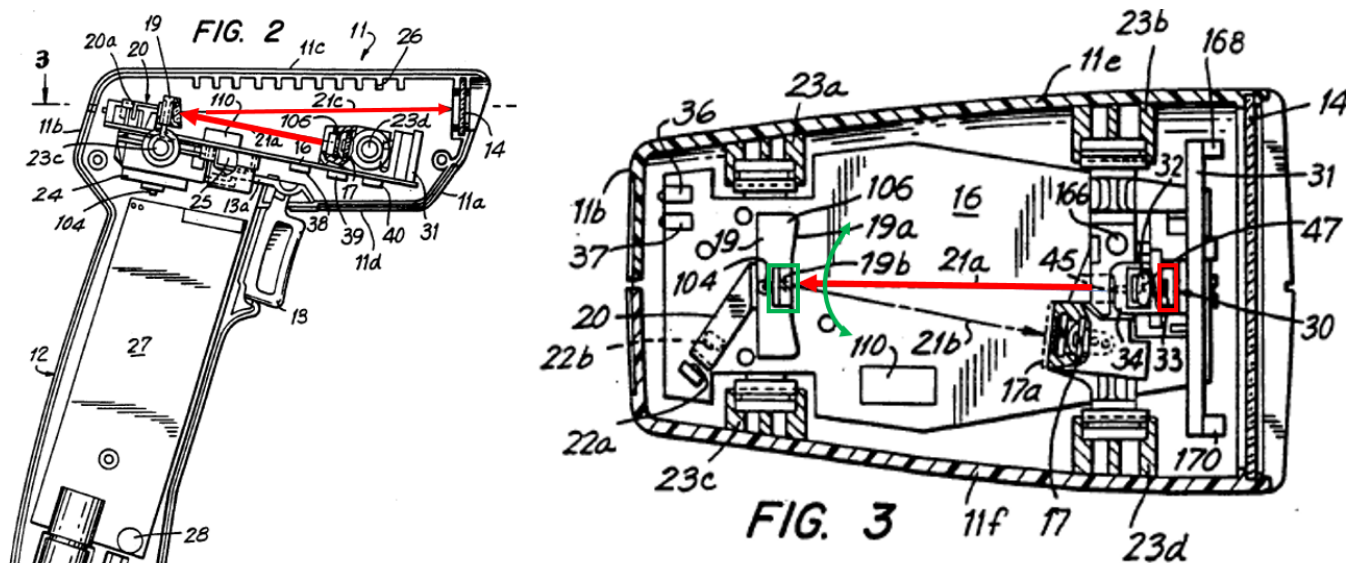
40. At the time of the '167 Patent (March 8, 2005), bar code laser scanners were ubiquitous in supermarkets and other retail stores, where they were used, *inter alia*, for scanning UPC codes on products as part of the store checkout process.

41. Below is an example of a classic hand-held barcode laser scanner from the time:



Ex. 2021, Figure 1. In order to use the device, an operator points the hand-held scanner at a barcode and depresses the manual trigger 13 to actuate the device. *Id.*, 7:16-17.

42. As shown in the cross-sectional diagrams of the hand-held scanner reproduced below, the laser scanner includes a laser light source 33 (red box below) that is actuated by the trigger. *Id.*, 7:40-43. The laser beam emitted by the source has “a beam cross-section resembling an oval.” *Id.*, 7:46-51. Light emitted from the laser diode follows the optical path represented by the red arrows, and exits the front of the hand-held scanner through window 14. *Id.*, 7:61-63.

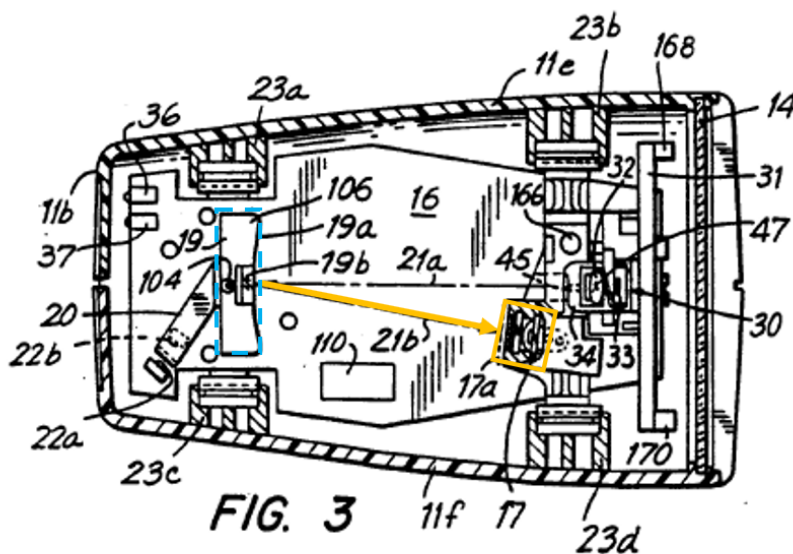
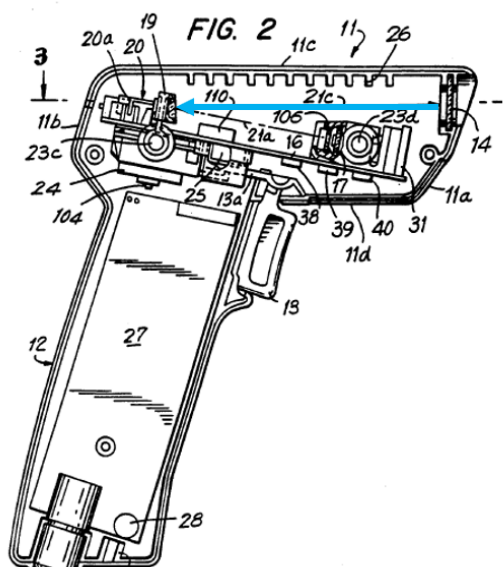


Ex. 2021, Figures 2 and 3 (annotations added). The laser beam emanating from the laser light source 33 (red box above) is initially directed toward a scanning mirror (green box above). A high-speed motor causes the mirror to oscillate about an arc such that that the scanning mirror sweeps the laser beam reflected by the mirror through (and exiting window 14) an angular arc of about 30° (corresponding to the green arc above) at a rate of about 20 scans or 40 oscillations per second. *Id.*, 8:63-9:14. The swept laser beam exits the laser scanner through the window 14, and is visible on the barcode being scanned, as shown below:

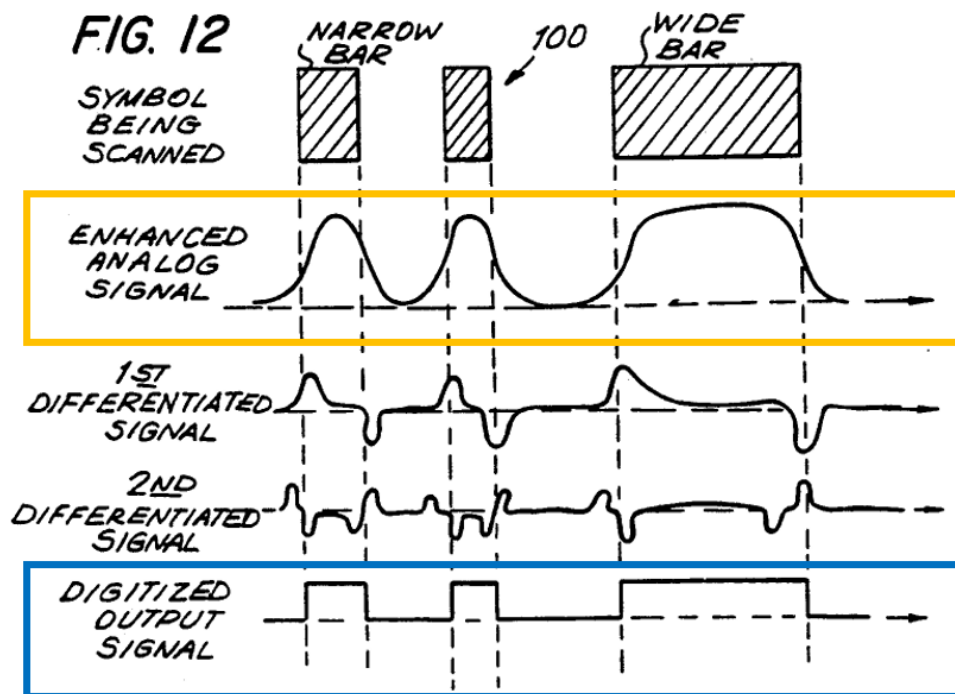


Although the laser beam corresponds to a singular oval-shaped spot on the barcode, the sweeping of laser beam back and forth across the barcode as a rate of 40 oscillations per second results in the appearance of a solid red line across the barcode during scanning.

43. Laser light hitting the barcode symbol reflects off the symbol as a specular component in one direction and as a scattered component in many directions. *Id.*, 8:6-10. The portion of the scattered laser light which returns along the optical path corresponding to the blue arrow (below) impinges upon a spherical collecting mirror (blue box below), which directs the returning light along the path corresponding to the orange arrow to a photosensor (orange box below). *Id.*, 9:15-27.



The photosensor (orange box above) detects the intensity of the collected laser light (which varies depending upon whether the laser light is reflecting off of a bar or a space in the bar code) and generates an electrical analog signal indicative of the detected variable light intensity, as illustrated in the orange box below. *Id.*, 9:27-32.

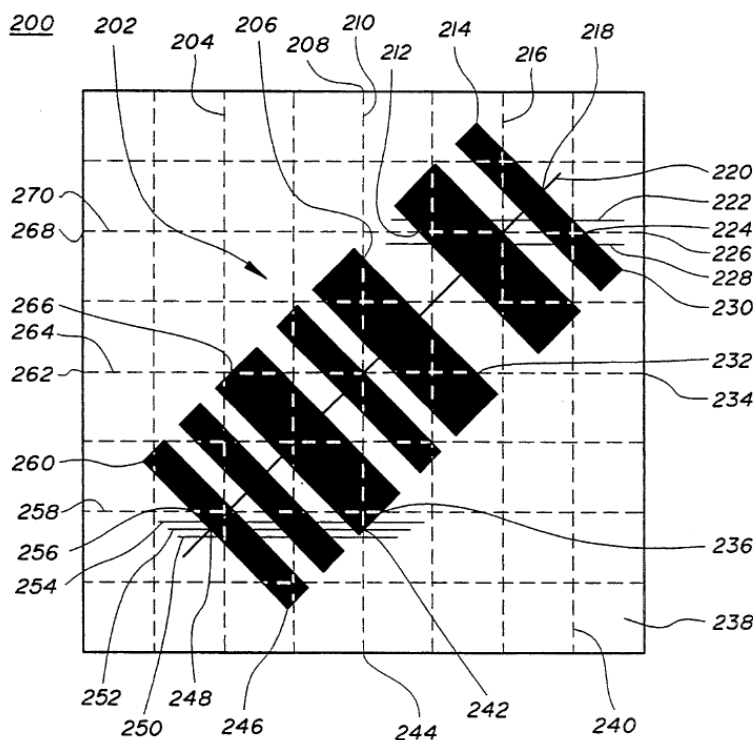


Id., Figure 12. The analog signal is processed and digitized to generate an electrical signal that corresponds to the bars and spaces in the barcode being scanned. *Id.*, 14:18-21.

C. Image Capture Devices For Scanning One-Dimensional Barcodes

44. In contrast to barcode laser scanners, image capture devices for scanning barcodes use a 2D CCD, or other sensor technology such as CMOS, camera

system to capture a pixel image that includes an image of a barcode. Ex. 2022, 1:23-25. An example of such a pixel image is reproduced below:



Ex. 2022, Figure 2. In a typical example, the pixel image shown above represents an imaged area that is 5.12 inches wide and 5.12 inches high, with each pixel representing an area that is 0.01 inch by 0.01 inch in size. *Id.*, 4:12-15. After the pixel image is captured by the CCD camera, an image processing system locates the corners of the bar code within the pixel image. *Id.*, 10:11-15. The four corners indicate the angular orientation of the barcode within the pixel image. The image processing system then decodes the bar code by stepping along the pixels forming

the image in a reference line crossing through the bars and spaces in the barcode represented in the image, and determining the alphanumeric characters represented by the bars and spaces. *Id.*, 8:23-33.

45. In contrast to a barcode laser scanner which simply sweeps a laser beam across the barcode itself and analyzes the intensity of the returned light, bar code image capture devices use a camera to first capture a pixel image containing the barcode and subsequently apply image processing to identify the location of barcode within the image. Image-based devices then step along pixels in the image representing the bars and spaces of the barcode to determine the information stored in the barcode.

46. Significantly, at the time of the ‘167 Patent, bar code image capture devices were used to read one-dimensional bar codes. Ex. 2022, Figure 2. As discussed more fully below, bar code image capture devices were also used at the time of the ‘167 Patent to read 2D barcodes.

D. It Was Well Accepted That Barcode Laser Scanners And Barcode Image Capture Devices Were Different

47. At the time of the ‘167 Patent, it was well accepted by those in the field of automatic identification that bar code laser scanners (on the one hand) and imaging (or image-based) barcode readers (on the other hand) operated differently and represented fundamentally different types of barcode readers. For example, one

group of inventors practicing in the area at the time of the '167 Patent characterized the state of the art as follows:

Most, if not all, conventional barcode readers use one of two general approaches to gathering data: either by using a flying-spot laser scanning technique, or by using an imaging technique. In flying-spot laser scanning systems, a beam of light is swept across a target barcode, and the reflected and/or refracted light from the target is detected and processed to decode the barcode. In imaging barcode readers, an image of the barcode is typically captured using an array of pixels (CCD or CMOS, for example), and the captured image is processed to decode the barcode. ...

Because both flying-spot and imaging readers have drawbacks, neither type is optimum for all situations. For example, imaging readers are best suited for situations in which the imaging head can be positioned very close to the target bar code. ...

On the other hand, a drawback of handheld flying-spot laser readers is that the scan line (i.e., the path traveled by the scanning spot across the target) must usually be aimed manually at the target barcode, with a relatively high degree of accuracy, for each scan.

A further drawback of flying-spot laser scanners is that it can be very difficult or even impossible to read two-dimensional barcodes. ... Reading a two-dimensional code with a flying-spot laser scanner is difficult or impossible. ... Ex. 2024, 1:19-2:9 (emphasis added).

48. The authors of the above, who were practitioners in the field, clearly understood that there were significant differences between barcode laser (flying-spot) scanners and imaging readers (based on image capture), referring to them as different types of barcode readers. Moreover, as set forth above, such practitioners referred to the "captured image" as the image captured by imaging bar code readers.

49. Others in the field at the time of the ‘167 Patent likewise identified the significant differences between “laser scanning based” barcode readers and “imaging-based” barcode readers:

Imaging-based bar code symbol readers have a number advantages over *laser scanning based bar code symbol readers*, namely: they are more capable of reading stacked 2D symbologies, such as the PDF 417 symbology; more capable of reading matrix 2D symbologies, such as the Data Matrix symbology; more capable of reading bar codes regardless of their orientation; have lower manufacturing costs; and have the potential for use in other applications, which may or may not be related to bar code scanning, such as OCR, security systems, etc. ...

Prior art *imaging-based bar code symbol readers* generally require *capturing* multiple frames of *image data* of a bar code symbol, and special apparatus for synchronizing the decoding process with the *image capture* process within such readers ...

Prior art *imaging-based bar code symbol readers* generally require large arrays of LEDs in order to flood the field of view within which a bar code symbol might reside during *image capture* operations, ...

Prior art *imaging-based bar code symbol readers* generally require processing the entire pixel data set of *capture images* to find and decode bar code symbols represented therein. ... Ex. 2025, 3:4-49 (emphasis added).

50. Again, the authors of the above, who were practitioners in the field, clearly understood that laser based scanning barcode readers and imaging-based bar code readers were different types of devices, and referred to “*image capture*” (or

“capturing ... image data” or “image capture operations”) solely in connection with imaging-based bar code readers.

51. Still others in the field at the time of the ‘167 Patent referred to “laser scan engine” based readers and “image sensor based” barcode readers as different classes of barcode readers:

Optical readers tend to fall into one of three classes: wand readers, laser scan engine optical readers and image sensor based optical readers. ...

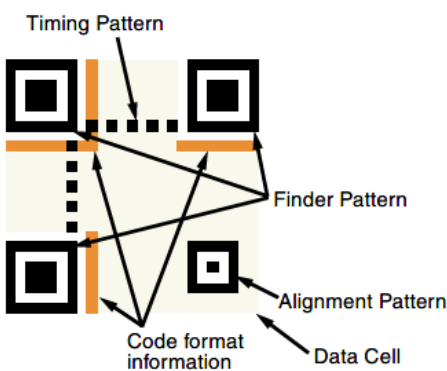
Laser scan engine based optical readers comprise a laser diode assembly generating a laser light beam, a moving mirror for sweeping the laser light beam across a decodable symbol and a signal is generated corresponding to the decodable symbol.

Image sensor based optical readers comprise multielement image sensors such as CID, CCD, and CMOS image sensors and an imaging optic for focusing an image onto the image sensor. ... Image sensor based optical readers are more durable and offer additional features relative to laser scan engine based bar code readers. One function which has been incorporated into image sensor based optical readers is a picture taking function. Optical readers have been developed which can both take pictures and decode decodable symbols represented in captured image data. Ex. 2026, 1:19-47.

52. Again, it is clear that practitioners in the field at the time of the ‘167 Patent understood that laser based scanning barcode readers and imaging-based bar code readers were different classes of devices, and referred to a “captured image” solely in connection with image-based readers.

E. Two-Dimensional (2D) Barcode Formats

53. In addition to one-dimensional barcodes like the UPC code described above, the ‘167 Patent identified “a multi-dimensional barcode, such as a 2D barcode.” Ex. 1001, 5:26-27. The most ubiquitous 2D barcode format at the time of the ‘167 Patent was the QR Code, examples of which were depicted in, e.g., Figures 3-6 of the ‘167 Patent. An example of a QR Code is reproduced below:

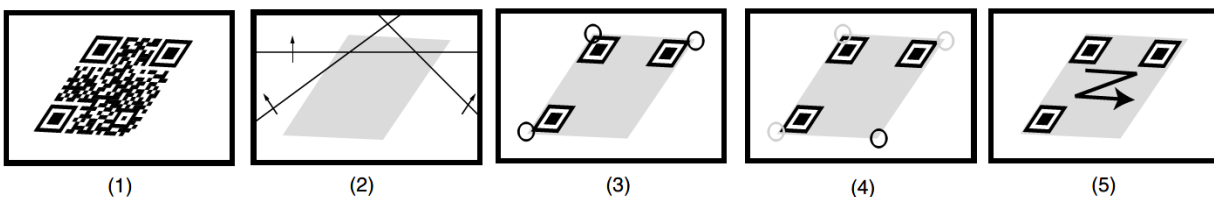


Ex. 2023, 3. A QR Code typically includes a finder pattern for locating the QR Code within a 2D pixel image, a timing pattern, format information and an alignment pattern. Ex. 2023, 2-3.

54. Barcode laser scanners “are ill-suited for reading two dimensional codes” such as a QR Code. Ex. 2022, 1:16-18; Ex. 2024, 2:8-9 (“Reading a two-dimensional code with a flying-spot *laser scanner* is *difficult or impossible....*”) In fact, to my knowledge, at the time of the ‘167 Patent, there was no commercially available laser scanner with the capability of reading 2D codes such as the QR Codes illustrated in Figures 3-6 of the ‘167 Patent. Rather, an image capture device is

required to read a 2D code such as a QR Code. Such devices first capture a 2D pixel image containing the QR Code and subsequently apply image processing to identify the location and orientation of the QR Code within the image and scan pixels in the image representing the code.

55. A typical image capture device for reading QR Codes begins by using a camera to capture a 2D pixel image (which may be skewed) that includes an image of the QR Code. Ex. 2023, 3. The input image (leftmost image, below) is then processed in the five steps illustrated below so that the decoder can correctly process the potentially skewed image:



Ex. 2023, Figure 4. In step (1), preprocessing is applied to the input image. Next, an image processing algorithm performs rough corner detection (step (2)) and the three marked corners of the QR Code as shown in step (3) are defined. In step (4), the fourth corner is detected. Finally, in step (5), the area that the QR Code occupies is scanned and a normalized version of the QR Code is generated for decoding. After step (5) the QR Code is decoded in accordance with the ISO/IEC standard. *Id.*

56. Again, in contrast to a barcode laser scanner which simply sweeps a laser beam across a one-dimensional barcode and analyzes the intensity of the

returned light, image capture devices use a camera to first capture a pixel image containing the code (e.g., a QR Code) and subsequently apply image processing to identify the location of QR Code within the image and step along pixels in the image representing the cells of the code to determine the information stored in the code.

V. SPECIFICATION OF ‘167 PATENT

57. The first paragraph of the Summary of the ‘167 Patent recites an image capture device:

An apparatus for providing a secure transaction is disclosed. In one embodiment, the apparatus includes an image capture device configured to capture an image having information embedded therein, a memory configured to store predetermined information, an input unit configured to receive input information provided by a user, a processor configured to: verify the user based on the input information to ensure that the user is authorized to use the apparatus, and generate an output based on the information embedded in the image and the predetermined information, and an output unit configured to forward the output generated by the processor. Ex. 1001, 3:17-28 (emphasis added).

58. The general embodiment depicted in Figure 1 of the ‘167 Patent (shown below) illustrates the basic components of the secure device 100 disclosed in the specification. “The secure device 100 may include a processor 100, an image capture device or circuit 120, an input unit 130, an output unit 140 and a memory 150.” Ex. 1001, 5:8-11 (emphasis added).

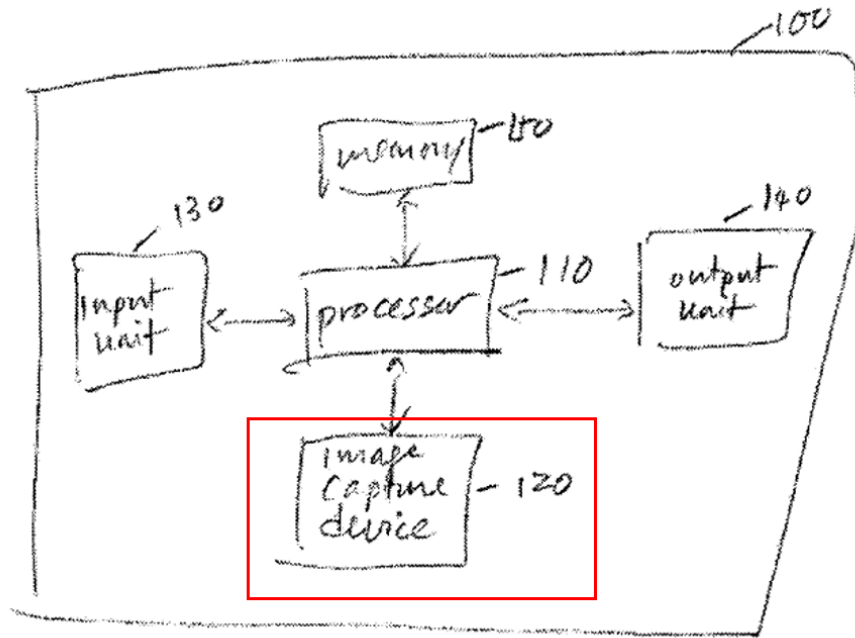


FIG. 1

Ex. 1001, Figure 1 (red annotation added).

59. The '167 Patent went on to describe the image capture device (or circuit)

120 as follows:

The image capture circuit 120 may include a digital camera or other types of image capturing devices. The image capture circuit 120 is used to capture image and/or video information. The captured image and/or video information may include a barcode including an one-dimensional bar code, such as a linear barcode, or a multi-dimensional barcode, such as a 2D barcode, multiple barcodes in a single image or multiple barcodes in multiple images where multiple images form a stream of images or a video. As will be further described below, the captured image and/or video information is used and processed for a number of different purposes. Ex. 1001, 5:21-32 (emphasis added).

60. Next, in describing the general embodiment of the invention, the ‘167 Patent explains that the image capture circuit 120 captures either a still image or a moving stream of images.

The secure device 100 generally operates in the following manner, as shown in FIG. 2. At block 200, the secure device 100 via the image capture circuit 120 captures information on a still or moving image or a stream of images. ...

At block 220, the secure device 100 via the processor 110 decodes the captured image or video and extracts the relevant embedded information. Ex. 1001, 5:47-50 and 6:8-10.

61. Every barcode illustrated in the figures of the ‘167 Patent is a 2D barcode in the format of a QR Code:

<u>Figure of ‘167 Patent</u>	<u>Illustrated code(s)</u>	<u>Figure of ‘167 Patent</u>	<u>Illustrated code(s)</u>
3		9	
4		10	
5		11	
6		12	
7			

62. As explained above, it was understood by those of skill in the art at the time of the ‘167 Patent that it was impossible to read 2D codes like the QR Codes

illustrated in the ‘167 with laser-based barcode scanners. Ex. 2022, 1:16-18 (Barcode laser scanners “are ill-suited for reading two dimensional codes”); Ex. 2024, 2:8-9 (“Reading a two-dimensional code with a flying-spot laser scanner is difficult or impossible...”) Unsurprisingly, the ‘167 Patent never mentions laser-based barcode scanners. In fact, the term “laser” is completely absent from the entirety of the ‘167 Patent.

63. A person of ordinary skill in the art at the time would have understood the disclosure in the ‘167 Patent of an “image capture device” for capturing “a still or moving image” and a processor that “decodes the captured image” corresponded to an imaging-based bar code reader, which was different from a laser-based barcode scanner. Ex. 1001, 3:17-19; 5:47-50; 6:8-10. As noted above, practitioners in the field at the time of the ‘167 Patent understood that imaging-based bar code readers and laser-based scanning barcode readers were different classes of devices, and referred to a “captured image” solely in connection with image-based readers. Ex. 2024, 1:19-2:9; Ex. 2025, 3:4-49; Ex. 2026, 1:19-47.

VI. CLAIMS OF ‘167 PATENT

64. Claim 1 of the ‘167 Patent recites as follows:

1. An apparatus for providing a secure transaction, the apparatus comprising:
an image capture device configured to capture an image, the image having information embedded therein including information relating to a transaction;

a memory configured to store predetermined information;
an input unit configured to receive input information provided by a user;
a processor configured to:
verify the user based on the input information to ensure that the user is
authorized to use the apparatus; and
generate an output based on the information embedded in the image and
the predetermined information; and
an output unit configured to forward the output generated by the
processor, wherein
the output includes a digital signature to be used to signify authorization
by the user with respect to the transaction.

65. Independent claim 1 recites an “an image capture device configured to capture an image,” and a processor configured to “generate an output based on the information embedded in the image.” Like the image-based bar code readers discussed above, claim 1 contemplates a process where an image capture device initially captures an image containing the code after which image processing is applied to the captured image in order to generate an output.

66. A person of ordinary skill at the time of the ‘167 Patent reading the claims in light of the specification would have understood the recitation in claim 1 of an “image capture device configured to capture an image” in combination with a processor configured to “generate an output based on the information embedded in the image,” to be referring to an imaging-based bar code reader and not a laser-based barcode scanner. Practitioners in the field at the time of the ‘167 Patent used the terms “image capture” and “captured image” as recited in claim 1 only in

connection with image-based readers. Ex. 2024, 1:19-2:9; Ex. 2025, 3:4-49; Ex. 2026, 1:19-47.

67. Like claim 1, independent claim 19 similarly recites “an image capture device configured to capture an image” and a processor configured to “generate an output based on the information embedded in the image.” Independent claims 23, 39 and 43 recite comparable limitations in method format, namely, “configuring a portable device to ... capture an image” and “generate an output based on the information embedded in the image.”

VII. PERSON OF ORDINARY SKILL IN THE ART

68. A person of ordinary skill in the art (“POSITA”) pertinent to the ‘167 Patent would have had at least a bachelor’s degree in the field of computer science and/or electrical engineering, engineering technology/industrial engineering, together with at least 2-3 years of experience in the use of Automatic Identification (Auto ID) technology and, in particular barcode technology, in connection with financial transactions.

VIII. CLAIM CONSTRUCTION

A. “*image capture device configured to capture an image*” (claims 1 and 19) and “*configuring a portable device to ... capture an image*” (claims 23, 29 and 43)

69. A person of ordinary skill at the time of the ‘167 Patent reading the claims in light of the specification would have understood the recitation in claims 1

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and 19 of an “image⁴ capture device configured to capture an image” in combination with a processor configured to “generate an output based on the information embedded in the image,” to be referring to an imaging-based bar code reader and not a laser-based barcode scanner. Similarly, a person of ordinary skill at the time of the ‘167 Patent reading the claims in light of the specification would have understood the recitation in claims 23, 29 and 43 of “configuring a portable device to ... capture an image” and “generate an output based on the information embedded in the [captured] image” to be referring to an imaging-based bar code reader and not a laser-based barcode scanner.

70. At the time of the ‘167 Patent, it was well accepted by those in the field of automatic identification that bar code laser scanners (on the one hand) and imaging (or image-based) barcode readers (on the other hand) operated differently and represented fundamentally different types of barcode readers. One group of

⁴ An image is “a visual representation of something: such as (1) a likeness of an object produced on a photographic material [or] (2) a picture produced on an electronic display (such as a television or computer screen).” Ex. 2012, Merriam Webster. The dictionary definition of image is consistent with the usage of the term in the ‘167 Patent which states that “the image capture circuit 120 captures information on a still or moving image or a stream of images.” Ex. 1001, 5:49-50 (emphasis added).

practitioners at the time of the ‘167 Patent characterized the state of the art as follows:

Most, if not all, conventional barcode readers use one of two general approaches to gathering data: either by using a flying-spot laser scanning technique, or by using an imaging technique. In flying-spot laser scanning systems, a beam of light is swept across a target barcode, and the reflected and/or refracted light from the target is detected and processed to decode the barcode. In imaging barcode readers, an image of the barcode is typically captured using an array of pixels (CCD or CMOS, for example), and the captured image is processed to decode the barcode. ...

Because both flying-spot and imaging readers have drawbacks, neither type is optimum for all situations. For example, imaging readers are best suited for situations in which the imaging head can be positioned very close to the target bar code. Ex. 2024, 1:19-39 (emphasis added).

71. These practitioners clearly understood that there were significant differences between barcode laser (flying- spot) scanners and imaging readers (based on image capture). In fact, the authors referred to barcode laser scanners and imaging readers as different types of barcode readers, and referred to the “captured image” as the image captured by imaging bar code readers.

72. Other practitioners at the time likewise discussed that “laser scanning based” barcode readers were different from “imaging-based” barcode readers:

Imaging-based bar code symbol readers have a number advantages over laser scanning based bar code symbol readers, ...

Prior art imaging-based bar code symbol readers generally require capturing multiple frames of image data of a bar code symbol, and special apparatus for synchronizing the decoding process with the image capture process within such readers ...

Prior art imaging-based bar code symbol readers generally require large arrays of LEDs in order to flood the field of view within which a bar code symbol might reside during image capture operations, ...

Prior art imaging-based bar code symbol readers generally require processing the entire pixel data set of capture images to find and decode bar code symbols represented therein. ... Ex. 2025, 3:4-49 (emphasis added).

73. Again, these practitioners understood that laser based scanning barcode readers and imaging-based bar code readers were different types of devices, and referred to “image capture” (or “capturing ... image data” or “image capture operations”) solely in connection with imaging-based bar code readers.

74. Still other practitioners referred to “laser scan engine” based readers and “image sensor based” barcode readers as different classes of barcode readers:

Optical readers tend to fall into one of three classes: wand readers, laser scan engine optical readers and image sensor based optical readers. ...

Laser scan engine based optical readers comprise a laser diode assembly generating a laser light beam, a moving mirror for sweeping the laser light beam across a decodable symbol and a signal is generated corresponding to the decodable symbol.

Image sensor based optical readers comprise multielement image sensors such as CID, CCD, and CMOS image sensors and an imaging optic for focusing an image onto the image sensor. ... Image sensor based optical readers are more durable and offer additional

features relative to laser scan engine based bar code readers. ... Ex. 2026, 1:19-47.

75. Thus, it is clear that practitioners in the field at the time of the ‘167 Patent understood that laser based scanning barcode readers and imaging-based bar code readers were different classes of devices, and referred to a “captured image” solely in connection with image-based readers.

76. Accordingly, a person of ordinary skill at the time of the ‘167 Patent reading the claims in light of the specification would have understood the recitation in claims 1 and 19 of an “image capture device configured to capture an image” in combination with a processor configured to “generate an output based on the information embedded in the image,” to be referring to an imaging-based bar code reader and not a laser-based barcode scanner. Similarly, a person of ordinary skill at the time of the ‘167 Patent reading the claims in light of the specification would have understood the recitation in claims 23, 29 and 43 of “configuring a portable device to ... capture an image” and “generate an output based on the information embedded in the [captured] image” to be referring to an imaging-based bar code reader and not a laser-based barcode scanner.

B. “the image having information embedded therein” (claims 1, 19, 23, 39 and 43)

77. In the Institution Decision, the Board determined that the term “embedded” should be given its “plain and ordinary meaning,” but did not articulate

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the specifics of what constitutes the plain and ordinary meaning of “embedded” to a person of ordinary skill at the time of the ‘167 Patent reading the claims in light of the specification. Institution Decision, at 17. However, the Board credited Mr. Purves testimony that “the transaction information derived from the barcode” constitutes “embedded information.” *Id.*, at 15 (emphasis added). In this regard, Mr. Purves testified that “it is my opinion that the plain and ordinary meaning of “embedded” includes information contained in any barcode.” Ex. 1036, ¶8 (emphasis added). I understand that Patent Owner accepts Mr. Purvis’s opinion that “embedded” information includes information contained in any barcode.” However, a person of ordinary skill in the art at the time of the ‘167 Patent would have understood that human readable text information in the form of unencrypted human-readable alphanumeric characters is outside the scope of “embedded” information.

78. The understanding of a person of ordinary skill in the art at the time of the ‘167 Patent that human readable text is not “embedded” information is consistent with the specification of the ‘167 Patent, which never uses the term “embedded” to refer to human readable text. This position is also consistent with the dictionary definition of “embedded,” which defines something as being “embedded” when it is “incorporated into something else as an essential characteristic.” Ex. 2021, 1 and *see also* Ex. 2022, 1 (defining “embedded” as functioning as part of a larger device rather than as an independent unit or system.”) In this respect, Mr. Purvis’s opinion

that “embedded” information includes information contained in any barcode is in keeping with dictionary definition which defines something (e.g., information) as being “embedded” when it is “incorporated into something else” (e.g., a barcode). Ex. 1036, ¶8 (emphasis added).

79. Unlike a barcode where information is embedded into the bars and spaces of a barcode, human readable text in the form of unencrypted human readable alphanumeric characters is not embedded into (or incorporated into) something else. Accordingly, a person of ordinary skill at the time of the ‘167 Patent reading the claims in light of the specification would have understood that human readable text in the form of unencrypted human readable alphanumeric characters is not “embedded” information.

IX. THE PRIOR ART RELIED ON IN THE PETITION

A. Wang

80. Grounds I-V rely on Wang (Ex. 1004) as either the sole or primary reference. Wang discloses “a portable electronic authorization device (PEAD) carried by a user.” Ex. 1004, Abstract. In one embodiment (the one relied on in the Petition), the PEAD is used as a “self-checkout terminal.” Ex. 1004, [0115]; Pet., 33-34. In this embodiment, the PEAD includes a barcode scanner for scanning UPC barcodes:

Another implementation of Point-of-Sale Transaction is to use PEAD as self checkout terminal. By entering the UPC code or barcode using keypad on the PEAD or scanning in the UPC code or barcode using the input device built into the PEAD such as a barcode scanner or OCR reader, the PEAD can generate the receipt with the list of item prices through the wireless network and Internet by querying the item price using the barcode as the index for price lookup table which is stored in a server system. The PEAD user can sign the receipt electronically using PEAD Ex. 1004, [0115] (emphasis added).

81. In the emphasized language from the paragraph above , Wang distinguishes “the UPC code” and “a barcode,” stating that the user could either enter the “UPC code” or a “barcode.” Below is an example of a “UPC code or barcode” as described in paragraph [0115] of Wang:



As shown above, a standard UPC barcode typically include bars and spaces (green box above), as well as numeric characters in human readable text form (red box) positioned below the bars and spaces. A POSITA reading [0115] of Wang would have understood that it discloses that the “UPC code” (human readable text) can be

entered by (i) entering the UPC code (human readable text) using a keypad, or (ii) scanning the UPC code (human readable text) with an OCR (optical character recognition) reader. A POSITA reading [0115] of Wang would not only have also understood that the only method disclosed in [0115] for reading the “barcode” (bars and spaces) was to scan the barcode with a barcode scanner, but would instinctively have used a linear barcode scanner. To the POSITA, the explicit discussion of “point of sale” and UPC would drive them to the use of a linear barcode scanner, and the intentional avoidance of a barcode imager due to the cost differences between the two devices. The POSITA would read the Wang patent and would instinctively look to include a linear barcode scanner due to their knowledge of the types of barcodes being used on retail items - UPC/EAN barcodes, which are linear, one dimensional barcodes.

With respect to the barcode scanner, Wang does not disclose the type or class of barcode scanner used for scanning the barcode.

B. Take An Order (TAO)

82. Ground VI relies on Take An Order (Ex. 1005) as the primary reference. TAO describes point-of-sale software for the Palm devices whereby a vendor can take orders from customers at, for example, a trade show. Ex. 1005, 1-2. Certain PalmOS devices compatible with the TAO software included a bar code scanner that the vendor could use to scan items to generate an order. *Id.* The software includes a

popup which lets the vendor key in the customer's name, credit card number and expiration date. *Id.*, at 2. The software includes the capability to print receipts, quotations, invoices and delivery reports by connecting to a variety of printers. *Id.*, at 3.

83. The Petition (at 65) relies on TAO's barcode scanning capability, which TAO describes as follows:

Point-of-sale Software for the Palm Computing Platform

Are you selling products at trade shows or expos? Taking orders from customers in their home or office? Submitting bids or issuing quotations in a field situation? Delivering product and need to issue a receipt? For all these situations and more, **Take An Order!** is the handheld tool you need. Combined with any Palm Computing platform handheld device including barcode scanning SPT units from Symbol Technologies and a portable printer like the Canon BJC-55 or Brother MPrint, **Take An Order!** gives you an office that travels with you.

* * *

If you're equipped with a Symbol SPT PalmOS handheld with its built-in barcode scanner, it's even easier! Just point the scanner at the product, press the scan button, and the item is added to the order!

Ex. 1005, at 1-2 (red underlining added). The SPT units from Symbol Technologies identified in TAO are barcode laser scanners. See, e.g., Ex. 2009, Symbol SPT 1800 Series Product Reference Guide, at 109 ("The SPT 1800 has an integrated bar code laser scanner"); Ex. 2010, Symbol SPT 1700 Series Product Reference Guide, at 108 ("The SPT 1800 has an integrated bar code laser scanner.")

C. Drummond

84. The Petition relies on Drummond as disclosing that, in addition or alternatively to receiving paper receipts, electronic receipts may be sent to one or more devices via e-mail and/or text message. Pet., 28; *citing* Ex. 1008, [0246]-[0251], [0301] and [0307].

D. Palm Treo Manual (PTM)

85. The Petition relies on the Palm Treo Manual (PTM) to show that Palm Treo devices included an internal memory, a processor, a keyboard and system locks that required a password to be entered on the device prior to accessing data stored on the device. Pet., 27, *citing*, Ex. 1006 at 24, 97, 109, 112, 129 and 173.

X. GROUND I FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES

86. Ground I alleges that claims 1, 4, 5, 7, 12, 17, 23, 26, 27, 29, 34 and 43 are anticipated by Wang and obvious over Wang in view of Drummond.

87. In Ground I, the Petition relies on paragraph [0115] of Wang with respect to the claim limitations reciting an “image capture device configured to capture an image” and a processor configured to “generate an output based on the information embedded in the image” as recited in independent claim 1, and “configuring a portable device to ... capture an image” and “generate an output based on the information embedded in the image” as recited in independent claims

23 and 43. Pet., 33 and 35 (claim 1 mapping); 38 and 40 (claim 23) and 43 (claim 43).

88. As explained above, a person of ordinary skill at the time of the ‘167 Patent reading the claims in light of the specification would have understood the recitation in claim 1 of an “image capture device configured to capture an image” in combination with a processor configured to “generate an output based on the information embedded in the image,” to be referring to an imaging-based bar code reader and not a laser-based barcode scanner. Similarly, a person of ordinary skill at the time of the ‘167 Patent reading the claims in light of the specification would have understood the recitation in claims 23 and 43 of “configuring a portable device to ... capture an image” and “generate an output based on the information embedded in the [captured] image” to be referring to an imaging-based bar code reader and not a laser-based barcode scanner. Practitioners in the field at the time of the ‘167 Patent used the terms “image capture” and “captured image” and “capture an image” as recited in such claims only in connection with image-based readers. Ex. 2024, 1:19-2:9; Ex. 2025, 3:4-49; Ex. 2026, 1:19-47.

89. Wang at [0115] fails to expressly or inherently disclose an imaging-based barcode reader. While Wang at [0115] discloses a barcode scanner, Wang is wholly silent as to the type or class of barcode scanner used for scanning the barcode. Thus, Wang does not expressly disclose an imaging-based barcode reader. Nor is

an imaging-based barcode reader inherent in Wang, as Wang's barcode scanner could have been implemented with a barcode laser scanner (which is not an imaging-based barcode reader.) Simply put, since there is no requirement in Wang that its barcode reader must be an imaging-based barcode reader, an imaging-based barcode reader is not inherently disclosed in Wang.

90. The OCR reader disclosed in Wang also fails to meet the claim language. As explained above, Wang discloses the use of an OCR (optical character recognition) reader for scanning the UPC code human readable text positioned below the bars and spaces in the barcode. Also as set forth above, such human readable text does not constitute embedded information. By contrast, independent claims 1, 23 and 43 all require generation of “an output based on the information embedded in the image.” Therefore, even if Wang's OCR device functioned to capture an image of the human readable text under the bars and spaces, the captured image would still fail to meet the claim limitation requiring that there be “information embedded in the image.”

91. Each of the remaining claims challenged in Ground I depends from either independent claim 1 or 23. Under Ground I, the Petition has failed to demonstrate that all of the claim limitations are met by the cited references with respect to any these dependent claims because the Petition has failed to demonstrate

that all of the claim limitations of the independent claim from which each such dependent claim depends are met by the cited references.

XI. GROUND II FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES

92. In Ground II, the Petition alleges Wang anticipates Claims 1, 2, 4, 7, 12, and 17. In Ground II, the Petition again relies on paragraph [0115] of Wang with respect to the claim limitations reciting an “image capture device configured to capture an image” and a processor configured to “generate an output based on the information embedded in the image” as recited in independent claim 1. Pet., 45-46. For the reasons discussed in connection with Ground I above, Wang at [0115] fails to meet the claim language because Wang at [0115] fails to expressly or inherently disclose an imaging-based barcode reader that captures an image with information embedded in the image.

93. Each of the remaining claims challenged in Ground II depends from independent claim 1. Under Ground II, the Petition has failed to demonstrate that all of the claim limitations are met by the cited references with respect to any these dependent claims because the Petition has failed to demonstrate that all of the claim limitations of the independent claim from which each such dependent claim depends are met by the cited references.

XII. GROUND III FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES

94. In Ground III, the Petition alleges that claims 19-21 and 39-41 are obvious over Wang in view of Drummond. In Ground III, the Petition again relies on paragraph [0115] of Wang with respect to the claim limitations reciting an “image capture device configured to capture an image” and a processor configured to “generate an output based on the information embedded in the image” as recited in independent claim 19, and “configuring a portable device to ... capture an image” and “generate an output based on the information embedded in the image” as recited in independent claim 39. Pet., 52-53. For the reasons discussed in connection with Ground I above, Wang at [0115] fails meet the claim language because Wang at [0115] fails to expressly or inherently disclose an imaging-based barcode reader that captures an image with information embedded in the image.

95. Each of the remaining claims challenged in Ground 3 depends from either independent claim 19 or 39. Under Ground III, the Petition has failed to demonstrate that all of the claim limitations are met by the cited references with respect to any these dependent claims because the Petition has failed to demonstrate that all of the claim limitations of the independent claim from which each such dependent claim depends are met by the cited references.

XIII. GROUND IV FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES

96. In Ground IV, the Petition alleges that Claims 8 and 30 are obvious over Wang and Denso. Ground 4 fails to explain how the elements in the base claims (i.e., claim 1 is the base claim for claim 8, and claim 23 is the base claim for claim 30) are being mapped to the cited references. For example, it is not apparent whether the Petition is relying on its mapping of claim 1 as set forth Ground I or its mapping of claim 1 as set forth in Ground II in connection with the mapping of claim 8 in Ground 4. To the extent the Petition intended to rely on the analysis of claims 1 and 23 set forth in Ground I for the limitations in the base claim for claims 8 and 30, respectively, in Ground 4, the confusion is further complicated by the fact that the analysis of claims 1 and 23 in Ground 1 relies in part on Drummond, which is absent from Ground 4. Ground 4 fails to set forth with clarity how it is mapping the claims to the prior art.

97. To the extent that the Petition is using only its citations to Wang (and not Drummond) for claims 1 and 23 from Ground I for the limitations in the base claim for claims 8 and 30, respectively, the Petition fails to demonstrate that all of the claim limitations are met by the cited references in Ground 4 because, as explained above, Wang at [0115] fails to expressly or inherently disclose an

imaging-based barcode reader that captures an image with information embedded in the image.

98. Claim 23 is not the subject of Ground II, so there are no mappings to Wang in Ground II for the limitations in the base claim (claim 23) for dependent claim 30. To the extent the Petition is using its citations to Wang from claim 1 from Ground II for the limitations in the base claim (claim 1) for claim 8, the Petition again fails to demonstrate that all of the claim limitations are met by the cited references in Ground IV because, as explained above, Wang at [0115] fails to expressly or inherently disclose an imaging-based barcode reader that captures an image with information embedded in the image.

XIV. GROUND V FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES

99. In Ground V, the Petition alleges that claim 13 is obvious over Wang and Raines. In Ground V, the Petition appears to rely on its mapping to Wang from Ground II for the limitations of the base claim (claim 1) from which claim 13 depends. Pet., at 57 (“As discussed in Ground 2, Wang discloses all of the features of Claim 1.”) Here again, the Petition fails to demonstrate that all of the claim limitations are met by the cited references in Ground V because, as explained above, Wang at [0115] fails to expressly or inherently disclose an imaging-based barcode reader that captures an image with information embedded in the image.

XV. GROUND VI FAILS TO DEMONSTRATE THAT ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS ARE MET BY THE RELIED ON REFERENCES

100. In Ground VI, the Petition alleges that claims 1, 4, 5, 7, 23, 26, 27, 29, and 43 are obvious over TAO in view of PTM and Wang. In Ground VI, the Petition relies on TAO's barcode scanning capability with respect to the claim limitations reciting an "image capture device configured to capture an image" and a processor configured to "generate an output based on the information embedded in the image as recited in independent claim 1, and "configuring a portable device to ... capture an image" and "generate an output based on the information embedded in the image" as recited in independent claim 23. Pet., 65 and 68.

101. As explained above, a person of ordinary skill at the time of the '167 Patent reading the claims in light of the specification would have understood the recitation in claim 1 of an "image capture device configured to capture an image" in combination with a processor configured to "generate an output based on the information embedded in the image," to be referring to an imaging-based bar code reader and not a laser-based barcode scanner. Similarly, a person of ordinary skill at the time of the '167 Patent reading the claims in light of the specification would have understood the recitation in claim 23 of "configuring a portable device to ... capture an image" and "generate an output based on the information embedded in the [captured] image" to be referring to an imaging-based bar code reader and not

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a laser-based barcode scanner. Practitioners in the field at the time of the ‘167 Patent used the terms “image capture” and “captured image” and “capture an image” as recited in such claims only in connection with image-based readers. Ex. 2024, 1:19-2:9; Ex. 2025, 3:4-49; Ex. 2026, 1:19-47.

102. As explained above, the barcode readers disclosed in TAO were SPT units from Symbol Technologies, which are barcode laser scanners. See, e.g., Ex. 2009, Symbol SPT 1800 Series Product Reference Guide, at 109 (“The SPT 1800 has an integrated bar code laser scanner”); Ex. 2010, Symbol SPT 1700 Series Product Reference Guide, at 108 (“The SPT 1800 has an integrated bar code laser scanner.”) Thus, TAO fails to disclose an imaging-based barcode reader.

103. Each of the remaining claims challenged in Ground VI depends from either independent claim 1 or 23. Under Ground VI, the Petition has failed to demonstrate that all of the claim limitations are met by the cited references with respect to any these dependent claims because the Petition has failed to demonstrate that all of the claim limitations of the independent claim from which each such dependent claim depends are met by the cited references.

XVI. DECLARATION

104. I, Dr. Kevin Berisso, 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: May 9, 2025

By: *Kevin Berisso*
Dr. Kevin Berisso