UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALLIANCE LAUNDRY SYSTEMS, LLC,
Petitioner,

v.

PAYRANGE LLC,
Patent Owner.

Case No. PGR2025-00027
Patent No. 11,966,920

DECLARATION OF JEFFREY MILLER, PH.D.

TABLE OF CONTENTS

Page

I. QUALIFICATIONS 1

II. SCOPE OF WORK 5

III. LEGAL PRINCIPLES 6

IV. SUMMARY OF THE '920 PATENT 11

V. PERSON OF ORDINARY SKILL IN THE ART 15

VI. CLAIM CONSTRUCTION 15

A. "affordance" 16

VII. GROUND 1: CLAIMS 1-10 AND 12-20 WOULD NOT HAVE BEEN OBVIOUS IN VIEW OF LOW, ARORA, AND FREENY 25

A. Independent claim 1 is not obvious over Low, Arora, and Freeny. 25

i. Limitation [1.6]: the user interface being configured to display a visual indication of the one or more payment accepting units 25

ii. Limitation [1.12]: the user interface includes a visual representation of ... an affordance that, in response to a user input, indicates completion of the transaction 33

B. Independent claims 13 and 15 are not obvious over Low, Arora, and Freeny 41

C. Dependent claims 2-10, 12, 14, and 16-20 are not obvious over Low, Arora, and Freeny 41

i. Claims 2 and 16 41

ii. Claim 3 43

iii. Claim 4 47

iv. Claims 5 and 18 49

v. Claims 6 and 19 51

vi. Claim 7 52

vii. Claim 10 58

VIII. GROUND 2: CLAIM 11 WOULD NOT HAVE BEEN OBVIOUS IN VIEW OF LOW, ARORA, FREENY, AND CASEY 60

IX. GROUND 3: CLAIMS 1-20 ARE DIRECTED TO SUBJECT MATTER THAT WAS NOT WELL-KNOWN, ROUTINE, AND CONVENTIONAL 60

X. CONCLUDING STATEMENTS 72
XI. APPENDIX – LIST OF MATERIALS CITED 73

I, Jeffrey Miller, declare as follows:

I. QUALIFICATIONS

1. I am currently a Professor of Computer Science and the former Dean of the College of Engineering and Computational Sciences at Southern Utah University (SUU). In 2002, I received both a B.S. in Computer Engineering and Computer Science and a M.S. in Computer Science from the University of Southern California (USC). In 2007, I received a Ph.D. in Computer Science, also from USC.

2. I have been at SUU since July 2022. In my role as Dean, I oversaw the departments of Computer Science and Cybersecurity (with programs in Computer Science, Software Development, Information Technology, Cybersecurity, Artificial Intelligence and Machine Learning, and Financial Technology), Engineering and Technology (with programs in Civil Engineering, Mechanical Engineering, Construction Management, Electrical Engineering, and Engineering Technology), Mathematics (with programs in Data Science, Theoretical Mathematics, Actuarial Mathematics, and Mathematics Education), and Aviation (with programs in Fixed-Wing Pilot, Rotor-Wing Pilot, Aviation Maintenance Technician, and Aviation Administration Leadership). These departments have over 60 full-time faculty, 1,500 major students, and 76 undergraduate and graduate degree and certificate programs.

3. I also teach courses in the Computer Science and Cybersecurity department, specifically on software engineering and software development. My current research also focuses on the software and network architectures and algorithms used in mobile and wireless communication, ethics in intelligent vehicular applications, and science, technology, engineering, and mathematics (STEM) education in K12 and higher education.

4. Prior to joining SUU, I was a professor of Computer Science and Information Technology Practice at USC, where I also served as the Department Chair for the Information Technology Program from 2019 to 2022. At USC, I taught courses on programming, software development, design and construction of large software systems, and analysis of algorithms. As the Department Chair, I oversaw more than 50 professors and lecturers teaching over 75 different courses focused on artificial intelligence, computer programming, applied analytics, cloud computing, computer and digital forensics, 3D computer graphics and modeling, applied computer security, blockchain, connected devices, computing education, enterprise information systems, mobile app development, video game programming, design and management, web technologies and applications, and digital entrepreneurship.

5. Prior to joining USC, I served as an Associate Professor of Computer Science and Computer Systems Engineering at the University of Alaska

Anchorage, where I taught courses on electrical engineering, computer systems and design, computer programming, systems administration, VLSI circuit design, computer networking, and network security.

6. I also have extensive industry experience in software and application development and system design. For example, in 2005 to 2006, I founded Imaginary Technology, LLC, a company that created handheld and standalone point-of-sale systems for the restaurant industry. The point-of-sale systems allowed customers to order items without an employee, sending the order to the backend system and completing payment unassisted. The system accepted credit/debit cards and gift cards, and cash transactions could be completed with the assistance of an employee. During development of the point-of-sale systems, I worked with business owners and potential clients to determine the requirements of the system. I also managed a team of five software engineers to implement and install the systems, and I was responsible for, among other things, procuring hardware and working with customers to improve the system.

7. In addition, in 2001, I developed an e-commerce site that allowed distributors and retailers to automate the ordering of their products. The web site allowed people in the entertainment industry to view, purchase, and download stock footage in real-time without the need for a physical medium to be shipped to them. In 2005, I also worked as a technical lead and senior architect on a team

responsible for all online payments of insurance policy premiums, including eCheck and direct-debit payments at 21st Century Insurance. From 2005 to 2015, I also acted as an independent consultant to create the Alaska 511 iPhone app for the Alaska Department of Transportation, displaying real-time traffic conditions and cameras to users. Moreover, in 2008, I worked as a senior programmer for Resource Data, Inc., in Anchorage, Alaska, where I led a team of four developers and one database administrator to work on the Joint Supply Management Module project for the US Department of Defense concerning fuel and ammunition inventory tracking.

8. I have also provided expert witness services involving point-of-sale systems. For example, I have served as an expert witness on behalf of the Massachusetts Commissioner of Revenue in several cases involving tax assessment based on orders reported by a point-of-sale system.

9. I have authored or co-authored 75 technical publications and a lab manual accompanying a textbook on computer security. I have also secured nearly $10,000,000 for projects concerning distributed networks and applications, and STEM education at the K12, undergraduate, and graduate levels.

10. I also have been a member of several professional societies and associations. For example, I have been a member of the Institute of Electrical and Electronics Engineers (IEEE) since 2002 and became a senior member in 2015. I

have been a member of the IEEE Education Society, the IEEE Communications Society, the IEEE Computer Society, the IEEE Intelligent Transportation Systems Society, and the IEEE Vehicular Technology Society. Further, I have been a member of the Association of Computing Machinery (ACM) since 2002, and I became a senior member in 2017. I have been a member of the ACM Special Interest Group on Computer Science Education.

11. For a more detailed listing of my credentials and publications, please see my *curriculum vitae* (EX2009).

II. SCOPE OF WORK

12. I have been retained by counsel for PayRange LLC as an expert witness in the above-captioned proceeding. I understand that Alliance Laundry Systems, LLC ("Petitioner"), filed a petition with the United States Patent and Trademark Office for post-grant review of U.S. Patent No. 11,966,920 (EX1001, "the '920 patent"), the subject of this proceeding.

13. I further understand that the Patent Trial and Appeal Board (the "Board") has decided to institute post-grant review of claims 1-20 of the '920 patent under 35 U.S.C. §103 based on U.S. Patent 10,210,501 (EX1005, "Low"), U.S. Patent No. 9,989,884 (EX1006, "Arora"), U.S. Patent No. 8,958,846 (EX1007, "Freeny"), and U.S. Patent No. 8,255,323 (EX1008, "Casey"). I understand that the Board has also decided to institute review of the claims under

35 U.S.C. §101 as being directed to ineligible subject matter. I understand the petition challenges the claims of the '920 patent based on the following grounds:

Ground	Claims	Basis
1	1-10 and 12-20	Obvious over Low, Arora, and Freeny
2	11	Obvious over Low, Arora, Freeny, and Casey
3	1-20	Unpatentable under §101

14. I have been specifically asked to provide my expert opinions on the patentability of the claims of the '920 patent in view of the grounds asserted in the petition. In connection with this analysis, I have reviewed the '920 patent and the prior art cited against the patentability of claims 1-20 of the '920 patent. I have also reviewed and considered the petition, Dr. Clifford Neuman's declaration (EX1003), the Board's institution decision, as well as various references listed in the Appendix, which I may cite to herein.

15. I am being compensated at a rate of $600 per hour for my services in this matter. My compensation is not contingent upon the outcome of this matter or the specifics of my testimony.

III. LEGAL PRINCIPLES

16. I have been advised that the burden is on the Petitioner to demonstrate the unpatentability of the challenged claims, which must be proven by a preponderance of the evidence. This burden of proof applies to each factual matter

in each ground raised in the petition, including specific arguments raised by the Petitioner regarding patent eligibility, anticipation, and obviousness.

17. I have been informed that Congress provided by statute that "any new and useful process, machine, or composition of matter, or any new and useful improvement thereof" may be patented. I have also been informed that the U.S. Supreme Court has clarified, however, that "laws of nature, natural phenomena, and abstract ideas" are not patent-eligible.

18. I understand that the Supreme Court has identified a two-part test to determine whether a claim is ineligible for patenting. To find that a claim is patent ineligible, one first must determine that the claim is directed to a patent-ineligible concept. The Supreme Court has explained that, at some level, all inventions embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas. Courts have thus concluded that a claim is not directed to an abstract idea, for example, if it focuses on non-abstract improvements to the functionality of a computer or network platform itself rather than on a process or system that qualifies as an abstract idea for which a computer is used merely as an implementation tool. In answering this question, the inquiry must focus on the language of the claims themselves and consider what the patent asserts to be the focus of the claimed advance over the prior art. Claims that recite a specific means

or method that solves a problem in an existing technological field are patent eligible at step one of the analysis.

19. I further understand that even if a claim is directed to an abstract idea, it still may be found patent eligible at step two of the analysis. At step two, one must consider whether the claimed elements—individually and as an ordered combination—recite an inventive concept. An inventive concept reflects something more than the application of an abstract idea using "well-understood, routine, and conventional activities" known in the relevant industry. One must consider not only whether individual claim elements were each well-understood, routine, and conventional to a skilled artisan in the relevant field, but also whether the claimed ordered combination of elements was well-understood, routine, and conventional to a skilled artisan in the relevant field. In other words, when the ordered combination of the claim as a whole is considered, an inventive concept can be found in a non-conventional and non-generic arrangement of known, conventional pieces.

20. I also understand that the U.S. Patent and Trademark Office issued a Patent Eligibility Guidance in January 2019, which was updated in October 2019, July 2024, and August 2025. Under that Guidance, one evaluating patent eligibility must evaluate whether a claim recites: (1) any judicial exceptions, including mathematical concepts, methods of organizing human activity such as a

fundamental economic practice, or mental processes; and (2) additional elements that integrate the judicial exception into a practical application. Only if a claim both recites a judicial exception and does not integrate that exception into a practical application does the Guidance then direct an evaluation of whether the claim adds a specific limitation beyond the judicial exception that is not well-understood, routine, and conventional in the field as opposed to simply appending well-understood, routine, and conventional activities previously known in the industry, specified at a high level of generality, to the judicial exception.

21. I also have been advised that a claim determined to be patent eligible may nonetheless be unpatentable. I am informed that the post-AIA text of 35 U.S.C. §§102 and 103 are applicable to this proceeding. For example, I have been advised that anticipation under 35 U.S.C. §102 is about prior invention and therefore a single prior art reference must be found to disclose all elements of the claimed invention arranged as in the claim. I have been further advised that it is not enough that the prior art references include multiple, distinct teachings that may somehow be combined to achieve the claimed invention. Rather, it is my understanding that the reference must clearly and unequivocally disclose the claimed invention or direct a person of ordinary skill in the art to the claimed invention without any need for picking, choosing, and combining various disclosures that are not directly related to each other in the reference.

22. I understand that differences between the prior art reference and a claimed invention, however slight, invoke the question of obviousness, not anticipation.

23. I have been advised that a claimed invention is not patentable under 35 U.S.C. §103 if it is obvious. A patent claim is unpatentable if the claimed invention would have been obvious to a person of ordinary skill in the art (a "POSITA") at the time the claimed invention was made. This means that even if all of the requirements of the claim cannot be found in a single prior art reference that would anticipate the claim, a POSITA who knew about all this prior art would have come up with the claimed invention.

24. I have further been advised that the ultimate conclusion of whether a claim is obvious should be based upon several factual determinations. That is, a determination of obviousness requires inquiries into: (1) the level of ordinary skill in the field; (2) the scope and content of the prior art; (3) what difference, if any, existed between the claimed invention and the prior art; and (4) any objective indicia of nonobviousness.

25. I have been advised that, in determining the level of ordinary skill in the field that someone would have had at the time the claimed invention was made, I should consider: (1) the levels of education and experience of persons working in

the field; (2) the types of problems encountered in the field; and (3) the sophistication of the technology.

26. I have been advised that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art. In evaluating whether such a claim would have been obvious, I may consider whether there is a reason that would have prompted a POSITA to combine the elements or concepts from the prior art in the same way as in the claimed invention.

27. I have also been advised, however, that I must be careful not to determine obviousness using the benefit of hindsight; many true inventions might seem obvious after the fact. I should put myself in the position of a POSITA at the time the claimed invention was made and I should not consider what is known today or what is learned from the teaching of the patent.

28. I have been advised that any obviousness rationale for modifying or combining prior art must include a showing that a POSITA would have had a reasonable expectation of success.

IV. SUMMARY OF THE '920 PATENT

29. I understand that the '920 patent issued from a series of applications and claims priority to a provisional application filed December 18, 2013.

30. The ’920 patent is directed to systems and methods for presenting representations of payment accepting unit events. *See* EX1001 (’920 patent), Title, Abstract. Specifically, the ’920 patent describes “a mobile-device-to-machine payment processing system over a non-persistent network connection.” *Id.*, 1:44-47.

31. The ’920 patent explains that “[v]ending machines (or ‘automatic retailing’ machines),” and more generally, payment accepting units, were traditionally operated by a user approaching the unit, determining from the face of the unit the product or service that is desired, inserting payment (such as coins, bills, or payment cards), and inputting his/her selection into the unit using a user interface provided on the unit. *Id.*, 1:51-2:15. The ’920 patent describes mobile-device-to-machine payment processing systems that enables a user additional options and increased convenience when using a payment processing unit. *Id.*, 2:16-21.

32. The ’920 patent describes two types of embodiments in which the system can operate. In a manual mode embodiment (sometimes referred to as “swipe-to-pay”), the user interacts with a user interface on a mobile device to conduct a transaction with a desired payment accepting unit. *See id.*, 6:11-16, 7:13-23. In a “hands-free” mode embodiment, the mobile device conducts a transaction with a payment accepting unit automatically without requiring user

interaction with the user interface on the mobile device. *See id.*, 7:34-60. As I explain in more detail below, the claims of the '920 patent are directed to the manual mode embodiments described in the '920 patent specification, in which specific, non-conventional user interface elements are provided to the user to enable a transaction with a desired payment accepting unit. *See infra*, section IX.

33. I understand the '920 patent has 20 claims. Claims 1, 13, and 15 are independent. For reference, I have reproduced claim 1 below. I have added the identifying labels in brackets that Petitioner and Dr. Neuman use to refer to the limitations individually.

> **[1.P]** A method of presenting representations of payment accepting unit events, comprising:
>
> **[1.1]** at a mobile device with one or more processors, memory, one or more output devices including a display, and one or more radio transceivers:
>
> **[1.2]** identifying one or more payment accepting units that are available to accept payment from a mobile payment application executing on the mobile device, **[1.3]** the identifying based at least in part on an identifier or location corresponding to the one or more payment accepting units, **[1.4]** wherein the one or more payment accepting units are payment operated machines that accept payment for dispensing of products and/or services;
>
> **[1.5]** displaying a user interface of the mobile payment application on the display of the mobile device, **[1.6]** the user

interface being configured to display a visual indication of the one or more payment accepting units and **[1.7]** accept user input selecting an available payment accepting unit of the one or more payment accepting units;

[1.8] establishing via the one or more radio transceivers a wireless communication path including the mobile device and the available payment accepting unit of the one or more payment accepting units;

[1.9] after establishing the wireless communication path, enabling user interaction with the user interface of the mobile payment application to complete a transaction with the available payment accepting unit, **[1.10]** wherein the user interface includes a visual representation of the available payment accepting unit, **[1.11]** an indication of a balance, and **[1.12]** an affordance that, in response to a user input, indicates completion of the transaction;

[1.13] exchanging information with the available payment accepting unit via the one or more radio transceivers, in conjunction with the transaction; and

[1.14] after exchanging the information, displaying, on the display, an updated user interface of the mobile payment application to the user of the mobile device.

Id., 47:6-47.

34. I understand independent claim 13 recites "[a] mobile device" and independent claim 15 recites "[a] non-transitory computer readable storage

medium." Dependent claims 2-12 depend from claim 1, dependent claim 14 depends from claim 13, and dependent claims 16-20 depend from claim 15.

V. PERSON OF ORDINARY SKILL IN THE ART

35. I have been advised that a POSITA is a hypothetical person who is presumed to be familiar with all relevant art at the time of the invention, and to whom one could assign a routine task with reasonable confidence that the task would be successfully carried out. According to Dr. Neuman, the relevant timeframe is December 18, 2013. EX1003 (Neuman Declaration), ¶21.

36. I understand that Dr. Neuman contends that a POSITA, as of December 18, 2013, "would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or equivalent training, and approximately three years of experience with electronic payment systems, vending machine technologies, or distributed network systems. Lack of work experience can be remedied by additional education, and vice versa." *Id.*, ¶22. For the purposes of my declaration, I have applied this understanding of the POSITA in forming my opinions. By December 2013, I met and exceeded these qualifications. *See* EX2009 (Miller CV); *supra*, section I.

VI. CLAIM CONSTRUCTION

37. I have been advised that the claim terms of the '920 patent are to be given their plain and ordinary meaning, *i.e.*, the meaning that the terms would have

to a POSITA at the time of the invention. I understand that the relevant timeframe is December 18, 2013.

38. I understand that this analysis focuses on intrinsic evidence, including how the claim term is used in the claims, specification, and prosecution history. I also understand that dictionaries or other extrinsic sources may assist in determining the plain and ordinary meaning but cannot override a meaning that is unambiguous from the intrinsic evidence. I have followed these principles in my analysis throughout this declaration. Relevant to my analysis, one term warrants discussion.

A. "affordance"

39. Each of the independent claims of the '920 patent recites *[a] user interface includes … an affordance that, in response to a user input, indicates completion of the transaction*.[1] As I detail more below, a POSITA would have understood the plain and ordinary meaning of the term *affordance* to be an interactive user interface element that informs a user as to how to interact with the element and its intended use. A POSITA would have also understood that an *affordance* did not refer to messages informing the user that an action has been

[1] I use italics throughout this declaration to indicate claim language recited in the challenged claims of the '920 patent.

completed. In my opinion, this understanding is informed by the claims and the specification of the '920 patent and further confirmed by the technical literature on user interface design.

40. I understand that, in his declaration, Dr. Neuman purports to construe the claims "under the so-called *Phillips* standard, under which claim terms are given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in view of the specification and prosecution history." EX1003 (Neuman Declaration), ¶62. Dr. Neuman also asserts that "[f]or purposes of [his] analysis," he "do[es] not believe any claim terms require explicit construction." *Id.*, ¶63.

41. However, I understand that in his deposition, when asked about his views on the plain and ordinary meaning of the term *affordance*, Dr. Neuman responded that he "did have to look that one up" to understand its meaning. EX2010 (Neuman Dep. Trans.), 50:3-18. Dr. Neuman stated that, in his view, the term *affordance* was "an element of the user interface in some sense," which would include "a pop-up or a message or something else that is indicating what completion is" or even be an element that is "hidden from the user." *Id.*, 49:9-50:7, 50:19-51:23.

42. As I explain below, I disagree with Dr. Neuman's testimony that the plain and ordinary meaning of the term *affordance* extends to user interface

elements that may be hidden from the user or elements that are pop-ups or messages. Instead, a POSITA would have understood the term in the context of the '920 patent claims to mean an interactive user interface element that informs a user as to how to interact with the element and its intended use.

43. First, the understanding that the term *affordance* is a specific type of user interface element that informs a user as to how to interact with the element and its intended use is supported by the specification of the '920 patent and does not extend to elements like a pop up or a message. For example, the '920 patent describes an affordance in the context of aborting a transaction. The patent explains that "the user aborts the transaction" using one of two methods. *Id.*, 37:8-12. The user can abort the transaction "by actuating a coin mechanism of the machine 120," or, alternatively, the user can abort the transaction "by selection [of] an abort affordance on the interface of the application 140 (not shown)." *Id.* After performing either of these actions, "the user interface 1320 includes a message 1322 indicating that the transaction with the machine 120 was aborted and that the user's account was not debited for the aborted transaction." *Id.*, 37:12-16; *see also id.*, 38:44-52 (describing same). Thus, the specification of the '920 patent describes an *affordance* as an interactive user element (*e.g.*, an element the user can select) that a user can use to effectuate an operation (*e.g.*, an abort operation). The '920 patent distinguishes this type of user element from user elements that

only provide an output that the operation has been performed (*e.g.*, a message that the transaction has been aborted).

44. I note that the claims of the ’920 patent further reflect the POSITA’s understanding. For example, as I noted above, claim 1 of the ’920 patent recites *an affordance that, in response to a user input, indicates competition of the transaction*. Dependent claim 11, which depends from claim 1, further specifies that *the user input is a swipe that causes the affordance to be slid*. Thus, the claims confirm that a POSITA would have understood an *affordance* to be a type of interactive user element (*e.g.*, an element that can be slid by a swipe input from the user).

45. I also note that the claims further reflect that an *affordance* is distinct from a message. Dependent claim 2, which also depends from claim 1, recites that *the updated user interface of the mobile payment application* (which is displayed after exchanging the information with the available payment accepting unit) *includes at least one of: a message displayed on the display of the mobile device*.

46. The specification of the ’920 patent further describes an embodiment of an *affordance* that is slid. For instance, the specification describes “a ‘swipe-to-pay’ feature,” which “refers to a user’s action implemented on his/her mobile device 150 where he/she quickly brushes his/her finger (or other pre-determined interaction) on the mobile device’s touch screen 152” in order to transfer payment

to the payment accepting unit. EX1001 ('920 patent), 7:13-24. An example of this is shown below, where the user "perform[s] a swipe gesture at a location corresponding to the representation of the dollar bill (e.g., a substantially vertical swipe gesture from a location corresponding to the representation of the dollar bill to the top edge of the mobile device 150)," which causes the dollar bill to move up toward the payment accepting unit shown on the screen, thereby effectuating payment. *Id.*, 36:34-45; *see also id.*, 7:27-31 ("The transaction is completed just as if cash was inserted in the machine 120 with the user inputting his selection on the payment accepting unit 120 and the payment accepting unit 120 dispensing the product or service.").

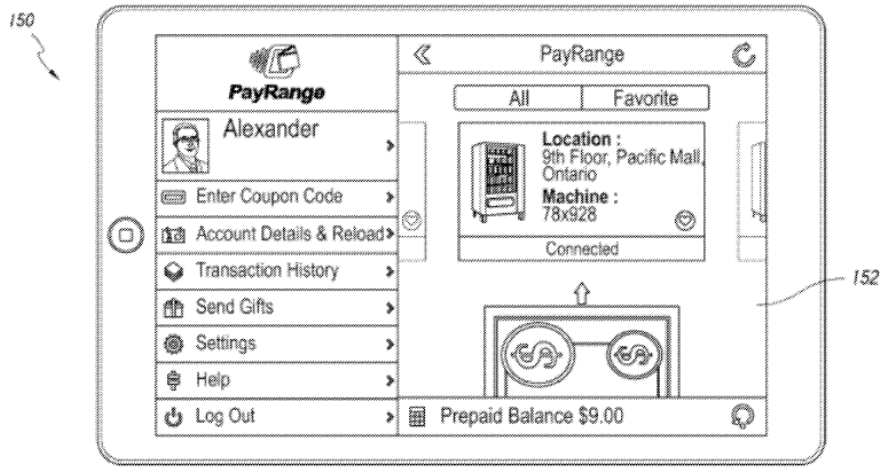


Figure 10C

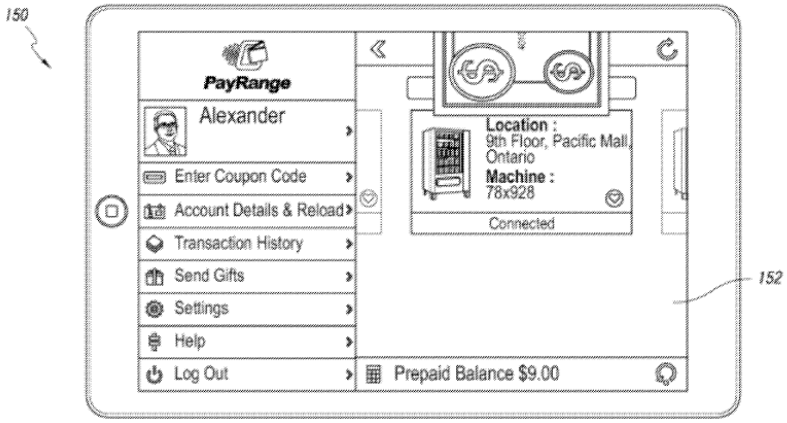


Figure 10D

EX1001 ('920 patent), FIGS. 10C-10D.

47. The specification again distinguishes this type of interactive user element from a message informing the user that the transaction has been completed. As reproduced below, the specification explains that, "after the user of the mobile device 150 initiates and performs a transaction with the machine 120," the user interface can "include[] a message 1306 indicating that the transaction with the machine 120 is complete." *Id.*, 36:46-57.

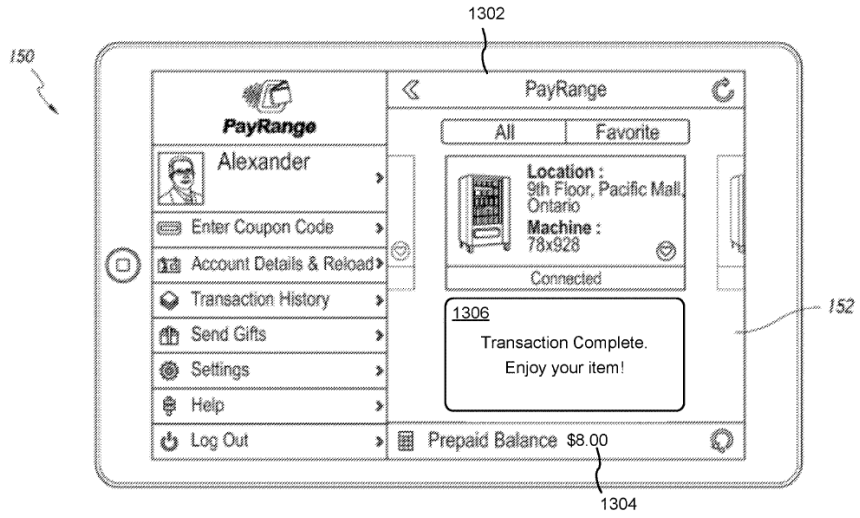
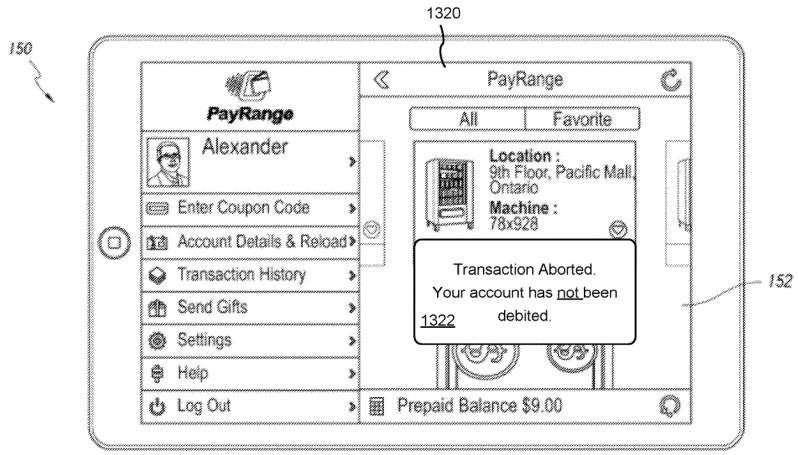


Figure 26A

EX1001 (’920 patent), FIG. 26A.

48. Similarly, the ’920 patent explains that, after using the above-described affordance to abort a transaction, the mobile device “display[s] a user interface 1320 of the application 140 on touch screen 152 … due to the transaction being aborted.” *Id.*, 37:4-8. This updated interface “includes a message 1332 indicating that the transaction with the machine 120 was aborted”:



EX1001 ('920 patent), FIG. 26C.

49. In addition, this understanding of the term *affordance* is further supported by the technical literature. For example, as proposed by Donald Norman in the 1988 book "The Psychology of Everyday Things," the word "affordance" is generally defined as "the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used"—that is, "[i]f you look at something and understand how to use it—you comprehend its affordances." EX2011 (Cooper), 64. For example, "[i]f a push-button is placed on the wall next to the front door of a residence, its affordances are 100% doorbell." *Id.*; *see also* EX2013 (Chen), 1248 ("a button on a product with round shape and fitting size for users' fingers indicates the pressing operation for users").

50. The term *affordance* was eventually incorporated into the field of user interface design, where the term took on the more specific meaning of "[t]he design of a control [that] suggest[s] how it is to be operated." EX2012 (Galitz), 53; *see also* EX2013, 1249 ("For GUI design, the shapes and features of virtual icons on product screens as the perceptual information can effectively present products' functions and operations."). One example of an affordance in the context of user interface design is a scrollbar, which "clearly shows that it is manipulable" and may include arrows to suggest its directionality. EX2011 (Cooper), 65-66. This is consistent with the '920 patent's claims (*e.g.*, an *affordance* that can be *slid*) and specification (*e.g.*, a dollar bill icon that the user can swipe toward the visually-represented payment accepting unit in order to complete the transaction).

51. As such, in view of the above, it is my opinion that a POSITA would have understood the term *affordance* to be an interactive user interface element that informs a user as to how to interact with the element and its intended use. As I discuss in more detail below, with respect to limitation [1.12], Dr. Neuman applies a theory that is inconsistent with the plain and ordinary meaning of the term.

VII. GROUND 1: CLAIMS 1-10 AND 12-20 WOULD NOT HAVE BEEN OBVIOUS IN VIEW OF LOW, ARORA, AND FREENY

52. I understand Dr. Neuman contends that claims 1-10 and 12-20 would have been obvious over Low (EX1005), Arora (EX1006), and Freeny (EX1007). In my opinion, however, claims 1-10 and 12-20 of the '920 patent would not have been obvious in view of Low, Arora, and Freeny as proposed. In particular, it is my opinion that Dr. Neuman fails to show that the combination of Low, Arora, and Freeny teaches each and every limitation of the independent claims and several dependent claims.

A. Independent claim 1 is not obvious over Low, Arora, and Freeny

53. As I discuss in detail below, it is my opinion that the combination of Low, Arora, and Freeny fail to disclose each of the limitations recited in independent claim 1.

i. Limitation [1.6]: the user interface being configured to display a visual indication of the one or more payment accepting units

54. Limitation [1.6] requires the display of a user interface on the mobile device where *the user interface [is] configured to display a visual indication of the one or more payment accepting units*. I understand that Dr. Neuman asserts that Low discloses this limitation through its discussion of "a machine identifier." *See* EX1003 (Neuman Declaration), ¶¶123-124. Specifically, Dr. Neuman contends that Low "teaches that a 'non-Internet connected machine (NICM) transmits a

machine identifier to the user device,'" which Dr. Neuman argues corresponds to the claimed *mobile device*. *Id.*, ¶123. Based on Low's description that "multiple machines may send their unique identifiers, such that the user is able to select one or more machines to purchase from" (EX1005 (Low), 2:26-28), Dr. Neuman explains that, "[i]n his opinion, the user device 110 is configured to display the available machines such that the user is able to interact with the display to select the one or more machines from which to make a purchase." EX1003 (Neuman Declaration), ¶125.

55. I disagree that Low discloses a user interface that is *configured to display a visual indication of the one or more payment accepting units*, as recited in limitation [1.6]. As I explain below, Low does not describe displaying a visual indication of the vending machine on the user device. In addition, a POSITA would not have understood that Low's user device would necessarily display a visual indication of the machine.

56. As an initial matter, the portions of Low that Dr. Neuman relies on for his analysis do not describe displaying a visual indication of the vending machine on the user device. *See id.*, ¶¶123-124 (citing EX1005 (Low), 2:16-20, 2:26-28, 8:66-9:2). To the extent Dr. Neuman relies on Low's "machine identifier" as the claimed *visual indication*, there is no description in Low that the machine identifier is displayed as a visual indication of the vending machine on the user interface.

Instead, in my opinion, Low describes the machine identifier as data that is communicated between the user device and payment provider server to facilitate a transaction. For instance, Low explains that the payment provider server 140 can "transmit[] information about items for sale" at a vending machine to a user device, which "may be transmitted in response to a request by user device 110." EX1005 (Low), 8:61-66. This can occur when a user "access[es] electronic payment module 130" provided on the vending machine using the user device 110, which causes the user device 110 to "receive a machine identifier" and transmit it "to payment provider server 140 to receive information corresponding to vending machine 120." *Id.*, 8:61-9:4; *see also id.*, 2:16-20 (stating that the NICM "transmits a machine identifier to the user device, which allows the user device to retrieve a menu of items at the specific machine from the payment provider"). Thus, Low describes the machine identifier as transmitted data that allows the payment provider server to retrieve information specific to the machine (*e.g.*, items for sale at the machine).

57. I understand that, in the institution decision, the Board agreed that "the cited disclosures in Low do not support th[e] contention" that "Low's user device 110 specifically displays a machine identifier 136 on its display." Institution Decision, 43. However, the Board stated that the cited disclosures in Low support the "more general contention" that Low's user device is "configured

to display the available machines such that the user is able to interact with the display to select the one or more machines from which to make a purchase." *Id.* (emphasis omitted). Specifically, the Board stated:

> In particular, Low states that user device 110 utilizes machine identifiers 136 to enable user 102 "to select one or more machines to purchase from." Ex. 1005, 2:25-28. Based on the current record, we conclude that in order for the user to select a specific vending machine 120 to make a purchase, user device 110 would necessarily "display a visual indication" of that machine as broadly recited in limitation [1.6] (otherwise the user would not be able to make a selection).

Id., 43-44.

58. I disagree that when "Low states that user device 110 utilizes machine identifiers 136 to enable user 102 'to select one or more machines to purchase from,'" the user device 110 would **necessarily** *display a visual indication* of the vending machine. Instead, in my opinion, a POSITA reading Low would have understood that, when Low states that "multiple machines may send their unique identifiers, such that the user is able to select one or more machines to purchase from" (EX1005 (Low), 2:25-28), there would be scenarios that would not involve displaying a visual indication of the vending machine on the user interface of Low's user device.

59. The relevant portion of Low states:

> The non-Internet connected machine (NICM) transmits a machine identifier to the user, which allows a user device to retrieve a menu of items at the specific machine from the payment provider or an operator of the machine. In some embodiments, the NICM, the payment provider, and/or the operator of the machine may send product details to the user device to upsell or advertise products available on the NICM. The menu is then displayed on the user device, and the user selects desired item(s) for purchase. Note that in some embodiments, multiple machines may send their unique identifiers, such that the user is able to select one or more machines to purchase from.

EX1005 (Low), 2:16-28.

60. In my opinion, a POSITA would not have understood that this description would mean that a visual indication of the vending machine itself would be **necessarily** displayed on the user device. For example, a POSITA would have understood that Low's description could be accomplished by displaying on the user device all the products available at the machines that sent their unique identifiers. That is, when multiple machines send their unique identifiers, the payment provider would retrieve a menu of items available at the machines, which would then be displayed on the user device, allowing the user to "select[] desired item(s) for purchase." EX1005 (Low), 2:16-28. As another example, the payment provider could retrieve and display on the user device multiple menus (*e.g.*, by

categories of product types) that the user can select from to purchase a product. Consistent with Low's description, by displaying a menu of the items that are available at the machines, a POSITA would have understood that this would allow the user to "select one or more machines to purchase from" by "add[ing] desired item(s) from one or more machines to a cart and make the purchase through a payment provider." *Id.*, 2:25-31. In this instance, a POSITA would have understood that it would not **necessarily** be the case that the user device would display *a visual indication* of the machines because the user would only be presented with the **items** that can be purchased from the machines.

61. I note that Dr. Neuman recognizes that Low's description does not **necessarily** result in the display of a visual indication of the machine on Low's user device. Specifically, in discussing limitation [1.7] (*the user interface of the mobile device being configured to … accept user input selecting an available payment accepting unit of the one or more payment accepting units*), Dr. Neuman again relies on Low's description that "multiple machines may send their unique identifiers, such that the user is able to select one or more machines to purchase from." EX1003 (Neuman Declaration), ¶125 (quoting EX1005 (Low), 2:26-28 (emphasis omitted)). Based on this, Dr. Neuman argues that, "[i]n [his] opinion, the user device 110 is configured to **display either** (i) the available machines such that the user is able to interact with the display to select the one or more machines

from which to make a purchase or (ii) products available at particular machines, whereby selecting the product(s) necessarily selects the available machine that offers the product(s)." *Id.* (emphasis added). Thus, Dr. Neuman's declaration confirms that Low's user device is not **necessarily** configured to *display a visual indication* of the vending machine, even when "multiple machines" send their identifiers.

62. In fact, a POSITA would have understood that there existed multiple, possible configurations where "multiple machines may send their unique identifiers, such that the user is able to select one or more machines to purchase from," beyond the two scenarios acknowledged by Dr. Neuman. For example, rather than display a visual indication of a vending machine from which to select, a POSITA would have understood that other types of indications may be provided. In the example I described above in which a menu or multiple menus are displayed to the user, once the user selects a product to purchase, an external cue, such as an audio indication, from the user device or the vending machine can indicate the machine from which the selected product will be dispensed. As an additional example that a POSITA would have understood as consistent with Low's description, multiple machines could send their unique identifiers to the user device to be forwarded to the payment provider server to allow inventory data to be updated on the server end. *See* EX1005 (Low), 8:22-36 (stating "[i]nventory

data 154 may be received from vending machine 120, for example using an Internet connection of user device 110 after a short range communication link is established between user device 110 and vending machine 120," which "may be utilized with payment provider server 140 to adjust viewable inventory levels of products 124 for display to user 102"). The user may then select the desired machine from which to purchase from by, *e.g.*, interacting with the desired machine through direct contact of the mobile device to the selected machine, upon which the payment provider server may display a menu of the products available at the selected machine. Again, this example would have been understood as a configuration consistent with Low's teachings that would not have necessarily resulted in the display of a visual indication of the vending machine. As such, a POSITA would not have understood from Low that when it states that "multiple machines may send their unique identifiers, such that the user is able to select one or more machines to purchase from" (EX1005 (Low), 2:25-28), this means that the user device 110 would necessarily *display a visual indication* of the machine. *See* Institution Decision, 44.

63. Thus, it is my opinion that Low fails to disclose limitation [1.6].

ii. Limitation [1.12]: the user interface includes a visual representation of … an affordance that, in response to a user input, indicates completion of the transaction

64. Limitation [1.12] requires *the user interface includes … an affordance that, in response to a user input, indicates completion of the transaction*. I understand that Dr. Neuman advances two theories as to how Low discloses the limitation. First, Dr. Neuman contends that Low teaches this limitation via "a payment button or option on the user device." EX1003 (Neuman Declaration), ¶¶144-146. Second, Dr. Neuman contends that a message displayed to the user after the purchase of a drink or an updated display screen teaches this limitation. *Id.*, ¶¶147-150. As I explain below, in my opinion, Dr. Neuman fails to show that Low discloses limitation [1.12] under either theory.

65. As an initial matter, with regard to Dr. Neuman's first theory, I note that his argument is based on an interpretation "consistent with Patent Owner's infringement contentions in the related district court litigation." *Id.*, ¶144. Dr. Neuman subsequently contrasts this theory with his second theory, which applies an interpretation "requiring an affordance that, in response to a user input, indicates *completion* of the transaction—as opposed to *initiation* of completion of the transaction." *Id.*, ¶147 (emphasis original).

66. For Dr. Neuman's first theory, Dr. Neuman fails to show that Low's "payment button or option on the user device" meets the claimed *affordance*. As I

explain below, Dr. Neuman's reliance on this aspect of Low overlooks that Low is discussing a different embodiment separate from the one relied on as disclosing other limitations recited in claim 1 of the '920 patent. Moreover, Dr. Neuman fails to show that Low's payment button or object *indicates completion of the transaction* in response to user input.

67. In particular, Low describes two ways in which a user can purchase a product from a vending machine. First, the user device can receive a list of products and the user can select a desired product using the user device. For example, Low describes a process in which "[t]he non-Internet connected machine (NICM) transmits a machine identifier to the user device, which allows the user device to retrieve a menu of items at the specific machine from the payment provider or an operator of the machine." EX1005 (Low), 2:16-20; *see also id.*, 4:2-5 ("In various embodiments, purchase application may access a menu or other data of purchasable products at vending machine 120."). After selecting the desired items, Low explains that a "purchase request is communicated to the payment provider over a wireless network," which "processes the request, and if approved, sends approval information back to the user device." *Id.*, 2:29-34. Low states that "the user device communicates the approval information to the machine, which then dispenses the purchased item(s)." *Id.*, 2:34-37.

68. As an alternative method, Low describes that the user can use the vending machine itself to select a product. In these "other embodiments," Low explains that "[t]he user device transmits a user identifier to the machine for display" on the machine. EX1005 (Low), 2:38-41. "During display of the user identifier, the user can then select one or more items for purchase from the machine." *Id.*, 2:41-43. After the user selects a product from the machine, "[t]he machine then transmits a purchase request … back to the user device," which "displays the purchase request." *Id.*, 2:43-46; *see also id.*, 4:5-13 ("However, in other embodiments, purchase application may interface with a corresponding module at vending machine 120 and receive a purchase request…."), 6:3-8 ("In other embodiments, payment verification application 132 [of the electronic payment module 130] may first transmit a purchase request … to user device 110…."). Low explains that "[i]f the information is correct, the user selects a payment button or option on the user device, which communicates the payment request to a payment provider." *Id.*, 2:47-49. The payment provider may then process and subsequently communicate an approval to authorize the machine to dispense the selected product. *Id.*, 2:49-62.

69. Thus, a POSITA would have understood Low as describing two separate ways in which a user can purchase a product from a machine: (1) items that can be purchased from a machine can be displayed on the user device, which

the user can select from using the user device, causing a purchase request to be generated by the user device and transmitted to the payment provider for approval; or (2) the user can select a product to purchase by making the selection at the vending machine itself, upon which the machine transmits a purchase request to the user device for review by the user, which, after selecting a payment button or option on the user device, causes the communication of a payment request to the payment provider. *Id.*, 2:11-62; *see also id.*, 10:26-34 ("For example, user 102 may utilize user device 110 to view and select a product while user device 110 is in communication with electronic payment module 130. In another embodiment, user 102 may also utilize product dispensing module 122 to select a product to purchase and electronic payment module may transmit the product information … to user device 110."). I understand that, during his deposition, Dr. Neuman agreed that Low teaches these two ways in which a user can select a product for purchase (*i.e.*, selecting the product with the user device or with the vending machine). *See* EX2010 (Neuman Depo. Tr.), 107:1-108:24.

70. For many of the limitations recited in claim 1, Dr. Neuman relies on the first embodiment described in Low—*i.e.*, the display and selection of purchasable products on the user device. For example, Dr. Neuman cites to Low's "menu … displayed on the user device, and the user selects desired item(s) for purchase" to the *displaying* requirements of limitation [1.5]. EX1003 (Neuman

Declaration), ¶121 (citing EX1005 (Low), 2:24-25). Dr. Neuman also cites to this embodiment in relation to limitations [1.P], [1.2]-[1.3], and [1.6]-[1.10]. *See, e.g.*, EX1003 (Neuman Declaration), ¶¶111 ("Low further teaches a method whereby a user may interact with the purchase application 112 via a display of a user device 110 to 'add desired item(s) from one or more machines to a cart and make the purchase through a payment provider." (citing EX1005 (Low), 2:29-34)), 115 (citing EX1005 (Low), 2:26-28), 117 (citing EX1005 (Low), 2:16-20)), 123 (citing EX1005 (Low), 2:16-20, 2:26-28), 125 (citing same), 127 (relying on the user device's receipt of inventory data), 129 (same), 132 (citing EX1005 (Low), 2:26-28).

71. In contrast, for limitation [1.12], Dr. Neuman relies on Low's second embodiment—*i.e.*, the user's selection of a product on the vending machine itself. *See* EX1003 (Neuman Declaration), ¶145. In particular, Dr. Neuman relies on Low's description where, after the user has used the vending machine to select a product, the "user device displays the purchase request [received from the vending machine] and, if the information is correct, the user selects a payment button or option on the user device." EX1005 (Low), 2:38-62; EX1003 (Neuman Declaration), ¶145 (citing EX1005 (Low), 2:42-62). However, Low only describes the use of a payment button in relation to embodiments where the user selects the product on the vending machine itself. Low does not describe providing a

payment button in embodiments where the user uses the **user device** to view and select purchasable products. Dr. Neuman does not acknowledge or address this distinction.

72. Moreover, Dr. Neuman also fails to explain how Low's payment button is an affordance that, *in response to user input, indicates completion of the transaction*. Low describes that, when the user selects the payment button, the user device "communicates the payment request to a payment provider," which must first approve the request and communicate the approval back to the user device for transmission to the machine before a product can be dispensed. EX1005 (Low), 2:46-62. Dr. Neuman does not explain how a payment button that only requests approval for a transaction when selected is an affordance that, *in response to user input, indicates completion of the transaction*.

73. Thus, in my opinion, Dr. Neuman fails to show that Low discloses limitation [1.12] under his first theory.

74. With regard to Dr. Neuman's second theory, Dr. Neuman asserts that Low "discloses that 'database 146 may include cross-promotional products and/or preferences for use in upselling products, for example, displaying a message to user 102 after purchasing a drink such as "Would you like chips with your

drink."”” EX1003 (Neuman Declaration), ¶148 (citing EX1005 (Low), 7:24-28[2]). According to Dr. Neuman, “the message displayed to user 102 would be displayed on the user interface of the user device 110 only after the purchased drink transaction is completed,” and thus “represent[s] an affordance that indicates competition of the transaction.” *Id.*, ¶¶148-49.

75. However, even assuming that the message described by Low would be displayed on the user device “only after the purchased drink transaction is completed,” [3] I disagree that a POSITA would have understood the message to be *an affordance*. As I discussed above in section VI.A, a POSITA would have understood the term *affordance* to be an interactive user interface element that informs a user as to how to interact with the element and its intended use. As I also discussed above, the specification distinguishes *an affordance* like that recited in limitation [1.12] from a **message** informing the user that an action has been completed. *See, e.g.*, EX1001 (’920 patent), 37:4-18 (distinguishing between an

[2] The quoted passage of Low appears at 7:35-39.

[33] As I discuss in more detail with respect to claims 2 and 16, Dr. Neuman fails to explain why this message would necessarily be displayed on the user device as opposed to, for example, the vending machine. *See infra*, section VII.C.i.

abort affordance and a message informing the user that the transaction has been aborted). Low's message of "Would you like chips with your drink" is, at best, a message informing the user that a transaction has been completed. Thus, in my opinion, Dr. Neuman fails to show that Low's message is *an affordance* according to the plain and ordinary meaning of the term.

76. Finally, I note that Dr. Neuman provides "another example" disclosed by Low that represents *an affordance*. EX1003 (Neuman Declaration), ¶149. Specifically, Dr. Neuman contends that "in *Low*, after 'the user selects a payment button or option on the user device,' the user interface of *Low* would display an updated screen either indicating the button has been selected (e.g., by graying out the button or showing the button in a depressed position) or removing the button altogether." *Id.* I disagree with Dr. Neuman. Low does not disclose, or even suggest, that, after a user selects the payment button, "an updated screen either indicating the button has been selected (e.g., by graying out the button or showing the button in a depressed position) or removing the button altogether" is provided on the user device. Moreover, as I noted above with regard to Dr. Neuman's first theory, Low only describes the use of a payment button with regard to embodiments where the user selects a product at the vending machine itself, which Dr. Neuman fails to acknowledge or explain how it would apply to the other embodiments relied on by Dr. Neuman as teaching other limitations of the claims.

77. Thus, it is my opinion that Low fails to disclose limitation [1.12].

B. Independent claims 13 and 15 are not obvious over Low, Arora, and Freeny

78. In asserting that Low, Arora, and Freeny render obvious independent claims 13 and 15, Dr. Neuman largely references his analysis with respect to independent claim 1, including with respect to the limitations I discussed above. *See* EX1003 (Neuman Declaration), ¶¶204-227, 231-247. As such, it is my opinion that claims 13 and 15 are not obvious over Low, Arora, and Freeny for the same reasons I identified above with respect to independent claim 1. *See supra*, section VII.A.

C. Dependent claims 2-10, 12, 14, and 16-20 are not obvious over Low, Arora, and Freeny

79. I understand claims 2-10, 12, 14, and 16-20 depend directly or indirectly from either claims 1, 13, or 15. In my opinion, these claims are not obvious over Low, Arora, and Freeny for the same reasons identified above with respect to the independent claims. Below, I provide further reasons why certain dependent claims are not obvious over Low, Arora, and Freeny.

i. Claims 2 and 16

80. Claim 2 depends from claim 1 and further recites *wherein the updated user interface of the mobile payment application includes at least one of: a message displayed on the display of the mobile device; a banner notification*

displayed on a display of the mobile device; and/or a visual alert from one or more light-emitting diodes (LEDs) of the mobile device.

81. Dr. Neuman contends that Low discloses *a message displayed on the display of the mobile device* as recited in claim 2. In particular, Dr. Neuman asserts that Low "discloses that 'database 146 may include cross-promotional products and/or preferences for use in upselling products, for example, displaying a message to user 102 after purchasing a drink such as "Would you like chips with your drink."'" EX1003 (Neuman Declaration), ¶158 (citing EX1005 (Low), 7:24-28[4]). Dr. Neuman goes on to argue that "in [his] opinion, the message displayed to user 102 would be displayed on the user interface of the user device 110." *Id.* However, Dr. Neuman does not explain why a POSITA would have understood from Low that the message "would be displayed" on the user interface of the user device. Instead, a POSITA would have understood from Low that the message could be displayed on the vending machine itself. For example, Low describes that the vending machine 120 may include a display capable of displaying information to the user. EX1005 (Low), 2:40-41 (displaying a user identifier at the machine), 5:19-24 (product dispensing module 122 may include a display), 12:52-62 (explaining that the user device's processor may process signals for display on the

[4] The quoted passage of Low appears at 7:35-39.

user device or "transmission to other devices via a communication link 418"). Thus, Dr. Neuman fails to explain how the message described in Low would necessarily be displayed on the user device.

82. Accordingly, it is my opinion that claim 2 is not obvious over Low, Arora, and Freeny for these additional reasons.

83. Claim 16 depends from claim 15 and recites the same limitations as claim 2. Dr. Neuman provides the same arguments as above. EX1003 (Neuman Declaration), ¶¶248-251. Accordingly, for the same reasons I explained for claim 2, it is my opinion that claim 16 is not obvious over Low, Arora, and Freeny.

ii. Claim 3

84. Claim 3 depends from claim 1 and further recites *wherein the information indicates completion of the transaction between the user of the mobile device and the available payment accepting unit*. I note that *the information* recited in claim 3 refers to the *information* that is exchanged between the mobile device and the available payment accepting unit as recited in limitation [1.13]. *See* EX1001 ('920 patent), 47:42-44 (reciting *exchanging information with the available payment accepting unit via the one or more radio transceivers, in conjunction with the transaction*).

85. Dr. Neuman contends that Low "teaches that payment provider server 140 includes a database 146, which 'include[s] information associated with the

transaction history processing' described in *Low*." EX1003 (Neuman Declaration), ¶161 (citing EX1005 (Low), 7:22-24) (alteration and emphasis in original). According to Dr. Neuman, "the transaction history is a record of one or more completed transactions, and this information is exchanged between the user device 110 and the vending machine 120 and ultimately sent to the payment provider server 140 via the network 160." *Id.*

86. In my opinion, Dr. Neuman fails to show how "information associated with the transaction history processing" that is saved on the payment provider server's database means that the information *indicates completion of the transaction* and was exchanged between the user device and the vending machine prior to storage at the payment provider server.

87. First, Low does not disclose that the information associated with the transaction history processing "is exchanged between the user device 110 and the vending machine 120 and ultimately sent to the payment provider server 140 via the network 160," as Dr. Neuman contends. *See* EX1003 (Neuman Declaration), ¶161 (citing EX1005 (Low), 4:45-48, 7:22-24). In the portions of Low cited by Dr. Neuman, Low does not describe that the vending machine and the user device exchange information indicating that the transaction is complete, which is then sent to and stored at the payment provider server. *See* EX1005 (Low), 4:45-48 (stating "user device 110 includes at least one communication module 118 adapted to

communicate with vending machine 120 and/or network 160 including payment provider server 140 and/or vendor server 150"), 7:22-24 (stating "[d]atabase 146 may also include information associated with the transaction history processing described herein"). Dr. Neuman does not identify any disclosure in Low describing (1) the vending machine and the user device exchanging information of a completed transaction and (2) the user device sending information to the payment provider server after a transaction is complete.

88. Second, it is my opinion that a POSITA would have understood Low's statement that "[d]atabase 146 may also include information associated with the transaction history processing described herein" to mean that the database can store a history of the payment provider's processing of the transaction (*i.e.*, , a history of purchase requests received from the user device and approvals transmitted to the user device). For example, Low states that "database 146 may be configured to interact with transaction processing application 142 on behalf of user 102 during a transaction with purchase application 112 to handle payments using account information corresponding to user 102." EX1005 (Low), 7:24-28. Low also explains that the "transaction processing application 142," which is included on the payment provider server 140, is "configured to receive a payment request and respond with an approval for transmission to a vender." *Id.*, 6:51-62.

89. Based on this description, a POSITA would have understood that, when Low states that database 146 "may also include information associated with the transaction history processing described herein," Low was referring to a history of the processing performed by the transaction processing application 142 (*i.e.*, a history of the application's processing of purchase requests and approvals). Contrary to Dr. Neuman's assertions, a POSITA would not have understood Low to mean this information included "a record of one or more completed transactions" that is first exchanged between the user device and the vending machine and then sent to the payment provider. *See* EX1003 (Neuman Declaration), ¶161.

90. Finally, I note that, with respect to limitation [1.13], Dr. Neuman asserts that Low discloses *exchanging information with the available payment accepting unit via the one or more radio transceivers* when the payment verification application 132 of the vending machine "receive[s] an approval of a payment from user device 110, verif[ies] the approval and dispense[s] items purchased from products 124 using product dispensing module 122." EX1003 (Neuman Declaration), ¶¶151-152. Dr. Neuman does not contend that this information (*i.e.*, approval of payment sent to the vending machine) is a "record of one or more completed transactions." *See id.*, ¶¶160-164. In my opinion, it could not be because Dr. Neuman argues that the record is exchanged between the

vending machine and the user device and "ultimately sent to the payment provider server 140." *Id.*, ¶161. A POSITA would not have understood Low to describe that an approval first transmitted by the payment provider server to the user device (and then to the vending machine) would then be sent back to the payment provider server for storage.

91. Accordingly, it is my opinion that claim 3 is not obvious over Low, Arora, and Freeny for these additional reasons.

iii. Claim 4

92. Claim 4 depends from claim 3 and further recites *wherein the mobile device includes a long-range transceiver and the information at least includes an amount of the completed transaction, and the method further comprises: sending at least the amount of the completed transaction to a server via the long-range transceiver*.

93. Dr. Neuman argues that Low "teaches user device 110 transmits to payment provider server 140 'a purchase request including … product price,' and that payment provider server 140 includes a database 146, which 'include[s] information associated with the transaction history processing' described in Low." EX1003 (Neuman Declaration), ¶167. In my opinion, Dr. Neuman fails to show Low discloses the limitations of claim 4 for the same reasons I explained above for claim 3. Specifically, Dr. Neuman fails to explain how "information associated

with the transaction history processing" that is saved on the payment provider server's database means that the information was exchanged between the user device and the vending machine prior to storage at the payment provider server.

94. Moreover, Dr. Neuman also cites to Low's description of "a purchase request" that includes a "product price" as *information [that] at least includes an amount of the completed transaction*. *See* EX1003 (Neuman Declaration), ¶167 (citing EX1005 (Low), 6:3-8). However, this portion of Low relates to embodiments where a purchase request is generated by the vending machine and transmitted to the user device when the user uses the vending machine itself to select a product to purchase. *See* EX1005 (Low), 6:3-8 (stating "[i]n other embodiments, payment verification application 132 [of the vending machine] may first transmit a purchase request including a … product price … to user device 110"). As I noted above with respect to limitation [1.12], this is distinct from embodiments where the user selects a product using the user device and the user device generates and transmits a purchase request to the payment provider server. Thus, for the reasons I explained above with respect to limitation [1.12], Dr. Neuman fails to show that Low discloses the limitations of claim 4 because Dr. Neuman relies on different embodiments described in Low.

95. Accordingly, it is my opinion that claim 4 is not obvious over Low, Arora, and Freeny for these additional reasons.

iv. Claims 5 and 18

96. Claim 5 depends from claim 1 and further recites *wherein the information indicates abortion of the transaction initiated by the user of the mobile device*.

97. Dr. Neuman argues that Low discloses the limitations of claim 5 because Low "teaches that 'the user device transmits the purchase request to a server for approval,' which 'may determine if there are any restrictions and/or limitations corresponding to the user account and may take appropriate actions as desired.'" EX1003 (Neuman Declaration), ¶171. According to Dr. Neuman, Low's "disclosure of a server determining whether there are any restrictions and/or limitations … encompasses a scenario where the transaction is aborted (e.g., because of a restriction and/or limitation on the user account or inadequate funds)." *Id.*, ¶172. Dr. Neuman then reasons that Low "contemplates the user device 410 transmitting information indicating an abortion of the transaction … to the vending machine 420 in a similar manner," such as "the sending of a 'close' or 'terminate' protocol message" to close the Bluetooth connection. *Id.*, ¶173.

98. In my opinion, Dr. Neuman fails to show that the exchange of information between the mobile device and the available payment accepting unit *indicates abortion of the transaction initiated by the user of the mobile device*.

99. Specifically, Dr. Neuman's reasoning as to how Low discloses this limitation is based on unsupported speculation. While Dr. Neuman argues that Low "contemplates" transmitting information indicating an abortion of the transaction, such as a "close" or "terminate" protocol message, when the server determines there is a restriction or limitation, there is no such disclosure in Low. Dr. Neuman's only basis for this theory is based on Low's description that the server may "take appropriate actions as desired." *Id.*, ¶173 (citing EX1005 (Low), 10:41-54). However, a POSITA would have understood that these appropriate actions may simply be informing the user of the restriction or limitation (*e.g.*, informing the user that there are inadequate funds), at which point, the user can walk away from the vending machine. In this scenario, no information is exchanged between the user device and the vending machine that *indicates abortion of the transaction*. Dr. Neuman provides no basis or reasoning why a POSITA would have understood that a "close" or "terminate" protocol message would be transmitted to the vending machine in Low or why a POSITA would have had reason to do so.

100. Accordingly, it is my opinion that claim 5 is not obvious over Low, Arora, and Freeny for these additional reasons.

101. Claim 18 depends from claim 15 and recites the same limitations as claim 5. Dr. Neuman provides the same arguments as above. EX1003 (Neuman

Declaration), ¶¶257-261. Accordingly, for the same reasons I explained for claim 5, it is my opinion that claim 18 is not obvious over Low, Arora, and Freeny.

v. Claims 6 and 19

102. Claim 6 depends from claim 1 and further recites *wherein the information indicates failure of the transaction initiated by the user of the mobile device or a malfunction associated with the available payment accepting unit*.

103. Dr. Neuman argues that Low discloses the limitations of claim 6 based on the same reasoning advanced for claim 5. That is, Dr. Neuman argues that the server's determination of restrictions and/or limitations "encompasses a scenario where the transaction fails (e.g., because of a restriction and/or limitation on the user account or inadequate funds)" and Low "contemplates the user device 410 transmitting information indicating a failure of the transaction … to the vending machine 420" by "a closing of the connection." EX1003 (Neuman Declaration), ¶¶175-179.

104. However, for the same reasons provided above with respect to claim 5, Dr. Neuman provides no basis or reasoning why a POSITA would have understood that a "close" or "terminate" protocol message would be transmitted to the vending machine in Low or why a POSITA would have had reason to do so. *Supra*, section VII.C.iv.

105. Accordingly, it is my opinion that claim 6 is not obvious over Low, Arora, and Freeny for these additional reasons.

106. Claim 19 depends from claim 15 and recites the same limitations as claim 6. Dr. Neuman provides the same arguments as above. EX1003 (Neuman Declaration), ¶¶262-265. Accordingly, for the same reasons I explained for claim 6, it is my opinion that claim 19 is not obvious over Low, Arora, and Freeny.

vi. Claim 7

107. Claim 7 depends from claim 1 and further recites *wherein the mobile device includes an accelerometer and the method further comprises: based on data from the accelerometer, determining whether the user is walking away from the available payment accepting unit; and in accordance with a determination that the user is walking away from the available payment accepting unit, canceling the wireless communication path*.

108. Dr. Neuman contends that Arora discloses the limitations recited in claim 7. *See* EX1003 (Neuman Declaration), ¶¶180-188. As I explain below, Dr. Neuman fails to show that Arora teaches each of the elements of claim 7.

109. First, Dr. Neuman asserts that Arora discloses, *based on data from [an] accelerometer, determining whether the user is walking away from the available payment accepting unit* because Arora teaches "two vending machines 30, 31 that define multiple transaction distances" and also teaches that "the

location of the customer relative to the vending machines 30, 31 … may be determined through '[i]nertial guidance [which] may use an accelerometer.'" *Id.*, ¶¶181-182 (alterations original).

110. However, I note that there is no disclosure in Arora describing using an accelerometer to determine whether a user is walking away from the vending machine. Instead, Arora describes only "determin[ing] whether or not a customer is within a particular transaction distance of a particular vending machine or vending group." EX1006 (Arora), 18:37-42. For example, in discussing FIG. 1, Arora describes "four transaction distances from a vending machine," including (from nearest to farthest) a "dispensing distance," an "identification distance," a "within sight" distance, and a "potential buyer" distance. *Id.*, 12:34-13:5.

111. Arora explains that "[w]hen the customer [is] within the transaction distance," a message "appropriate to the potential transaction is sent to the customer." *Id.*, 18:44-47, FIG. 6. If no response is received within a timeout period, the user's position is again determined and the process repeats. *See id.*, 18:53-55 ("If no response is received within a timeout period …, the flowchart restarts at 89."), FIG. 6 (illustrating step 89 as initiating "Customer Transaction Distance to Vending Machine?"). If a response is received and validated, Arora teaches "we wait until dispensing distance is confirmed." *Id.*, 18:56-19:1. Thus, in my opinion, Arora describes use of an accelerometer in relation to determining a

user's distance from a machine and whether that distance falls within "a particular transaction distance." This includes FIG. 6 of Arora, which similarly describes "determin[ing] whether or not a customer is within a particular transaction distance of a particular vending machine or vending group." *Id.*, 18:37-42; *see also* EX1003 (Neuman Declaration), ¶¶183-184 (citing to FIG. 6 of Arora). Dr. Neuman does not explain how Arora's determination of a transaction distance equates to disclosure of a determination of how a user is moving relative to a machine, including that the user is *walking away* from the machine as recited in claim 7.

112. Dr. Neuman also cites to Arora's process for how a customer's response is verified as valid. *See* EX1003 (Neuman Declaration), ¶184. In particular, Dr. Neuman cites to Arora at 18:57-61, which states that the verification of the received customer's response can be achieved in various ways:

> For example, the message may be encrypted; contain a password; contain a communications checksum or hash; fall within predetermined bounds such as time, location, product type or price; use a secure element within a personal electronic device; use a third party to determine validity or any combination of these or other means.

EX1006 (Arora), 18:56-64.

113. Dr. Neuman contends that "[g]iven Arora's prior teachings of determining customer location through inertial guidance, the verification of the message through predetermined bounds such as time and location clearly encompasses determining whether the customer is walking away from the machine." EX1003 (Neuman Declaration), ¶185.

114. However, I disagree with Dr. Neuman's assertion that Arora's general listing of time or location as options for verifying a received customer response "clearly encompasses determining whether the customer is walking away from the machine." *Id.* In my opinion, this assertion is undermined by the surrounding context of Arora's description, including the other options listed by Arora for verifying a received customer response. For example, Arora lists determining whether a "product type of price" "fall[s] within predetermined bounds" as a way to verify the validity of the response. EX1006 (Arora), 18:56-64. A POSITA would have understood this to be directed to a determination of whether the received response is in relation to a product type or price that falls within a predetermined bound. Similarly, a POSITA would have understood that Arora's additional listing of time and location to indicate a determination whether the received response falls within a predetermined time period (*e.g.*, within business hours) or a predetermined location. Thus, in my opinion, Arora does not support

Dr. Neuman's assertion that Arora "clearly encompasses determining whether the customer is walking away from the machine."

115. Second, Dr. Neuman argues that a POSITA "would have found it obvious" to *cancel[] the wireless communication path* when it is *determin[ed] that the user is walking away from the available payment accepting unit*. EX1003 (Neuman Declaration), ¶186. In particular, Dr. Neuman contends that "because *Arora* describes when the inertial guidance indicated that the personal electronic device was moving away from the vending machine, then a POSA would have been motivated to incorporate these teachings from *Arora* into *Low* to cancel the wireless communication path between the personal electronic device and the vending machine to conserve resources." *Id.* However, as I noted above, there is no support in Arora that an accelerometer is used to determine that a user is walking away from a vending machine. Moreover, neither Low nor Arora discusses canceling a communication link between the user device and the vending machine (*e.g.*, as opposed to just letting the user walk out of range or timing out a transaction).

116. I also disagree with Dr. Neuman's assertions that a POSITA would have understood that cancelling the wireless communication path would "conserve resources." *Id.*; *see also id.*, ¶96 (Dr. Neuman stating that "[o]ne of ordinary skill in the art would have understood that maintaining connections requires resources

on both ends of the connection …, and that such connections should not remain active when not needed in order to preserve those resources for other interactions"). As an initial matter, neither Low nor Arora mentions a concern about the resources required to maintain connections, including any connection between the user device and vending machine. In addition, a POSITA would have understood that the type of connections described in Low (*e.g.*, a short-range communication link) typically involved the use of minimal resources to maintain. A POSITA would have further appreciated that this would have been especially true in the context of how the user device and the vending machine communicate in Low through discrete messages (*e.g.*, the transmission of a machine identifier from the vending machine or an approval from the user device). Moreover, a POSITA would have understood that cancelling the wireless communication path would lead to the unnecessary use of additional resources. For example, in the event that the user walks back toward the machine, the communication path would need to be re-established, which would require a need to expend additional resources (*e.g.*, by requiring the user device to repeat the handshake to re-establish the communication link). Lastly, a POSITA would have appreciated that more efficient means existed to manage connections, including using a timeout period to ensure that the user would not be proceeding with the transaction or simply letting the user walk out of range.

117. Accordingly, it is my opinion that claim 7 is not obvious over Low, Arora, and Freeny for these additional reasons.

vii. Claim 10

118. Claim 10 depends from claim 1 and further recites *wherein the user interface of the mobile payment application, after establishing the wireless communication path, indicates that the wireless communication path has been established with the available payment accepting unit*.

119. Dr. Neuman argues that Low discloses the limitations of claim 10 because Low "teaches that '[i]nventory data 154 may be received from vending machine 120, for example using an Internet connection of user device 110 after a short range communication link is established between user device 110 and vending machine 120.'" EX1003 (Neuman Declaration), ¶198. Dr. Neuman then argues that "the user device 110 receiving and displaying the inventory data of the particular vending machine 120 indicates that the wireless communication path has been established with the vending machine 120, as the inventory data could not be displayed unless the wireless communication path had successfully been established." *Id.*, ¶199.

120. I disagree with Dr. Neuman's assertion that "the inventory data could not be displayed unless the wireless communication path had successfully been established" and thus necessarily *indicates that the wireless communication path*

has been established with the available payment accepting unit. This is because Low teaches that inventory data can be displayed on the user device even where there is no wireless communication path between the user device and the vending machine.

121. Specifically, Low explains that inventory data is communicated to the user device for display via the payment provider server. *See* EX1005 (Low), 2:16-20 (stating user device "retrieve[s] a menu of items at the specific machine from the payment provider or an operator of the machine"), 9:8-11 (payment provider server may transmit "list of products 124"). Low also describes that this inventory data can be transmitted to the user device even in instances where the user device is **not** in communication range with the vending machine. For instance, Low teaches that "a user may not know a location of a NICM configured to accept electronic payments," but "the user may utilize a user device to access payment provider server 140 and receive locations of available NICMs with lists of available products at each machine." *Id.*, 9:18-23. Low also states that the "user device 110 may remotely purchase an item from products 124 **without** a short range communication link established concurrently with vending machine 120." *Id.*, 9:62-65 (emphasis added). Thus, Dr. Neuman fails to show that the display of inventory data on the user device *indicates that the wireless communication path has been established* because Low teaches that inventory data can be displayed

without an established wireless communication between the user device and the vending machine.

122. Accordingly, it is my opinion that claim 10 is not obvious over Low, Arora, and Freeny for these additional reasons.

VIII. GROUND 2: CLAIM 11 WOULD NOT HAVE BEEN OBVIOUS IN VIEW OF LOW, ARORA, FREENY, AND CASEY

123. For Ground 2, Dr. Neuman contends that Casey further teaches limitations recited in dependent claim 11. *See* EX1003 (Neuman Declaration), ¶¶282-286. I understand that Dr. Neuman does not rely on Casey as disclosing any of the limitations recited in the independent claims. For this reason, claim 11 is not obvious over Low, Arora, Freeny, and Casey for the same reasons I detailed above for Ground 1. *See supra*, section VII.A.

IX. GROUND 3: CLAIMS 1-20 ARE DIRECTED TO SUBJECT MATTER THAT WAS NOT WELL-KNOWN, ROUTINE, AND CONVENTIONAL

124. I understand that Dr. Neuman asserts that claims 1-20 "are directed to using well-understood, routine, and conventional wireless technology and graphical user interface (such as a generic smart phone), operating as such devices do, according to well-understood, routine, and conventional methods to perform the concept of identifying a merchant and enabling completion of a purchase." EX1003 (Neuman Declaration), ¶288. Dr. Neuman also asserts that the claims "considered on an element-by-element basis, and as an ordered combination,

would have been considered by a POSA to be well-understood, routine, and conventional as of December 18, 2013" and refers to his opinions that the claims "would have been obvious to a POSA" based on Low, Arora, Freeny, and Casey, which, according to Dr. Neuman, "further support[] [his] opinion that the Challenged Claims were well-understood, routine, and conventional." *Id.*, ¶¶289-290.

125. Before I address the specific opinions expressed in Dr. Neuman's declaration, I have been asked to opine on what a POSITA would have understood to be the differences between limitation [1.3] of the '920 patent and a limitation that appears in U.S. Patent No. 10,891,614 ("the '614 patent"), which I understand is a patent related to the '920 patent and was the subject of a prior post-grant review proceeding before the Board.

126. The limitations I have been asked to discuss are shown below. I understand that the limitations shown on the left are limitations recited in claim 1 of the '614 patent. The limitations shown on the right are limitations [1.2] and [1.3] of the '920 patent, with annotations that show the relative differences between limitations [1.2] and [1.3] of the '920 patent and the limitations recited in claim 1 of the '614 patent. Claim language that does not appear in claim 1 of the '920 patent is shown in red font with strikethrough, while claim language that

appears in claim 1 of the ’920 patent is shown in green font with bold and underline.

The '614 Patent Claim 1	**The ’920 Patent Claim 1**
identifying one or more payment accepting units in proximity to the mobile device that are available to accept payment from a mobile payment application executing on the mobile device,	[limitation 1.2] identifying one or more payment accepting units ~~in proximity to the mobile device~~ that are available to accept payment from a mobile payment application executing on the mobile device,
the identifying including detecting predefined radio messages broadcast by the one or more payment accepting units	[limitation 1.3] the identifying ~~including detecting predefined radio messages broadcast by~~ **based at least in part on an identifier or location corresponding to** the one or more payment accepting units

127. As shown above, limitation [1.3] of the ’920 patent claim 1 recites identifying one or more payment accepting units, where *the identifying [is] based at least in part on an identifier or location corresponding to the one or more payment accepting units*. In contrast, claim 1 of the ’614 patent recites identifying one or more payment accepting units, where *the identifying includ[es] detecting predefined radio messages broadcast by the one or more payment accepting units*.

128. In my opinion, a POSITA would have understood that limitation [1.3] of the ’920 patent recited features distinct from the limitation that appears in claim 1 of the ’614 patent. Specifically, a POSITA would have understood claim 1 of the ’614 patent to be reciting a particular communication medium that is detected in

order to identify a payment accepting unit (*i.e.*, predefined radio messages), while limitation [1.3] of the '920 patent recites the type of content (*i.e.*, an identifier or location) that is used to identify a payment accepting unit. I note that the '920 patent specification treats these terms as distinct and even describes the type of content recited in limitation [1.3] as narrower than the predefined radio messages recited in claim 1 of the '614 patent. *See, e.g.*, EX1001 ('920 patent), 11:34-35 (referring to a "message" as "a communication or transmissions"), 13:41-46 (stating "messages" can "include various types of information and/or instructions"), 29:48-55 (describing "a packet 1100 of information broadcast by the payment module 100," which includes "module ID 1102"), 29:56-59 (stating "the module ID 1102 is a unique identifier corresponding to the payment module 100").

129. Turning to Dr. Neuman's opinions, according to the legal principles outlined in section III above, I understand that Dr. Neuman's opinions are directed to step two of the Supreme Court's two-part test on assessing the patent eligibility of patent claims. *See supra*, section III ((¶¶18-20). I understand that Dr. Neuman does not provide any opinions relating to step one of the test, instead stating that he has "been informed by counsel" that "the independent Claims 1, 13, 15 are directed to the abstract idea of identifying a merchant and enabling completion of a purchase from the merchant." EX1003 (Neuman Declaration), ¶287.

130. As I explain below, it is my opinion that Dr. Neuman fails to show that each of the challenged claims of the '920 patent "would have been considered by a POSA to be well-understood, routine, and conventional as of December 18, 2013." *See id.*, ¶289.

131. As an initial matter, as I explained above in section IV, the '920 patent describes two types of embodiments in which the system can operate: a "hands-free mode" or a "manual mode" (or also referred to as a "'swipe-to-pay' mode"). *See* EX1001 ('920 patent), 2:25-29, 6:11-16. The specification describes that, in the hands-free mode, user input to the mobile device is not required in order to conduct a transaction. That is, in the hands-free mode, a user can "leave the mobile device 150 in a pocket, purse, briefcase, backpack, or other carrier" when approaching a payment accepting unit. *Id.*, 7:45-58. When a user is within range to a payment accepting unit, "a pre-installed mobile application 140 automatically connects to the payment accepting unit 120" and, as the user approaches the unit within an "arm's-length" distance, "the user could observe the transferred funds on the display" of the payment accepting unit and "input[] his/her selection on the payment accepting unit 120" to dispense a product or service without having to interact with the mobile device. *Id.*

132. In contrast, in the manual mode, the '920 patent teaches that the user must interact with the mobile device to interact with the payment accepting unit.

For example, the ’920 patent explains that, after “a pre-installed mobile application 140 automatically connects to the payment accepting unit 120,” the mobile application itself “might display (on the touch screen 152) a prepaid balance that the user ‘swipes’ to transfer payment to the payment accepting unit.” *Id.*, 7:19-24. The user then “could observe the transferred funds on the touch screen 152 of the mobile device 150,” which allows the user to “input[] his selection on the payment accepting unit 120” to dispense the product or service. *Id.*, 7:24-31. The ’920 patent also explains that, in the manual mode, “the mobile device 150 can display … a visual indication of the payment accepting unit 120 … for visual confirmation,” which “the user can manually change the payment accepting unit 120.” *Id.*, 24:53-59.

133. The claims of the ’920 patent recite limitations that make clear that the claimed invention is directed to the manual mode embodiment. For example, claim 1 of the ’920 patent recites that the user interface of the mobile application is configured to *display a visual indication of the one or more payment accepting units* that have been identified as available to accept payment by the mobile device (limitations [1.2]-[1.6]) and *accept user input selecting an available payment accepting unit of the one or more payment accepting units* (limitation [1.7]). Claim 1 also recites that *establishing via the one or more radio transceivers* of the mobile device *a wireless communication path including the mobile device and the*

available payment accepting unit (limitation [1.8]) and, *after establishing the wireless communication path*, *enabling user interaction with the user interface of the mobile payment application to complete a transaction with the available payment accepting unit* (limitation [1.9]). The claim further specifies that, *after establishing the wireless communication path*, the user interface includes specific user interface elements, including *a visual representation of the available payment accepting unit, an indication of a balance, and an affordance that, in response to a user input, indicates completion of the transaction* (limitations [1.10]-[1.12]).

134. These claim limitations describe a mobile device that provides specific features that a user must interact with to engage with the payment accepting unit. This includes for example, providing the user the ability to *select[] an available payment accepting unit* among the one or more payment accepting units from which to purchase. It also includes *enabling* the user to interact with the application *to complete a transaction*, while providing specific assurances that the user will be able to conduct the transaction that the user desires, including by providing *a visual representation of the available payment accepting unit* in the wireless communication path so that the user confirms that the transaction will be conducted with the desired payment accepting unit. The user interface also provides an assurance to the user that sufficient funds are available to conduct a desired transaction by providing *an indication of a balance*. In addition, the user

interface provides *an affordance that, in response to a user input, indicates completion of the transaction*, which, as I discussed above in section VI.A, a POSITA would have understood as being a type of interactive element specific to user interfaces.

135. Moreover, it is my opinion that Dr. Neuman has not shown that the specific elements recited in claims 1-20 were "well-known, routine, and conventional." EX1003 (Neuman Declaration), ¶¶288-290. For example, with respect to claim 1 and the requirement that *the user interface be[] configured to display a visual indication of the one or more payment accepting units* as recited in limitation [1.6], Dr. Neuman argues that "[d]isplaying a visual representation on a user interface was well-known, routine, and conventional as of December 18, 2013," citing to Low as "disclos[ing] a user interface that is configured to display an available machine" *Id.*, ¶¶306-307. However, as I explained above, Dr. Neuman's Ground 1 assertions regarding how Low discloses the claimed display of *a visual indication of the one or more payment accepting units* are unsupported. *See supra*, section VII.A.i. In addition, also with respect to claim 1, Dr. Neuman argues that a user interface that includes an *affordance* as recited in limitation [1.12] "was well-known, routine, and conventional as of December 18, 2013." *Id.*, ¶317. As support, Dr. Neuman argues that, as he discussed in his Ground 1 analysis, "the prior art demonstrates that a user interface that includes an

'affordance' that, in response to user input, indicates completion of the transaction, was well-known, routine and conventional." *Id.* However, as I explained above, Dr. Neuman's Ground 1 assertions regarding how Low discloses the claimed *affordance* are unsupported. *See supra*, section VII.A.ii. Thus, Dr. Neuman's assertions that the "the prior art demonstrates" that the claimed *affordance* was "well-known, routine and conventional" are also unsupported. EX1003 (Neuman Declaration), ¶317.

136. In addition, Dr. Neuman also fails to show that limitations recited in the dependent claims of the '920 patent were well-known, routine, and conventional.

137. For example, claims 2 and 16 recite the display of particular features (*i.e.*, a message, a banner notification, or a visual alert from one or more LEDs) after a particular sequence of events using specific hardware (*i.e.*, after *exchanging information with the available payment accepting unit via the one or more radio transceivers, in conjunction with the transaction* (limitation [1.13])). Dr. Neuman argues that these limitations "were well-understood, routine, and conventional" because "the prior art discloses user interfaces which display or include the functions claimed" in claims 2 and 16 as explained in his Ground 1 analysis. EX1003 (Neuman Declaration), ¶325. However, as I explained in section VII.C.i,

Dr. Neuman fails to show that the applied prior art discloses the specific features recited in these claims.

138. Dr. Neuman makes similar allegations with respect to claims 3 and 4. These claims recite that particular types of information (*i.e.*, information that *indicates completion of the transaction between the user of the mobile device and the payment accepting unit* (claim 3) and *includes an amount of the completed transaction* (claim 4)) are exchanged between the mobile device and the available accepting unit using particular hardware (*i.e.*, *one or more radio transceivers* (limitation [1.13])), with claim 4 further specifying that the information is also sent to *a server via [a] long-range transceiver*. In arguing that these specific limitations were "well-understood, routine, and conventional," Dr. Neuman again refers to his Ground 1 arguments to allege that "the prior art discloses" the limitations recited in the claims. EX1003 (Neuman Declaration), ¶¶325-326. However, as I explained in sections VII.C.ii-iii, Dr. Neuman fails to show that the applied prior art discloses the specific features recited in these claims.

139. For claims 5-6 and 18-19, Dr. Neuman argues that the claims recite "nothing more than using a conventional display to convey generic information about a transaction," which is "much like a cashier communicating the same information to a customer verbally." EX1003 (Neuman Declaration), ¶327. Similarly, for claim 10, Dr. Neuman asserts that it "recites a generic user interface

notification that a conventional communication path has been established." *Id.*, ¶329. For each of claims 5-6, 10, and 18-19, Dr. Neuman again asserts that "the prior art discloses" the elements of these claims, "further demonstrating that these functions were well-understood, routine, and conventional." *Id.*, ¶¶327, 329. However, these claims specify particular components and hardware by which specific information is exchanged or provided. For example, for claims 5-6 and 18-19, the claims specify that particular information (*i.e.*, *abortion of the transaction* (claims 5 and 18) or *failure of the transaction* (claims 6 and 19)) are exchanged between the mobile device and the available payment accepting unit via the one or more radio transceivers. Claim 10 also specifies that the user interface provides specific information to the user regarding the status of a particular connection (*i.e.*, an indication *that the wireless communication path has been established*) between particular devices and hardware (*i.e.*, *the mobile device and the available payment accepting unit of the one or more payment accepting units* that is established *via the one or more radio transceivers* (limitation [1.8])). As I explained in sections VII.C.iv-v, VII.C.vii, Dr. Neuman fails to show that the applied prior art discloses the specific features recited in these claims.

140. For claim 7, Dr. Neuman argues that "using a standard accelerometer inherent to a mobile device to detect movement was already well-known." EX1003 (Neuman Declaration), ¶332. Dr. Neuman specifically cites to Arora to

argue that "using a generic, well-known accelerometer to apply the idea of cancelling a transaction when a customer walks away from a location was well-known, routine, and conventional." *Id.*, ¶¶332-333. Claim 7, however, does not recite the generic use of an accelerometer. In particular, claim 7 recites the use of data from an accelerometer to make a specific determination (*i.e.*, *whether the user is walking away from the available payment accepting unit*) and *canceling the wireless communication path* that had been established between the mobile device and the available payment accepting unit upon a determination that the user is walking away. As I explained above in section VII.C.vi, Dr. Neuman provides no evidence that this specific combination of features is disclosed in the prior art, including Arora.

X. CONCLUDING STATEMENTS

141. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

142. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and 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.

Dated: 12/5/2025 By: 

Jeffrey Miller, Ph.D.

XI. APPENDIX – LIST OF MATERIALS CITED

Exhibit No	Description
	Alliance Laundry Systems, LLC v. PayRange LLC, PGR2025-00027, Paper 12 (P.T.A.B. Aug. 25, 2025) (Board's Decision on Institution)
1001	U.S. Patent No. 11,966,920 to Patel
1003	Declaration of Dr. Clifford Neuman
1005	U.S. Patent No. 10,210,501 to Low
1006	U.S. Patent No. 9,898,844 to Arora
2010	Transcript of the Deposition of Dr. Clifford Neuman, held on November 4, 2025
2011	A. Cooper, *About Face: The Essentials of User Interface Design*, Chapter 5, IDG Books Worldwide, Inc. (1995)
2012	W.O. Galitz, *The Essential Guide to User Interface Design*, Chapter 2, Wiley Publishing, Inc. (2007)
2013	L.H. Chen et al., *Applicability of Affordance Concept in User-Computer Interaction*, 2012 7th International Conference on Computing and Convergence Technology (03-05 December 2012)