

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CSC SERVICEWORKS, INC.,
Petitioner,

v.

PAYRANGE, INC.,
Patent Owner.

IPR2023-01186
U.S. Patent No. 8,856,045

**DECLARATION OF DR. B. CLIFFORD NEUMAN
UNDER 37 C.F.R. § 1.68 IN SUPPORT OF PETITION FOR
INTER PARTES REVIEW**

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I, Dr. B. Clifford Neuman, do hereby declare as follows:

I. INTRODUCTION

1. I am making this declaration at the request of CSC Serviceworks, Inc. in the matter of the *Inter Partes* Review of U.S. Patent No. 8,856,045 (“the ‘045 patent”) to Patel *et al.*

2. I am also being reimbursed for reasonable and customary expenses associated with my work and testimony in this investigation. My compensation is not contingent on the outcome of this matter or the specifics of my testimony, and I have no other interest in this case or the parties thereto.

3. I have been asked to provide my opinions regarding whether claims 1-26 (“the Challenged Claims”) of the ‘045 patent are unpatentable as they would have been anticipated and/or obvious to a person having ordinary skill in the art (“POSITA”) at the time of the alleged invention, in light of the prior art. It is my opinion that all of the Challenged Claims would have been anticipated and/or obvious to a POSITA.

4. In the preparation of this declaration, I have studied:

- a. The ‘045 patent, Ex.1001;
- b. The prosecution history of the ‘045 patent (“‘045 file history”), Ex.1002;
- c. U.S. Patent No. 10,210,501 to Low *et al.* (“Low”), Ex.1004;

- d. U.S. Patent Pub. No. 2009/0106160 to Skowronek (“Skowronek”), Ex.1005;
- e. U.S. Patent No. 8,958,846 to Freeny (“Freeny”), Ex.1006;
- f. U.S. Patent No. 7,455,223 to Wilson *et al.* (“Wilson”), Ex.1007; and
- g. *Multi-Drop Bus/Internal Communication Protocol (MDB/ICP) Specification* (version 3.0, March 26, 2003) (“MDB/ICP Specification”), Ex.1008.

5. In forming the opinions expressed below, I have considered: the documents listed above; the relevant legal standards, including the standards for anticipation and obviousness; any additional authoritative documents as cited in the body of this declaration; and my own knowledge and experience based upon my work in the field of electronic payments and distributed networks as described below.

6. Unless otherwise noted, all emphasis in any quoted material has been added.

II. QUALIFICATIONS AND PROFESSIONAL EXPERIENCE

7. My complete qualifications and professional experience are described in my *Curriculum Vitae*, a copy of which can be found in Exhibit 1009. The following is a brief summary of my relevant qualifications and professional experience.

8. I received a Ph.D. in Computer Science in 1992 and an M.S. in Computer Science in 1988 from the University of Washington, and an S.B. (Bachelor’s) in

Computer Science and Engineering in 1985 from the Massachusetts Institute of Technology.

9. Since receiving my doctorate, I have devoted my career to the field of distributed computer systems development and research, with a significant portion of my experience in the area of electronic commerce and internet payments. I have studied, taught, practiced, and researched in the field of computer science for over forty years.

10. I am currently an Associate Professor of Computer Science Practice in the Department of Computer Science at the University of Southern California (USC), where I have taught since 1992. I am also the Director of the Center for Computer Systems Security, affiliated faculty at USC's Information Sciences Institute, and I direct the Computer Security Curricula within the Data Science Program at USC.

11. I teach and have taught numerous courses at USC, including advanced courses in computer science for upper-level undergraduates and graduate students, on topics such as distributed systems and computer and network security.

12. As part of my research at USC, I have worked in a number of areas, including research in distributed computer systems with emphasis on scalability and computer security, especially in the areas of authentication, authorization, policy, electronic commerce, and protection of cyber-physical systems and critical infrastructure such as the power grid. I have worked on the design and development

of scalable information, security, and computing infrastructure for the Internet. I am also the principal designer of the Kerberos system, an encryption-based authentication system used among other things as the primary authentication method for most versions of Microsoft's Windows, as well as many other systems. I developed systems which used Kerberos as a base for more comprehensive computer security services supporting authorization, accounting, and audit.

13. In addition to my academic experience, I have many years of practical experience designing computer security systems. For example, from 1985-1986, I worked on Project Athena at MIT, to produce a campus-wide distributed computing environment. I also served as Chief Scientist at CyberSafe Corporation from 1992-2001. I have designed systems for network payment which build upon security infrastructure to provide a secure means to pay for services provided over the Internet. For example, I designed the NetCheque and NetCash systems, which are suitable for micropayments (payments on the order of pennies where the cost of clearing a credit card payment would be prohibitive). In 2000 and 2001 I was on the advisory board for NetResearch Inc, d/b/a BayBuilder, which was a company developing online auction platforms.

14. As part of my research on computer security and electronic payment systems I was involved with the integration of portable electronic devices such as

smart cards and PCMCIA cryptographic processors with other computer devices such as card readers and personal computers.

15. I have authored or co-authored over 50 academic publications in the fields of computer science and engineering. In addition, I have been a referee or editor for the following academic journals: ACM Transaction on Information and Systems Security and International Journal of Electronic Commerce. My curriculum vitae includes a list of publications on which I am a named author.

16. I am also a member of the IEEE, Association for Computer Machinery (ACM), and the Internet Society (ISOC), among others. I have also served as program and/or general chair of the following conferences: The Internet Society Symposium on Network and Distributed System Security and the ACM Conference on Computer and Communications Security.

17. My complete qualifications and professional experience are described in my Curriculum Vitae, a copy of which can be found in Exhibit 1009.

III. LEVEL OF ORDINARY SKILL IN THE ART

18. I understand there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the levels of education and experience of persons working in the field at the time of the invention; (2) the sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems.

19. It is my understanding that the earliest possible priority date for the ‘045 patent is December 18, 2013. A person of ordinary skill in the art (“POSITA”) in the field of the ‘045 patent, 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.

20. For purposes of this Declaration, in general, and unless otherwise noted, my statements and opinions, such as those regarding my experience and the understanding of a POSITA generally (and specifically related to the references I consulted herein), reflect the knowledge that existed in the field as of the alleged priority date of the ‘045 patent (*i.e.*, December 18, 2013). Unless otherwise stated, when I provide my understanding and analysis below, it is consistent with the level of a POSITA as of the alleged priority date of the ‘045 patent.

IV. RELEVANT LEGAL STANDARDS

21. I am not an attorney. In preparing and expressing my opinions and considering the subject matter of the ‘045 patent, I am relying on certain basic legal principles that counsel have explained to me. These principles are discussed below.

22. I understand that prior art to the '045 patent includes patents and printed publications in the relevant art that predate the priority date of the alleged invention recited in the '045 patent.

23. I have been informed and understand that a patent claim may be invalid as “anticipated” under 35 U.S.C. § 102 if each element of that claim is disclosed either explicitly or inherently in a single prior art reference. I understand that a disclosure is “inherent” if the missing element is necessarily present in view of the explicit disclosure. The fact that the reference might possibly practice or contain a claimed limitation is insufficient to establish that the reference inherently teaches the limitation. For anticipation by a prior art publication or document, I further understand that the reference’s description must enable a POSITA to practice the claimed invention without undue experimentation.

24. I have been informed that a claimed invention is unpatentable under 35 U.S.C. § 103 if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. I have also been informed by counsel that the obviousness analysis takes into account factual inquiries including the level of ordinary skill in the art, the scope and content of the prior art, and the differences between the prior art and the claimed subject matter.

25. I have been informed by counsel that the Supreme Court has recognized several rationales for combining references or modifying a reference to show obviousness of claimed subject matter. Some of these rationales include the following: (a) combining prior art elements according to known methods to yield predictable results; (b) simple substitution of one known element for another to obtain predictable results; (c) use of a known technique to improve a similar device (method, or product) in the same way; (d) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results; (e) choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and (f) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

V. BACKGROUND

The ‘045 patent relates to systems and methods to perform mobile payments on a “payment accepting unit”—an unmanned retail device. ‘045 patent at 1:14-17, 1:27-38. The background of the ‘045 patent explains that methods for mobile payment on these devices—including by wireless communications between the machine and a customer’s personal mobile device—was known in the art at the time the ‘045 patent was filed. ‘045 patent at 1:55-3:30. For example, it was already known that mobile payments could be completed using a machine “that is designed

to communicate with a cellular phone such that it dispenses a product when it receives information indicating that the product has been selected.” ‘045 patent at 2:15-18. The prior art systems included “an interface to communicate with users, a communications system that enables it to act as part of a network and communicate with a central system, and a controller, that articulates the communication among the above mentioned components, so as to enable a central system to perform diverse actions on a vending machine” as well as authorization performed by a “remote payment server.” ‘045 patent at 2:56-61, 3:27-30.

26. However, according to the ‘045 patent, these prior art methods of communication required a “persistent network connection,” making these methods susceptible to network disruption which would render the electronic payment system unavailable. ‘045 patent at 3:15-30, 10:1-37. According to the ‘045 patent specification, the ‘045 patent solves the persistent network connection problem by requiring only a non-persistent network connection with a mobile device at the location of the payment accepting unit. In the ‘045 patent claims, the payment accepting unit (via an adapter module) communicates with the mobile device using short-range communication technology such as “Bluetooth . . . near-field communication, Ultra Wideband UWB), RFID, infrared wireless, induction wireless, or any wired or wireless technology that could be used to communicate a small distance.” ‘045 patent at 13:22-32.

27. However, as explained in further detail below, this purported benefit of the ‘045 patent was not novel. Each of the limitations in the ‘045 patent claims were found in prior art references available before the date of the ‘045 patent, including in the Low, Skowronek, Freeny, and Wilson references.

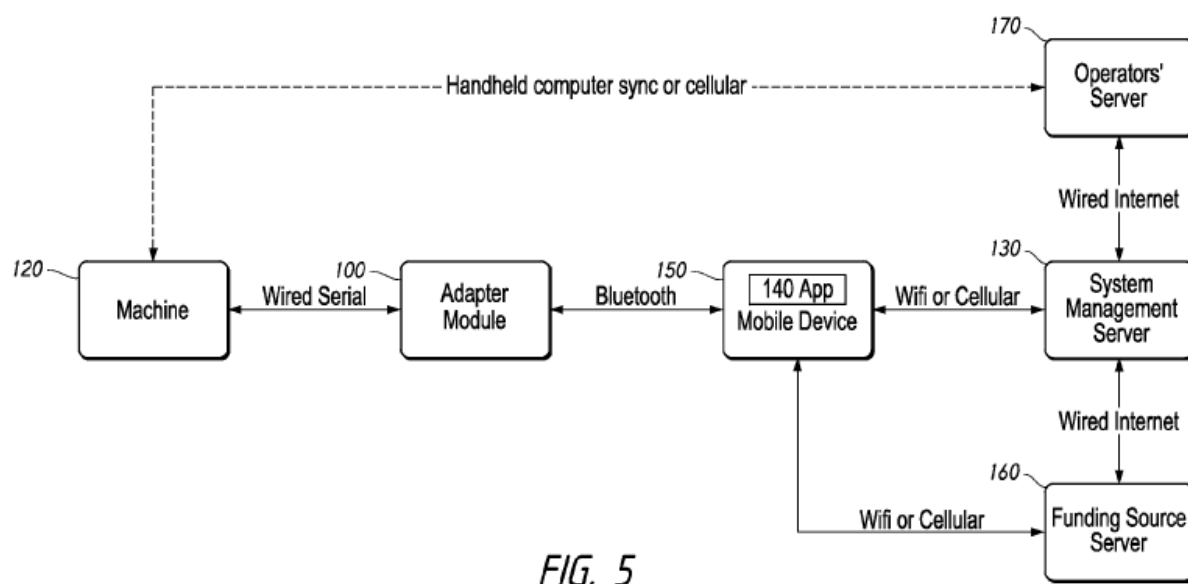
VI. OVERVIEW OF THE ‘045 PATENT

28. The ‘045 patent relates to “mobile-device-to-machine payment systems.” ‘045 patent at 1:14-17. The specification of the ‘045 patent acknowledges that unmanned machines which accept payment have “been around for thousands of years,” and more modern iterations, such as vending machines, “were introduced in the 1880s.” ‘045 patent at 1:18-26. The specification calls vending machines and other unmanned retail machines, “payment accepting units.” ‘045 patent at 1:27-38. These include “parking meters, toll booths, laundromat washers and dryers, arcade games, kiosks, photo booths, toll booths, transit ticket dispensing machines” or other machines yet to be discovered.” ‘045 patent at 1:27-38.

29. The ‘045 patent claims systems and methods for mobile payments on the payment accepting units. The payment accepting unit includes an adapter module, which communicates with a customer’s personal mobile device, such as a smartphone or tablet, via a short-range communications technology (*e.g.*, Bluetooth). ‘045 patent at 3:46-49, 12:28-34, 13:22-34, 18:48-57. The adapter module sends an authorization request for funds to the user’s mobile device, which

then forwards that request to the server using long-range communication technology such as Wifi or a cellular connection. '045 patent at 3:52-56, 13:4-11. The server then sends an authorization grant back to the mobile device via long-range communication technology, and the mobile device then “forwards the authorization grant for funds to the adapter module using short-range communication technology.” '045 patent at 3:56-60. The payment accepting unit then dispenses the item or service. '045 patent at 3:60-64, Fig. 5.

30. A schematic of the transmitted communications between the payment accepting device, the customer's mobile device, and the servers is summarized in Figure 5 of the '045 patent:



31. The '045 patent claims various other features of a mobile payment system, including the use of separate communication, authorization, and payment “zones.”

The “communication zone” is the “Bluetooth range” of the adapter module, within which the mobile device may receive advertisements from the adapter module. ‘045 patent at 5:52-57, 6:21-25. The “authorization zone” is a zone within which the adapter module may manually or automatically send an authorization request from the adapter module to the mobile device. ‘045 patent at 5:45-52, 14:53-65, 21:66-22:17, 22:26-60. The “payment zone,” which may be within the authorization zone, is the area in which the mobile device may forward the authorization grant of funds to the adapter module. ‘045 patent at 5:45-52, 21:66-22:17, 22:61-23:16.

VII. CLAIM CONSTRUCTION

32. It is my understanding that in order to properly evaluate the ‘045 patent, the terms of the claims must first be interpreted. It is my understanding that for the purposes of this *inter partes* review, the claims are to be construed 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 light of the specification and prosecution history, unless the inventor has set forth a special meaning for a term. For the purposes of my analysis below, I do not believe any claim terms require explicit construction.

VIII. IDENTIFICATION OF HOW THE CLAIMS ARE UNPATENTABLE

33. I have been asked to provide my opinion as to whether the Challenged Claims of the ‘045 patent would have been anticipated or obvious in view of the

prior art. The discussion below provides a detailed analysis of how the prior art references identified below teach the limitations of the Challenged Claims of the ‘045 patent.

34. As part of my analysis, I have considered the scope and content of the prior art and any differences between the alleged invention and the prior art. I describe in detail below the scope and content of the prior art, as well as any differences between the alleged invention and the prior art, on an element-by-element basis for each of the Challenged Claims of the ‘045 patent.

35. As described in detail below, the alleged invention of the Challenged Claims is anticipated or would have been obvious in view of the teachings of the identified prior art references as well as the knowledge of a POSITA.

A. Summary of References

a. Summary of Low

36. Low discloses a similar system and device as the ‘045 patent, describing “wireless electronic payments to non-Internet connected machines through user devices.” Low at 1:16-20. The non-Internet connected machine (i.e., a vending machine) lacks an internet connection with a network, but has “capability of wireline or wireless communication with user device 110, for example using microwave, radio frequency, infrared, Bluetooth, and near field communication.” Low at 2:10-16, 4:57-64. Notably, Low therefore possesses the “benefit” touted by the ‘045 by

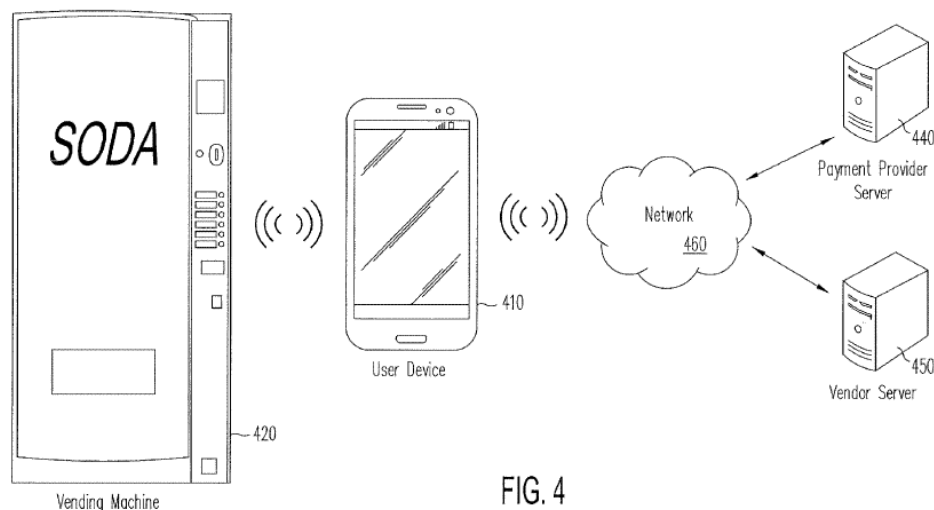
not requiring a persistent network connection at the location of the machine. ‘045 patent at 3:15-30, 10:1-37.

37. Low’s non-Internet connected machine has an “electronic payment module” having a “storage and communication interface to store and communicate a machine identifier and other transaction information, as well as processing (including decrypting) information for dispensing purchased items from vending machine.” Low at 4:64-5:3, 5:54-61, 6:9-16. The electronic payment module communicates with the “user device,” which is a “consumer device, such as a smart phone or computing tablet.” Low at 2:10-16. 36.

38. A consumer looking to make a purchase from the machine may use input mechanisms for allowing a user to make selections of desired items to purchase and dispense which are included in a dispensing module of the machine. Low at 5:19-30. These input mechanisms may include “a keypad, touchscreen, display, or other selection means.” Low at 5:19-24.

39. The system also includes remote servers, including a “payment provider server” and “vendor server,” which communicate with the user device over a wired or wireless network, such as by using “a DSL (*e.g.*, Digital Subscriber Line) modem, a PSTN (Public Switched Telephone Network) modem, an Ethernet device, a broadband device, a satellite device and/or various other types of wired and/or wireless network communication devices” in order to complete the transaction. Low

at 7:40-50, *see also* 3:20-25, 4:45-56. Figure 4 of the '045 patent illustrates an example of this arrangement of devices:



40. Once the transaction is authorized by the remote “payment provider server,” the authorization is transmitted back to the user device (in some cases, after being routed to a “vendor server”), then the user device transmits said authorization to the machine to allow the user to dispense the products. Low at 2:49-62 (“After processing, the payment provider may approve the payment request and communicate the approval directly to an operator of the machine, such as a vendor server, or may communicate the approval to the user device to be transmitted to the operator of the machine.”), *see also* 2:34-37, 9:39-62, 10:55-61, 12:9-12. The payment authorization sent between the servers and electronic payment module of the vending machine may be encrypted by the servers and then decrypted by the electronic payment module. Low at 8:3-21, 10:62-11:8, 12:9-19, claims 1, 7, 12.

b. Summary of Skowronek

41. Skowronek relates generally to contactless payments on an unattended retail device and, like in the ‘045 patent and Low, it discloses system and methods which require a user’s mobile device to act as a communication intermediary between the payment accepting unit and remote servers which process the transaction. Skowronek at [0001], [0016]. Like the “payment accepting unit” in the ‘045 patent, an “unattended retail device” is a device that “provides a retail service or product without the assistance of a person,” such as a vending machine. Skowronek at [0002].

42. The unattended retail device 102 communicates with the mobile appliance 104 via a first communications channel 112, and the mobile device appliance communicates with a merchant processor 108 over a second communications channel 114. Skowronek at [0022], [0024]. The first communications channel can be “Bluetooth R, 802.11g, or other wireless system,” and the second communications channel can be a “cellular network, a wireless LAN or WAN, or other communication system.” Skowronek at [0022], [0024]. As such, Skowronek also discloses the “benefit” touted by the ‘045 patent of using a non-persistent network connection at the location of the unattended retail device.

43. A transaction can be initiated either by the unattended retail device 102 or by the consumer on the mobile appliance 104. Skowronek at [0026]. When the

transaction is initiated, the “unattended retail device 102 compiles transaction information” which is “compiled into a packet of information for transfer over the first communications channel 112 to the mobile appliance 104.” Skowronek at [0026]. This packet of transaction information may be “encrypted for transmission” such that it “cannot be decrypted by the mobile appliance” to prevent “tampering.” Skowronek at [0026], [0047], [0051].

44. Upon receiving the transaction information, the mobile appliance may “append[] the payment information to the transaction information received from the unattended retail device 102” and then “[t]he combined information is . . . encrypted and sent to the merchant processor 108.” Skowronek at [0027]. The merchant processor then issues the authorization and “sends the authorization to the mobile appliance 104, which forwards the authorization to the unattended retail device 102.” Skowronek at [0028]. These transmissions are illustrated in Fig. 1 below:

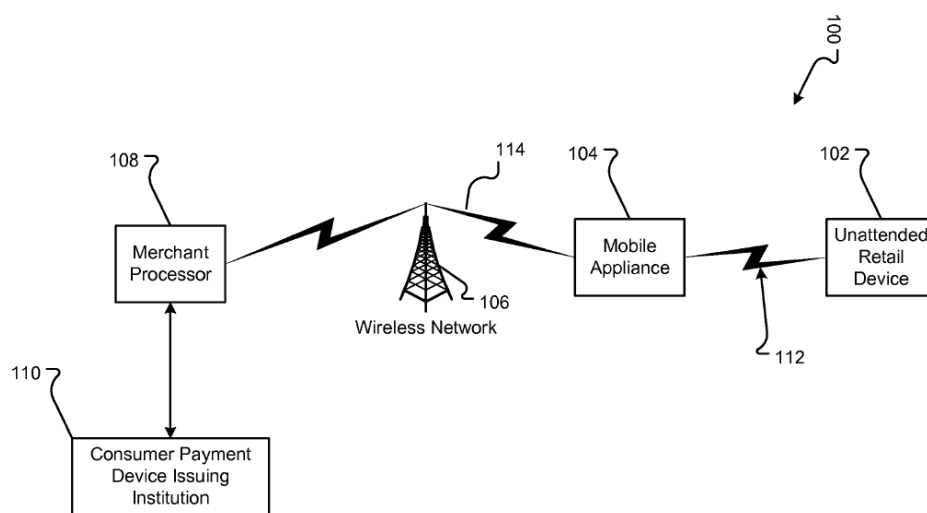


Fig. 1

c. Summary of Freeny

45. Freeny is generally related to proximity-based transmissions of transaction information in a mobile payment system. Freeny at Abstract (a “proximity service unit for providing at least one predetermined service for use with multiple types of wireless devices.”) A “proximity service unit” is “any device which provides a predetermined service upon activation.” Freeny at 31:34-42, 2:8-25, 15:13-21. These include toll systems, public transportation systems, ATMs, store checkout systems, and vending machines. Freeny at 31:34-42, 2:8-25, 15:13-21. In Freeny, “the proximity service unit 2920 communicates with the proximity authorization unit 2910 via either a wireless link 2912 or in some cases a physical link 2917.” Freeny at 31:43-49. The wireless link is “preferably a low power wireless link which does not typically communicate farther than about 300 feet.” Freeny at 31:43-49.

46. In the Freeny system, a machine may be activated either manually or automatically when the customer’s mobile device is within a certain proximity to the machine. Freeny at 32:49-55. The proximity-based system can be set up such that certain transmissions are executed when the mobile device is at a “first proximity distance”—for example, at the “first proximity distance” the payment authorization process may begin. Freeny at 33:18-36. At a “second proximity distance”—which may be closer than the first proximity distance—the transaction may be approved. Freeny at 13:2-37, 33:18-36, 33:37–53. These transmissions may be “automatic,”

meaning the user would not have to interact with the mobile device to complete the transaction. Freeny at 13:2-37, 33:18-36, 33:37–53.

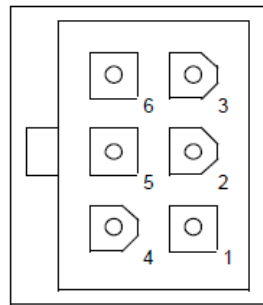
d. Summary of Wilson

47. Wilson relates to “systems, methods, and apparatuses for cashless vending,” particularly disclosing a vending machine with an interface (NetVend) that connects to a Vending Machine Controller (VMC) through its Multi-Drop Bus interface. Wilson at 1:7-10, 2:28-43. NetVend communicates with a central server via a “linked connection” which is “any known or later developed connection system or structure usable to connect the NetVend interface 114 to the central server 160, including both wired and wireless connections.” Wilson at 4:38-58.

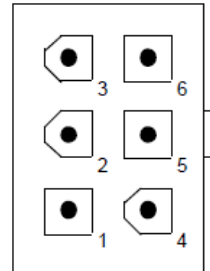
48. To describe how NetVend interfaces with the vending machine, Wilson relies on a publication titled “Multi-Drop Bus / Internal Communication Protocol,” Version 3.0, which was published by the National Automatic Merchandising Association on March 26, 2003. *See* MDB/ICP Specification; Wilson at 2:38, 4:26-31, 7:11-14, 7:27-35. Wilson explains that the NetVend interface is analogous to “Cashless Device #1” in the MDB/ICP Specification. *See* MDB/ICP Specification; Wilson at 2:38, 4:26-31, 7:11-14, 7:27-35.

49. The “Cashless Device” in the MDB/ICP Specification and Wilson enables mobile payments on the vending machine and communicates via the MDB/ICP interface. Wilson at 2:38, 4:26-31, 7:11-14, 7:27-35. The MDB/ICP Specification

discloses that Wilson's NetVend Multi-Drop Bus interface includes Peripheral and VMC/MDB Connectors, which feature female (socket) and male (pin) connections:



Peripheral Connector
Face View
Receptacle
(Sockets)



VMC / Bus Connector
Face View
Header
(Pins)

MDB/ICP Specification at 7.

B. Reasons to Combine

a. Skowronek, Freeny, and Wilson are Analogous to Low and the '045 Patent

50. When considering the teachings of Low, a POSITA would have also considered the teachings of Skowronek, Freeny, and Wilson. All four references relate to electronic payment on a machine that dispenses goods or services. *See* Low at 1:16-19 (“The present application generally relates to . . . wireless electronic payments to non-Internet connected machines through user devices.”); Skowronek at [0001] (“This invention relates, in general, to . . . contactless payments for a retail service that an unattended retail device provides.”); Freeny at 33:37-53 (explanation of mobile payment authorization for payment service units), *see also* 7:60-67, 35:60-36:5, 37:58-67; Wilson at 1:7-10 (“This invention relates generally to systems,

methods, and apparatuses for cashless vending.”). As such, Low, Skowronek, Freeny, and Wilson are all analogous art to the ‘045 patent. *See* ‘045 patent at 3:38-41.

51. With regards to Skowronek, both Low and Skowronek describe in detail methods to communicate payment requests and authorizations between a machine and a mobile device, and between a mobile device and a remote server or processor. Low at 2:38-46, 4:45-56, 5:61-6:9, 7:40-50, 9:39-62, 10:55-61, 12:20-21; Skowronek at [0022]-[0026]. As such both Low and Skowronek are analogous art to the ‘045 patent. ‘045 patent at 3:38-41.

52. With regards to Freeny, both Low and Freeny describe methods to communicate information between a machine (such as a vending machine) and a mobile device. Low at 2:38-46, 4:45-56, 5:61-6:9, 7:40-50, 9:39-62, 10:55-61, 12:20-21; Freeny at 7:60-67, 33:37-53, 35:60-36:5, 37:58-67. As such both Low and Freeny are analogous art to the ‘045 patent. ‘045 patent at 3:38-41.

53. With regards to Wilson, both Low and Wilson describe a vending machine including a module to communicate with external devices to complete payments. Low at 5:10-18, 5:44-53, 6:9-31; Wilson at 2:32-43, 4:20-58. As such both Low and Wilson are analogous art to the ‘045 patent. ‘045 patent at 3:38-41.

b. Reasons to Combine Low and Skowronek

54. A POSITA would have been motivated to combine Low's electronic payment system with Skowronek's message encryption techniques. It would have been obvious, beneficial, and predictable to do so.

55. Low itself recognizes the importance of security features in communications between the various devices of the system. It already teaches encryption of these communications—in particular that the payment authorization sent from the server to the user device, and then from the user device to the vending machine, may be encrypted. Low at 8:3-21, 12:9-19, 10:62-11:8, claims 1, 7, 12. Low assumes that the POSITA would have knowledge of basic encryption techniques and the ability to implement those techniques, as the specification describes the encryption only at a high level.

56. A POSITA starting with the high-level description of encryption in Low would have looked to Skowronek for more detailed teachings about how encryption of messages transmitted between a retail device, mobile device, and external servers would be implemented. Skowronek at [0027]-[0030], [0047], [0051], Figs. 2A-2B. A POSITA would have recognized that the several encryption techniques taught by Skowronek would have improved the similar Low system, in the same way, to improve the security of the transmitted communications.

57. Skowronek teaches encryption methods, including symmetrical or asymmetrical encryption, public key encryption, and pretty-good-privacy (PGP)—

all previously-known techniques which a POSITA would have understood to be suitable options for mobile-payment-to-machine systems. Skowronek at [0036], [0040].

58. Skowronek also teaches that the payment authorization *request*, which includes both the transaction information and payment information (such as credit or debit card accounts), may be encrypted to secure the transaction and payment information included in the request. Skowronek at [0026]. Low's payment authorization requests contain the same types of transaction and payment information that Skowronek encrypts. Skowronek at [0026]-[0027]; Low at 10:34-40, 9:24-31, 10:18-26. A POSITA would have naturally been motivated to apply Skowronek's teachings of encrypting the same such information to Low.

59. Additionally, Skowronek teaches that the encrypted information may be unreadable to the mobile device in order to prevent "tampering." Skowronek at [0026]. A POSITA would have understood that this same technique would prevent "tampering" in Low's system in the same way. Thus, a POSITA would have been motivated to apply this technique from Skowronek to Low to prevent tampering with the payment request, in addition to the payment authorization.

60. A POSITA would have had a reasonable expectation of success in making the combination between Low's system and Skowronek's encryption techniques and methods. The techniques taught in Skowronek were specifically meant to improve

systems like Low's for electronic payment on machines. Thus, a POSITA would have naturally expected success.

61. These modifications to Low's system would have been within the level or ordinary skill in the art, especially because Low already teaches the use of encryption for payment authorization grant communications between devices, so the POSITA would have been familiar with encryption techniques. Low at 8:3-21, 12:9-19, 10:62-11:8, claims 1, 7, 12. It would have been within the background knowledge and standard capabilities of a POSITA to expand the use of encryption in Low to encrypt the payment authorization request, expand the encryption methods used (including to use Skowronek's symmetrical encryption in Low), and render the encrypted information undecipherable to the mobile device.

62. The combination of Low and Skowronek represents applying known techniques (encryption methods) to a known device ready for improvement (Low's system for electronic payment on a machine) to yield predictable results (improving security of the information transmitted, including that transmitted in the payment authorization request).

c. Reasons to Combine Low and Freeny

63. A POSITA would have been motivated to combine Low's electronic payment system with Freeny's proximity-based transmission of authentication and payment information. It would have been obvious, beneficial, and predictable to do

so. Automatic proximity-based payments would have increased convenience for the customer paying at one of Low's vending machines, as it would have reduced the number of interactions the customer must have with the user device to complete the transaction.

64. Low itself emphasizes user convenience, disclosing that the user's device application may transmit approvals and/or purchase authorizations in order to "dispens[e] the purchased product at a convenient time." Low at 4:3-13. In addition, Low's claims 1, 7, and 12, require monitoring the user's proximity to the machine, requiring: "based at least in part on the location, identification of the plurality of non-Internet connected machines within a distance to the user device." Low at claims 1, 7, 12. Because Low touts the importance of user convenience, and because Low already discloses that machines are identified based on the location of the user device, a POSITA would have been motivated to implement Freeny's proximity-based transactions in Low's system.

65. Because Low presumes that a POSITA would have understood that the user's mobile device would have been able to track the proximity between the device and the non-Internet connected machine, a POSITA would have been able to set up a first proximity distance (in which to initiate payment authorization) and a second proximity distance (in which to initiate payment), as taught by Freeny. Low at claims 1, 7, 12; Freeny at 2:8-25, 13:23-37, 32:49-55, 33:18-36.

66. Additionally, a POSITA would have been motivated to make authorization and payment automatic to increase customer convenience, as disclosed by Freeny's automatic authorization and payment at the first and second proximity distances, without requiring user interaction with the mobile device. Freeny at 13:2-37, 33:37-53.

67. A POSITA would have had a reasonable expectation of success in making the combination between Low's system and Freeny's proximity-based transactions. The techniques taught in Freeny were specifically meant to improve systems like Low's for electronic payment on machines. Thus, a POSITA would have naturally expected success.

68. These modifications to Low's system would have been within the level of ordinary skill in the art, especially because Low already contemplates that the POSITA would have been able to identify the location of the user device and its proximity to the non-Internet connected machines. Low at claims 1, 7, 12. It would have been within the background knowledge and standard capabilities of a POSITA to expand the use of location data in Low to trigger authorization and payment upon arrival at certain proximities to the non-Internet connected machines. In addition, as Low describes automatic pairing of user devices to certain non-Internet connected machines, it would have been within the background knowledge and standard

capabilities of a POSITA to make those proximity-based transmissions automatic, as in Freeny. Low at 11:30-35.

69. The combination of Low and Freeny represents applying known techniques (proximity-based transmissions) to a known device ready for improvement (Low's system for electronic payment on a machine) to yield predictable results (improving user convenience by reducing the number of interactions the consumer must have with the user device to complete the transaction).

d. Reasons to Combine Low and Wilson

70. A POSITA would have been motivated to combine Low's electronic payment system with Wilson's Multi-Drop Bus (MDB) interface. It would have been obvious, beneficial, and predictable to do so as Low does not describe how to attach the electronic payment module to the vending machine and the use of an MDB interface would have allowed a POSITA to retrofit existing vending machines with electronic payment capabilities.

71. Low's electronic payment module is a physical hardware component of the vending machine which communicates with external devices with a wireless connection, such as Bluetooth. Low at 5:14-17, 5:49-53. However, Low does not describe specifically how the electronic payment module is integrated into the vending machine. As such, POSITA starting with Low would look to Wilson for teachings about how to connect the electronic payment module to the vending

machine, including the ability to retrofit an existing machine with the capability to accept electronic payments, how to make the electronic payment module an in-line dongle for insertion within the standard MDB, and how to connect the MDB and electronic payment module with the MDB's standard male and female adapter. Wilson at 4:15-58; MDB/ICP Specification at 7-8.

72. Using the existing Multi-Drop Bus to connect the electronic payment module to the machine would have allowed a POSITA to use Low's system on existing machines. As is disclosed in the Background section of the '045 patent specification, "[m]ost vending machines made since 1995 have this industry standard MDB technology" and it would have been known in the art to "include interfaces to communicate with external peripherals through the MDB protocol." '045 patent at 2:52-61, 9:60-62. A POSITA would therefore have naturally been motivated to apply Wilson's teachings of using that industry standard MDB technology in Low.

73. A POSITA would have also looked to Wilson for other ways to improve user convenience, for example displaying the user's available funds to make a purchase on the vending machine's display based on information in the payment authorization. A POSITA would have appreciated that applying Wilson's vending machine display of available funds to Low's vending machine display would have

furthered Low's stated goal of enhancing convenience, and, thus would have been motivated to make such a combination.

74. A POSITA would have had a reasonable expectation of success in making the combination between Low's system and Wilson's MDB and vending machine display. The techniques taught in Wilson were specifically meant to improve systems like Low's for electronic payment on machines. Thus, a POSITA would have naturally expected success.

75. The combination of Low and Wilson represents applying known techniques (an MDB interface and available funds vending machine display) to a known device ready for improvement (Low's system for electronic payment on a machine) to yield predictable results (a communication link between the vending machine and external devices and an available funds display).

C. Ground 1: Claims 1 and 18 are anticipated under 35 U.S.C. § 102 by Low and obvious under 35 U.S.C. § 103 over Low

1. Claim 1

[1(pre)] A mobile-device-to-machine payment system for facilitating a cashless transaction for purchase of at least one product or service by a user from a payment accepting unit having input mechanisms,

76. Because Low describes a system for cashless, electronic payments on a vending machine using a mobile device, wherein the machine accepts user inputs to purchase products, Low discloses a “mobile-device-to-machine payment system for

facilitating a cashless transaction for purchase of at least one product or service by a user from a payment accepting unit having input mechanisms” as claimed.

77. Low’s system is for purchasing products on a non-Internet connected vending machine (“*payment accepting unit*”) using a user device, such as a smart phone (“*mobile device*”). Low at 2:11-16, 5:24-35. The system is for “*facilitating a cashless transaction*” as it “enables [a] user 102 to make electronic payments for products 124 in the absence of physical money.” Low at 5:44-46. “[A]t least one product or service” is dispensed as a result of the transaction. Low at 5:30-35. (“Products 124 may include purchasable products for user 102, such as drinks, food, items, or other purchasable products included in vending machine 120.”)

78. The “payment accepting unit” has “*input mechanisms*”: “Vending machine 120 may also include an (sic) product dispensing module 122 for accepting user input, such as for selecting desired items to purchase.” Low at 5:3-5:9. The product dispensing module “may include means to select a product, such as using a keypad, touchscreen, display, or other selection means.” Low at 5:19-24.

79. A POSITA would have understood inputs, such as a keypad and touchscreen, to comprise multiple input mechanisms, because a keypad would have been understood to have multiple keys and a touchscreen would have been understood to have multiple touch points.

[1(pre.i)] the user having a mobile device having both short-range communication technology and long-range communication technology,

80. Because Low's system includes a user device which may communicate via both long-range and short-range technologies, Low discloses "*the user having a mobile device having both short-range communication technology and long-range communication technology*" as claimed.

81. Low describes a user device ("*mobile device*") which is a "personal computer (PC), a smart phone, personal digital assistant (PDA), laptop computer, and/or other types of computing devices capable of transmitting and/or receiving data, such as an IPAD® from APPLE®." Low at 3:37-48. The user device described in Low may communicate with the machine "via wireless communication, such as Bluetooth or NFC (Near Field Communication)"—i.e., via "*short range communication technology*." Low at 2:11-16, 4:57-5:9. "Bluetooth" and "near-field communication" are two examples of "*short range communication technology*" disclosed in the '045 patent. '045 patent at 13:22-32.

82. Low's user device may also communicate with "a LAN, WLAN, PTSN, and/or various other wired or wireless networks, including telecommunications, mobile, and cellular phone networks)," i.e., via "*long range communication technology*." Low at 13:30-39, 4:45-56 (describing the user device's communication module 118), 8:40-57 (providing other examples of network technologies for Network 160 that the user device may communicate with).

83. A “hard-wired, telephone network technology, cellular technology, . . . , wide area network (WAN), local area network (LAN), or any wired or wireless communication technology over the internet” are examples of “*long range communication technology*” disclosed in the ‘045 patent. ‘045 Patent 13:4-10.

[1(pre.ii)] the payment accepting unit capable of dispensing at least one product or service, said system comprising:

84. Because Low’s vending machine is capable of dispensing products, Low discloses “*the payment accepting unit capable of dispensing at least one product or service*” as claimed.

85. Low’s vending machine (“*payment accepting unit*”) “dispens[es] items that are purchased.” Low at 4:57-59. The items include “drinks, food, items, or other purchasable products included in vending machine.” Low at 5:30-35.

[1(a)] an adapter module associated with the payment accepting unit, said adapter having short-range communication technology for communicating with the short-range communication technology of the mobile device;

86. Because Low describes a vending machine including an electronic payment module which communicates with a user’s device via short-range communication technology, Low discloses “*an adapter module associated with the payment accepting unit, said adapter having short-range communication technology for communicating with the short-range communication technology of the mobile device*” as claimed.

87. Low's "electronic payment module" is the *adapter module*, and has a "storage and [a] communication interface." Low at 4:64-67. The electronic payment module is "**included with**" vending machine 120 to enable the user to make electronic payments for products, so the electronic payment module is *associated with* the vending machine ("*payment accepting unit*"). Low at 5:44-46, 5:10-18.

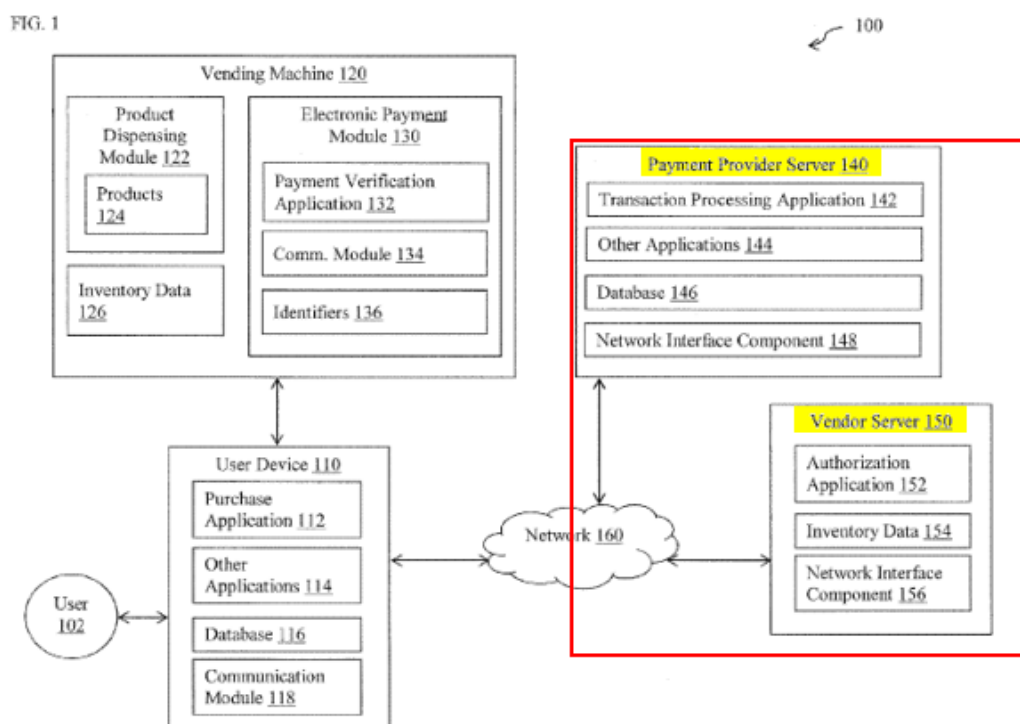
88. The '045 patent's describes the "*adapter module*" as "a physical device that is installed in a machine." '045 patent at 11:59-61. Likewise, Low's electronic payment module may be implemented as one or more hardware components within the vending machine. Low at 5:14-17, 5:49-53.

89. The electronic payment module ("*adapter module*") includes a "communication module 134" which is "adapted to communicate with user device 110." Low at 6:9-16. The electronic payment module uses "*short-range communication technology*," including "various types of wired and/or wireless short range communication devices including microwave, radio frequency, infrared, Bluetooth, and near field communication devices" to communicate with the user device ("*mobile device*"). Low at 4:57-5:3, 6:9-16. Low's list of communication technologies are consistent with the *short-range communication technology* disclosed in the '045 patent. '045 patent at 13:22-32.

[1(b)] a server having long-range communication technology for communicating with the long-range communication technology of the mobile device;

90. Because Low describes servers which communicate with a user device via a network interface using long-range communication technology, Low discloses “a server having long-range communication technology for communicating with the long-range communication technology of the mobile device” as claimed.

91. Low’s payment provider server and vendor server are illustrated in Figure 1 below:



Low at 7:40-50, FIG. 4. The “server” limitation is met by either the payment provider server or the vendor server or both collectively as shown in Figure 4 above. The ‘045 patent discloses that its “server” may be comprised of multiple servers. ‘045 patent at 19:51-54 (“The shown components have been simplified in that, for

example, only one mobile device 150 (or machine 120, adapter module 100, or server 130) is shown where many may be included.”).

92. The “user device 110 is in communication over a network 160 with a payment provider server 140 and a vendor server 150.” Low at 3:18-25. The user device and the server communicate via “*long-range communication technology*,” over a network interface comprising “a DSL (e.g., Digital Subscriber Line) modem, a PSTN (Public Switched Telephone Network) modem, an Ethernet device, a broadband device, a satellite device and/or various other types of wired and/or wireless network communication devices.” Low at 7:40-50. Low also describes that network 160 “may include the Internet or one or more intranets, landline networks, wireless networks, and/or other appropriate types of networks” and that network 160 “may correspond to small scale communication networks, such as a private or local area network, or a larger scale network, such as a wide area network or the Internet.” Low at 8:48-57. These also constitute *long-range communication technology*.

[1(c)] said adapter module for sending an authorization request for funds to the mobile device using short-range communication technology, the mobile device forwarding said authorization request for funds to said server using long-range communication technology; and

93. Because Low describes an electronic payment module which includes a payment verification request to send a purchase request to the user device using short-range communications technologies, and because the user device transmits the

purchase request to the server using long-range communications technologies, Low discloses “*said adapter module for sending an authorization request for funds to the mobile device using short-range communication technology, the mobile device forwarding said authorization request for funds to said server using long-range communication technology*” as claimed.

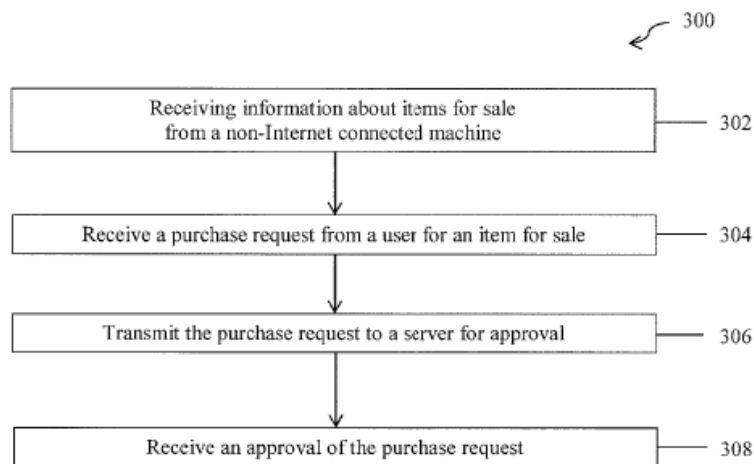
94. Low’s electronic payment module (“*adapter module*”) contains a “payment verification application” which “correspond[s] to processes, procedures, and/or applications executable by a hardware processor, for example, a software program.” Low at 5:61-6:9. The electronic payment module’s payment verification application transmits a “purchase request” (“*authorization request for funds*”) to the user device, such request including “a product name, product price, product code, a machine identifier, and/or a transaction number to user device 110.” Low at 5:66-6:3, 2:38-46.

95. The electronic payment module communicates with the user device using “*short-range communication technology*,” including “various types of wired and/or wireless short range communication devices including microwave, radio frequency, infrared, Bluetooth, and near field communication devices.” Low 4:45-56.

96. After the user device receives the purchase request (“*authorization request for funds*”), it is transmitted (“*forward[ed]*”) to payment provider server 140. Low

at 5:61-6:9. “[T]he purchase request” received by the user device is transmitted to the server for approval (step 306):

FIG. 3



Low at FIG. 3. That is, a POSITA would have understood that the same purchase request that is received by the user device is transmitted to the server, because “the purchase request” (referring to the received purchase request from the prior step) is what is transmitted to the server.

97. The user device and the server communicate with “*long-range communication technology*,” over “a DSL (*e.g.*, Digital Subscriber Line) modem, a PSTN (Public Switched Telephone Network) modem, an Ethernet device, a broadband device, a satellite device and/or various other types of wired and/or wireless network communication devices,” as well as the internet and other large scale networks. Low at 7:40-50, 8:48-57.

[1(d)] said server for sending an authorization grant for funds to the mobile device using long-range communication technology, the mobile device forwarding said authorization grant for funds to said adapter module using short-range communication technology;

98. Because Low describes the payment provider server communicating a payment authorization to the user device via long-range communications technologies, and because it describes the payment authorization being forwarded from the user device to the vending machine's electronic payment module via short-range communications technologies, Low discloses "*said server for sending an authorization grant for funds to the mobile device using long-range communication technology, the mobile device forwarding said authorization grant for funds to said adapter module using short-range communication technology*" as claimed.

99. The payment provider server 140 ("server") executes a transaction processing application to review and approve the purchase request. Low at 9:24-62, 10:41-61. The server 140 "may communicate the payment authorization included in the approval to user device 110 for transmission to vending machine 120." Low at 9:39-62, 10:55-61. This payment authorization is the "*authorization grant for funds.*"

100. The user device and the server communicate using "*long-range communication technology,*" over "a DSL (e.g., Digital Subscriber Line) modem, a PSTN (Public Switched Telephone Network) modem, an Ethernet device, a broadband device, a satellite device and/or various other types of wired and/or

wireless network communication devices,” as well as the internet. Low at 7:40-50, 4:45-56, 8:48-57.

101. Once the payment authorization (“*authorization grant for funds*”) is communicated to the user device, the user device “transmit[s]” (“*forward[s]*”) the authorization to the vending machine 120. Low at 12:9-19, 9:39-62 (“payment provider server 140 may communicate the payment authorization included in the approval to user device 110 for transmission to vending machine 120”), 10:55-61, 12:20-21. That is, a POSITA would have understood that the same payment authorization sent from the server to the user device is sent from the user device to the vending machine, because the payment authorization communicated to the user device is “for transmission to vending machine 120.” Low at 9:39-62.

102. The payment authorization is communicated to the electronic payment module (“*said adapter module*”) of the vending machine. Low at 10:57-61. The electronic payment module of the vending communicates with the user device using “*short-range communication technology*,” including “various types of wired and/or wireless short range communication devices including microwave, radio frequency, infrared, Bluetooth, and near field communication devices.” Low at 4:45-56, 4:59-64, 6:9-16.

[1(e)] wherein the payment accepting unit dispenses the at least one product or service in response to receiving user input to the payment accepting unit input mechanism if said adapter module has received said authorization grant.

103. Because Low describe a vending machine which dispenses a product in response to the user's selection of a product if the electronic payment module has received a payment authorization, Low discloses "*the payment accepting unit dispenses the at least one product or service in response to receiving user input to the payment accepting unit input mechanism if said adapter module has received said authorization grant*" as claimed.

104. Low's vending machine 120 ("*payment accepting unit*") also has a "dispensing module, such as product dispensing module 122, for a user to make selections, purchase, and dispense products 124." Low at 5:19-22. The dispensing module has as an "*input mechanism*" a "means to select a product, such as using a keypad, touchscreen, display, or other selection means." Low at 5:22-24.

105. The dispensing module is "configured to interact with electronic payment module 130 to accept electronic payment for products 124." Low at 5:26-30. After the user selects the product using the "*input mechanism*," and after the purchase request is sent to the server and a payment authorization has been forwarded back to the electronic payment module ("*adapter module*") of the vending machine via the user device, the "vending machine 120 may dispense the purchased item of products 124." Low at 9:39-62, 10:55-61, 12:9-25.

2. Claim 18

[18(pre)] A method for using a mobile-device-to-machine payment system for facilitating a cashless transaction for purchase of at least one product or service by a user from a payment accepting unit having input mechanisms,

106. Because Low describes a system for cashless, electronic payments on a vending machine using a mobile device, wherein the machine has input mechanisms that accept user inputs to purchase products, Low discloses a “*method for using a mobile-device-to-machine payment system for facilitating a cashless transaction for purchase of at least one product or service by a user from a payment accepting unit having input mechanisms*” as claimed. See [1(pre)].

[18(pre.i)] the user having a mobile device having both short-range communication technology and long-range communication technology,

107. Because Low’s system includes a user device which may communicate via both long-range and short-range technologies, Low discloses “*the user having a mobile device having both short-range communication technology and long-range communication technology*” as claimed. See [1(pre.i)].

[18(pre.ii)] the payment accepting unit capable of dispensing at least one product or service, said method comprising the steps of:

108. Because Low’s vending machine is capable of dispensing products, Low discloses “*the payment accepting unit capable of dispensing at least one product or service*” as claimed. See [1(pre.ii)].

[18(a)] sending an authorization request for funds to the mobile device using short-range communication technology of an adapter module associated with the payment accepting unit;

109. Because Low describes an electronic payment module which includes a payment verification application to send a purchase request to the user device using short-range communications technologies, Low discloses “*sending an authorization request for funds to the mobile device using short-range communication technology of an adapter module associated with the payment accepting unit*” as claimed. See [1(c)].

[18(b)] receiving said authorization request for funds from said short-range communication technology of said adapter module at the short-range communication technology of the mobile device;

110. Because Low describes an electronic payment module which includes a payment verification application to send a purchase request to the user device using short-range communications technologies, Low discloses “*receiving said authorization request for funds from said short-range communication technology of said adapter module at the short-range communication technology of the mobile device*” as claimed. See [1(c)].

111. This limitation is also inherent from Low’s disclosure during normal operation of the system. Low discloses that the payment verification application of the electronic payment module (“*adapter module*”) transmits a “purchase request” (“*authorization request for funds*”) to the user device (“*mobile device*”) using short-

range communication technology. Low at 2:38-49, 4:45-64, 5:66-6:16. The user device then receives the request. Low at 2:38-49, 4:45-64, 5:66-6:16. Because the purchase request is being transmitted to the user device using short-range communication technology and the user device receives the request, the user device will necessarily “receive” the request with the corresponding short-range communication technology, so long as the system is operating normally such that the communications are not lost in transmission.

[18(c)] forwarding said authorization request for funds to a server using the long-range communication technology of the mobile device;

112. Because Low’s user device transmits the purchase request to the server using long-range communications technologies, Low discloses “*forwarding said authorization request for funds to a server using the long-range communication technology of the mobile device*” as claimed. See [1(c)].

[18(d)] receiving said authorization request for funds from the long-range communication technology of the mobile device at long-range communication technology of said server;

113. Because Low’s user device transmits the purchase request to the server using long-range communications technologies, Low discloses “*receiving said authorization request for funds from the long-range communication technology of the mobile device at long-range communication technology of said server*” as claimed. See [1(c)].

114. This limitation is also inherent from Low's disclosure. During normal operation of the system, Low discloses that after the purchase request ("*authorization request for funds*") is received by the user device, it is transmitted ("*forward[ed]*") to payment provider server 140 using long-range communication technology and is received by the payment provider server 140. Low at 5:61-6:9, 6:51-64, 7:40-50, 10:41-61. Because the purchase request is being transmitted to the server using long-range communication technology and the server receives the request, the server would necessarily "*receive*" the request with the corresponding long-range communication technology, so long as the system is operating normally such that the communications are not lost in transmission.

[18(e)] sending an authorization grant for funds to the mobile device using said long-range communication technology of said server;

115. Because Low describes the payment provider server communicating a payment authorization to the user device via long-range communications technologies, Low discloses "*sending an authorization grant for funds to the mobile device using said long-range communication technology of said server*" as claimed. See [1(d)].

[18(f)] receiving said authorization grant for funds from long-range communication technology of said server at the long-range communication technology of the mobile device;

116. Because Low describes the payment provider server communicating an approval to the user device via long-range communications technologies, Low discloses “*receiving said authorization grant for funds from long-range communication technology of said server at the long-range communication technology of the mobile device*” as claimed. See [1(d)].

117. This limitation is also inherent from Low’s disclosure. During normal operation of the system, Low discloses that the transaction processing application 142 of the server communicates a payment authorization (“*authorization grant for funds*”) to the user device using long-range communication technology and the user device receives the payment authorization. Low at 7:40-50, 9:39-62, 12:2-19. Because the payment authorization is being transmitted to the user device using long-range communication technology and the user device receives the authorization, the user device would necessarily “*receive*” the authorization with the corresponding long-range communication technology, so long as the system is operating normally such that the communications are not lost in transmission.

[18(g)] forwarding said authorization grant for funds to said adapter module using the short-range communication technology of the mobile device;

118. Because Low discloses the payment authorization being forwarded from the user device to the vending machine’s electronic payment module via short-range communications technologies. Low discloses “*forwarding said authorization grant*

for funds to said adapter module using the short-range communication technology of the mobile device” as claimed. See [1(d)].

[18(h)] receiving said authorization grant for funds from the short-range communication technology of the mobile device at short-range communication technology of said adapter module; and

119. Because Low discloses the payment authorization being forwarded from the user device to the vending machine’s electronic payment module via short-range communications technologies, Low discloses “*receiving said authorization grant for funds from the short-range communication technology of the mobile device at short-range communication technology of said adapter module*” as claimed. See [1(d)].

120. This limitation is also inherent from Low’s disclosure. During normal operation of the system, Low discloses that the user device “transmit[s]” (“*forward[s]*”) the payment authorization to the electronic payment module (“*adapter module*”) of the vending machine 120 using short-range communication technology, and the module receives the authorization. Low at 4:45-56, 9:39-62, 10:55-61, 12:9-19. Because the payment authorization is being transmitted to the electronic payment module using short-range communication technology and the module receives the authorization, the module would necessarily “*receive*” the authorization with the corresponding short-range communication technology so long as the system is operating normally such that the communications are not lost in transmission.

[18(i)] dispensing the at least one product or service from the payment accepting unit in response to receiving user input to the payment accepting unit input mechanism if said adapter module has received said authorization grant.

121. Because Low describes a vending machine which dispenses a product in response to the user's selection of the product if the electronic payment module has received a payment authorization, Low discloses "*dispensing the at least one product or service from the payment accepting unit in response to receiving user input to the payment accepting unit input mechanism if said adapter module has received said authorization grant*" as claimed. See [1(e)].

D. Ground 2: Claims 2-3 and 19-20 are obvious under 35 U.S.C. § 103 over Low in view of Skowronek

1. Claim 2

[2] The system of claim 1, said adapter module having security technology and said server having security technology,

122. Because Low describes the electronic payment module and the vendor server having technology to encrypt and decrypt messages, Low discloses "*said adapter module having security technology and said server having security technology*" as claimed.

123. Low's electronic payment module has security technology in order to decrypt the payment authorization. Low at 10:62-11:8. Low discloses that the "Electronic payment module may then decrypt the authorization message received from user device 110 using a public key and dispense the product." Low at 10:62-

11:8. The electronic payment module “may include an encryption key, such as a public key of an asymmetric key pair” to decrypt the message. Low at 9:39-62.

124. The vendor server also has security technology, as it “may include data and/or processes corresponding to vending machine 120, for example, an encrypted message corresponding to dispensing of a purchased item from products 124 or other desired information.” Low at 8:3-21, 10:62-11:8. Low’s authorization message “may be encrypted, for example, by a private key of vendor server 150.” Low at 12:9-19, claims 1, 7, 12.

[2.i] said authorization request being secured by said adapter module security technology to create a secured authorization request,

125. Because Low describes an electronic payment module which sends a purchase request, and a POSITA would have found it obvious for the electronic payment module to secure said purchase request as taught by Skowronek, Low and Skowronek render obvious “*said authorization request being secured by said adapter module security technology to create a secured authorization request*” as claimed.

126. Low discloses a “payment verification application” on the electronic payment module which may “correspond to processes, procedures, and/or applications executable by a hardware processor, for example, a software program.”

Low at 5:61-6:9. The application transmits the “purchase request” (“*authorization request*”) to the user device. Low at 5:66-6:3, 2:38-46.

127. For at least the reasons identified at Sec. B.b, a POSITA would have found it obvious, and would have been motivated to implement Skowronek’s teaching of encrypting the purchase request in Low’s system. This is especially true where Low already recognizes the importance of securing communications regarding payment by teaching the use of encryption to secure the payment authorization (“*authorization grant*”). Low at 8:3-21, 9:39-62, 10:66-11:8, 12:14-19.

128. Skowronek’s unattended retail device 102 (“*payment accepting unit*”) compiles transaction information into a packet of information, including “the good or service requested, the amount of payment required, an identifier for the unattended retail device 102, an identifier for the merchant that needs to approve the transaction, instructions for the mobile appliance 104 to contact the merchant processor, and/or one or more other items of information.” Ex.1005, [0026]. Said packet of transaction information is sent to the mobile appliance 104 (“mobile device”). Skowronek at [0026]. That packet of transaction information is “encrypted for transmission.” Skowronek at [0026].

129. As described in the ‘045 patent specification, “*security technology*” includes “encryption/decryption technology.” ‘045 patent at 4:6-21, 14:53-65,

17:19-24. The ‘045 specification uses the words “encrypted” and “secured” interchangeably. ‘045 patent at 12:24-26.

[2.ii] said authorization grant being secured by said server security technology to create a secured authorization grant, and

130. Because Low describes the payment authorization being encrypted by the vendor server, Low discloses “*said authorization grant being secured by said server security technology to create a secured authorization grant*” as claimed. See [1(d)].

131. The vendor server 150 (part of the “server”) sends an encrypted payment authorization, so the server includes *security technology* to encrypt said payment authorization. Low at 10:62-11:8, 8:3-21, 9:39-62, 12:9-19, claims 1, 7, 12.

[2.iii] said secured authorization request and said secured authorization grant being undecipherable to the mobile device.

132. Because Low describes a payment request and payment authorization, and a POSITA would have found it obvious to make those communications undecipherable to the user’s device as taught by Skowronek, Low and Skowronek render obvious “*said secured authorization request and said secured authorization grant being undecipherable to the mobile device*” as claimed.

133. In Low, the vendor server encrypts the payment authorization that is transmitted to the user device and forwarded to the electronic payment module (“*adapter module*”) where it is decrypted. Low at 8:3-21, 9:39-62, 10:62-11:8, 12:9-19.

134. A POSITA would have understood that where the payment authorization is received by the user device but is not decrypted by the user device—as is the case in Low—it would be undecipherable to the user device. A POSITA would have understood this to be the case, as Low does not describe the user device as having a decryption key and the decryption is not described to occur until receipt by the electronic payment module.

135. For at least the reasons explained above at Sec. B.b, a POSITA would have found it obvious and been motivated to implement Skowronek’s teaching of making the purchase request and purchase authorization undecipherable to the user device, especially as Low already recognizes the importance of securing communications regarding payment by teaching the use of encryption to secure the payment authorization (“*authorization grant*”). Low at 8:3-21, 9:39-62, 10:66-11:8, 12:14-19.

136. It would have been obvious for a POSITA to make Low’s payment request (“*authorization request*”) and payment authorization (“*authorization grant*”) undecipherable to the user device as taught by Skowronek, as Skowronek teaches that details of the transaction “are encrypted and cannot be decrypted by the mobile appliance 200,” so that the details are “preserved without tampering[.]” Skowronek at [0047], [0051], [0074], [0078].

137. I note that in my analysis of the combination of Low and Skowronek, I do not rely on the “alternative embodiments” of Skowronek, where portions of the transaction details may be unencrypted, and therefore available to the mobile device, at, e.g., [0047].

2. Claim 3

[3] The system of claim 1, said adapter module and said server sharing a unique private key,

138. Because Low describes the electronic payment module and vendor server using a key to encrypt and decrypt messages, and because a POSITA would have found it obvious to use symmetrical encryption (wherein a unique private key is shared) to encrypt the messages as taught by Skowronek, Low and Skowronek render obvious “*said adapter module and said server sharing a unique private key*” as claimed.

139. The electronic payment module of Low’s vending machine may use “a public key of an asymmetric key pair” to decrypt the authorization message which was encrypted using a “private key of vendor server 150.” Low at 9:39-62, 10:63-11:8, claims 1, 7, 12. Thus, Low discloses the use of asymmetric encryption and is silent as to the use of symmetric encryption in which a unique private key is shared.

140. For at least the reasons explained above at Sec. B.b, a POSITA would have been motivated to implement Skowronek’s teaching of symmetrical encryption with

a reasonable expectation of success, as Skowronek discusses using this well-known method for an analogous device.

141. If this limitation requires symmetrical encryption (wherein the same unique private key is shared between the adapter module and server), a POSITA would have found it obvious to implement it in Low. In Skowronek, the encryption module 226 of the unattended retail device 202 (“*payment accepting unit*”) may “use any encryption method, such as, symmetrical or asymmetrical encryption[.]” Skowronek at [0036]. The encryption module 238 of the merchant processor 222 (“*server*”) in Skowronek may also use “any encryption method, such as, symmetrical or asymmetrical encryption[.]” Skowronek at [0040]. A POSITA would have understood that symmetrical encryption uses the same shared unique private key.¹

[3.i] said adapter module having encryption/decryption technology and said server having encryption/decryption technology,

142. Because Low describes the electronic payment module and vendor server able to encrypt/decrypt the payment authorization, Low discloses “*said adapter module having encryption/decryption technology and said server having encryption/decryption technology*” as claimed.

¹ See, e.g., https://en.wikipedia.org/wiki/Symmetric-key_algorithm

143. Low's electronic payment module ("*adapter module*") is described as including "an encryption key, such as a public key of an asymmetric key pair, to decrypt [an] encrypted message." Low at 9:39-62, 10:63-11:8. A POSITA would have understood that because the electronic payment module has the ability to decrypt messages, it has "*encryption/decryption technology*."

144. Likewise, because Low the vendor server (part of "*said server*"), is able to encrypt the payment authorization, it has "*encryption/decryption technology*." Low at 8:3-21, 9:39-62, 10:62-11:8, 12:9-19, claims 1, 7, 12.

145. In addition, because Low describes the electronic payment module and vendor server being able to encrypt/decrypt the payment authorization and because Skowronek discloses a vending machine module that may use symmetrical encryption/decryption and a merchant processor server that may use symmetrical encryption/decryption, Low and Skowronek render obvious "*said adapter module having encryption/decryption technology and said server having encryption/decryption technology*" as claimed.

146. In Skowronek, the vending machine has an encryption module which may use symmetrical encryption/decryption and a merchant processor server which may use symmetrical encryption/decryption. *See* [3]. It would have been obvious to a POSITA to use Skowronek's symmetrical "encryption/decryption technology" with Low. *See* Sec. B.b; *see also* [3].

[3.ii] said authorization request being encrypted by said adapter module encryption/decryption technology using said unique private key to create an encrypted authorization request,

147. Because Low describes an electronic payment module and vendor server using a key to encrypt and decrypt messages, and because a POSITA would have found it obvious for the electronic payment module to secure the purchase request using symmetrical encryption as taught by Skowronek, Low and Skowronek render obvious “*said authorization request being encrypted by said adapter module encryption/decryption technology using said unique private key to create an encrypted authorization request*” as claimed. See [2.i], [3].

[3.iii] said encrypted authorization request being decrypted by said server encryption/decryption technology using said unique private key,

148. Because Low describes an electronic payment module and vendor server using a key to encrypt and decrypt messages, and because a POSITA would have found it obvious for the electronic payment module to secure the purchase request using symmetrical encryption as taught by Skowronek, Low and Skowronek render obvious “*said encrypted authorization request being decrypted by said server encryption/decryption technology using said unique private key*” as claimed. See [2.i], [3].

[3.iv] said authorization grant being encrypted by said server encryption/decryption technology using said unique private key to create an encrypted authorization grant,

149. Because Low describes the electronic payment module and vendor server using a key to encrypt and decrypt the payment authorization, and because a POSITA would have found it obvious to use symmetrical encryption to encrypt the payment authorization as taught by Skowronek, Low and Skowronek render obvious *“said authorization grant being encrypted by said server encryption/decryption technology using said unique private key to create an encrypted authorization grant”* as claimed. See [3], [3.i].

[3.v] said encrypted authorization grant being decrypted by said adapter module encryption/decryption technology using said unique private key, and

150. Because Low describes the electronic payment module and vendor server using a key to encrypt and decrypt the payment authorization, and because a POSITA would have found it obvious to use symmetrical encryption to encrypt the payment authorization as taught by Skowronek, Low and Skowronek render obvious *“said encrypted authorization grant being decrypted by said adapter module encryption/decryption technology using said unique private key”* as claimed. See [3], [3.i].

[3.vi] said encrypted authorization request and said encrypted authorization grant being undecipherable to the mobile device.

151. Because Low describes a payment request and payment authorization, and a POSITA would have found it obvious to make those communications undecipherable to the user’s device as taught by Skowronek, Low and Skowronek

render obvious “*said encrypted authorization request and said encrypted authorization grant being undecipherable to the mobile device*” as claimed. See [2.iii].

3. Claim 19

[19] The method of claim 18, securing said authorization request using security technology associated with said adapter module to create a secured authorization request,

152. Because Low describes an electronic payment module which sends a purchase request, and a POSITA would have found it obvious for the electronic payment module to secure said purchase request as taught by Skowronek, Low and Skowronek render obvious “*securing said authorization request using security technology associated with said adapter module to create a secured authorization request*” as claimed. See [2.i].

[19.i] securing said authorization grant using security technology associated with said server to create a secured authorization grant

153. Because Low describes the payment authorization being encrypted by the vendor server, Low discloses “*securing said authorization grant using security technology associated with said server to create a secured authorization grant*” as claimed. See [1(d)], [2.ii].

[19.ii] said secured authorization request and said secured authorization grant being undecipherable to the mobile device.

154. Because Low describes a payment request and payment authorization, and a POSITA would have found it obvious to make those communications undecipherable to the user's device as taught by Skowronek, Low and Skowronek render obvious "*said secured authorization request and said secured authorization grant being undecipherable to the mobile device*" as claimed. See [2.iii].

4. Claim 20

[20] The method of claim 18, sharing a unique private key between said adapter module and said server,

155. Because Low describes the electronic payment module and vendor server using a key to encrypt and decrypt messages, and because a POSITA would have found it obvious to use symmetrical encryption to encrypt the messages as taught by Skowronek, Low and Skowronek render obvious "*sharing a unique private key between said adapter module and said server*" as claimed. See [3].

[20.i] encrypting using said unique private key said authorization request using encryption/decryption technology associated with said adapter module to create an encrypted authorization request,

156. Because Low describes an electronic payment module which sends a purchase request, and a POSITA would have found it obvious for the electronic payment module to secure said purchase request using symmetrical encryption as taught by Skowronek, Low and Skowronek render obvious "*encrypting using said unique private key said authorization request using encryption/decryption*

technology associated with said adapter module to create an encrypted authorization request” as claimed. See [2.i], [3], [3.i].

[20.ii] decrypting using said unique private key said encrypted authorization request using encryption/decryption technology associated with said server,

157. Because Low describes a server receiving a purchase request, and a POSITA would have found it obvious for the server to decrypt the request using symmetrical encryption as taught by Skowronek, Low and Skowronek render obvious “*decrypting using said unique private key said encrypted authorization request using encryption/decryption technology associated with said server*” as claimed. See [2.i], [3], [3.i].

[20.iii] encrypting using said unique private key said authorization grant using said encryption/decryption technology associated with said server to create an encrypted authorization grant,

158. Because Low describes the electronic payment module and vendor server using a key to encrypt and decrypt a payment authorization, and because a POSITA would have found it obvious to use symmetrical encryption to encrypt the payment authorization as taught by Skowronek, Low and Skowronek render obvious “*encrypting using said unique private key said authorization grant using said encryption/decryption technology associated with said server to create an encrypted authorization grant*” as claimed. See [3], [3.i].

[20.iv] decrypting using said unique private key said encrypted authorization grant using encryption/decryption technology associated with said adapter module,

159. Because Low describes the electronic payment module and vendor server using a key to encrypt and decrypt a payment authorization, and because a POSITA would have found it obvious to use symmetrical encryption to encrypt the payment authorization as taught by Skowronek, Low and Skowronek render obvious “*decrypting using said unique private key said encrypted authorization grant using encryption/decryption technology associated with said adapter module*” as claimed. See [3], [3.i].

[20.v] said encrypted authorization request and said encrypted authorization grant being undecipherable to the mobile device.

160. Because Low describes a payment request and payment authorization, and a POSITA would have found it obvious to make those communications undecipherable to the user’s device as taught by Skowronek, Low and Skowronek render obvious “*said encrypted authorization request and said encrypted authorization grant being undecipherable to the mobile device*” as claimed. See [2.iii].

E. Ground 3: Ground 3: Claims 4-6 and 21-23 are obvious under 35 U.S.C. § 103 over Low in view of Freeny

1. Claim 4

[4(a)] The system of claim 1 further comprising: (a) said adapter module surrounded by two zones, a payment zone and an authorization zone,

161. Because a POSITA would have found it obvious to surround Low's electronic payment module with a payment zone and an authorization zone as taught by Freeny, Low and Freeny render obvious "*said adapter module surrounded by two zones, a payment zone and an authorization zone*" as claimed.

162. Low's payment transaction may take place when the user device 110 ("*mobile device*") is in communication range of the adapter module. Low at 9:63-67. A POSITA would have understood that the communication range is the range in which the user's device can connect to the adapter module using Bluetooth or other *short-range communication technologies*. Low at 4:45-56, 9:63-67, 10:18-40. In fact, the '045 patent specification uses "communication range" and "Bluetooth range" interchangeably. '045 patent at 6:20-25, 6:45-49, 21:66-22:5.

163. For at least the reasons explained above at Sec. B.c, a POSITA would have been motivated to implement Freeny's teaching of authorization and payment zones in Low with a reasonable expectation of success, as Freeny discusses using this same method in an analogous system.

164. It would have been obvious to a POSITA to surround the electronic payment module ("*adapter module*") in Low with two separate zones ("*a payment zone and an authorization zone*"), as taught by Freeny.

165. Freeny uses a "proximity authorization unit" (a mobile device) at a "proximity service unit"—a machine such as a vending machine, ATM system, or

store checkout system. Freeny at 2:8-25. The proximity service unit has a wireless adapter element 3180 which communicates with the mobile device. Freeny 33:18-36.

166. When the mobile device is within a “first proximity distance” (“*authorization zone*”) from the proximity service unit, Freeny’s wireless adapter element transmits authorization for a mobile payment. Freeny at 33:18-36. At a “second proximity distance” (“*payment zone*”), which is closer than the first proximity distance, the transaction is then approved. Freeny at 33:18-36, *see also* 13:23-37.

[4(a.i)] wherein said payment zone is within said authorization zone;

167. Because Freeny’s “second proximity distance” is closer than the “first proximity distance,” Low and Freeny render obvious “*said payment zone is within said authorization zone*” as claimed.

168. For at least the reasons explained above at Sec. B.c, a POSITA would have been motivated to implement Freeny’s teaching of the payment zone being within the authorization zone in Low with a reasonable expectation of success, as Freeny discusses using this method for an analogous system for mobile payments.

169. It would have been obvious to a POSITA to make the payment zone within the authorization zone. Freeny teaches that the “second proximity distance” (“*payment zone*”) between the “proximity authorization unit” (“*mobile device*”) and

the “proximity service unit” (“*payment accepting unit*”) is closer than the “first proximity distance” (“*authorization zone*”). Freeny at 33:18-36, *see also* 13:23-37.

The second proximity distance is therefore within the first proximity distance, as the radius of the second proximity distance is shorter than the radius of the first proximity distance.

[4(b)] said adapter module sending said authorization request when the mobile device is within said authorization zone; and

170. Because Low discloses the electronic payment module transmitting a payment authorization request to a user’s device, and because a POSITA would have found it obvious to transmit that request when the mobile device is within a first proximity distance as taught by Freeny, Low and Freeny render obvious “*said adapter module sending said authorization request when the mobile device is within said authorization zone*” as claimed.

171. Low’s electronic payment module (“*adapter module*”) sends an authorization request to the user’s mobile device. *See* [1(c)].

172. For at least the reasons explained above at Sec. B.c, a POSITA would have been motivated to implement Freeny’s teaching of sending a transmission when a mobile device is within a certain proximity to Low’s transmission of authorization requests from the electronic payment module with a reasonable expectation of success, as Freeny discusses using this method for an analogous device.

173. It would have been obvious to a POSITA to modify Low's system to send the authorization request when the mobile device is within the "first proximity distance" ("*authorization zone*"), as taught by Freeny. Freeny's authorization request codes ("*authorization request*") are transmitted when the proximity authorization unit ("*mobile device*") is within the first proximity distance ("*authorization zone*"). Freeny at 33:18-36, 13:23-37.

[4(c)] the mobile device forwarding said authorization grant for funds to said adapter module when the mobile device is within said payment zone.

174. Because Low discloses the user device forwarding a purchase authorization to the electronic payment module, and because a POSITA would have found it obvious to transmit that authorization when the mobile device is within a second proximity distance as taught by Freeny, Low and Freeny render obvious "*the mobile device forwarding said authorization grant for funds to said adapter module when the mobile device is within said payment zone*" as claimed.

175. Low discloses the user device ("*mobile device*") forwarding the purchase authorization to the electronic payment module ("*adapter module*"). See [1(d)].

176. For at least the reasons explained above at Sec. B.c, a POSITA would have been motivated to apply Freeny's teaching of sending a transmission when a mobile device is within a certain proximity to the machine to Low's transmission of the

authorization grant for funds with a reasonable expectation of success, as Freeny discusses using this method for an analogous device.

177. It would have been obvious to a POSITA to send the purchase authorization when the mobile device is within the “second proximity distance” (“*payment zone*”). In Freeny, the transaction is approved (“*authorization grant for funds*”) when the mobile device is at the second proximity distance (“*payment zone*”). Freeny at 33:18-36 (“The store checkout system can approv[e] the transaction at a second proximity distance . . .”), 13:23-37.

2. Claim 5

[5(a)] The system of claim 1 further comprising: (a) said adapter module surrounded by three zones, a payment zone, an authorization zone, and a communication zone,

178. Because a POSITA would have found it obvious to surround Low’s electronic payment module with a payment and authorization zone as taught by Freeny, and because a “communication zone” is inherent in Low, Low and Freeny render obvious “*said adapter module surrounded by three zones, a payment zone, an authorization zone, and a communication zone*” as claimed.

179. Low and Freeny render obvious “*said adapter module surrounded by two zones, a payment zone and an authorization zone*” as claimed. See [4(a)].

180. For at least the reasons explained above at Sec. B.c, a POSITA would have been motivated to apply Freeny’s proximity-based communications to Low’s system

with a reasonable expectation of success, as Freeny discusses using this method for an analogous device.

181. The claimed “*communication zone*” is inherent in Low’s disclosure. The ‘045 patent specification uses “communication zone” and “Bluetooth range” interchangeably. ‘045 patent at 6:21-25, 21:66-22:6, FIG. 1. In Low, the user device may store a purchase approval and “redeem the approval when user device 110 is in communication range of vending machine 110.” Low at 9:62-67. So, the communication range of Low’s machine is the range of the short-range communication technology (e.g., Bluetooth). Low at 6:9-16, 4:57-5:3. Thus, Low’s communication range (e.g., Bluetooth range) constitutes a “*communication zone*” as claimed.

[5(a.i)] wherein said payment zone is within said authorization zone and said authorization zone is within said communication zone;

182. Because a POSITA would have found it obvious to make the payment zone within the authorization zone as taught by Freeny, and because the authorization zone being within the communication zone is inherent in Low, Low and Freeny render obvious “*said payment zone is within said authorization zone and said authorization zone is within said communication zone*” as claimed.

183. Freeny renders obvious the “*payment zone is within said authorization zone.*” See [4(a.i)].

184. The authorization zone being within the communication zone is inherent from the disclosure in Low. The communication zone is inherent from Low's description of the communication range (*i.e.* Bluetooth range) between the user device and vending machine. *See* [5(a)]. The authorization request is sent from the adapter module to the user device using short-range communication technology which defines the "communication range." *See* [1(c)]; Low at 4:45-56. So, to initiate authorization of the transaction while the user is in the authorization zone, the authorization zone must be within the "communication range" ("*within said communication zone*").

[5(b)] the mobile device receiving advertising broadcast signals from said adapter module within said communication zone;

185. Because Low discloses the vending machine sending advertising broadcast signals to the user device while the user device is in communication range, Low discloses "*the mobile device receiving advertising broadcast signals from said adapter module within said communication zone*" as claimed.

186. In Low, the vending machine may send advertising broadcast signals to the user device ("*user device*"). Low discloses, "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." Low at 2:20-25. These advertisements are sent to the user device using "wireless communication, such as

Bluetooth or NFC (Near Field Communication) means,” so the user device must be within the communication range (i.e., “*within said communication zone*”). See [5(a.i)]; Low at 2:11-16.

[5(c)] said adapter module sending said authorization request when the mobile device is within said authorization zone; and

187. Because Low discloses the electronic payment module transmitting a payment authorization request to a user’s device, and because a POSITA would have found it obvious to transmit that request when the mobile device is within a first proximity distance as taught by Freeny, Low and Freeny render obvious “*said adapter module sending said authorization request when the mobile device is within said authorization zone*” as claimed. See [4(b)].

[5(d)] the mobile device forwarding said authorization grant for funds to said adapter module when the mobile device is within said payment zone.

188. Because Low discloses the user device forwarding a purchase authorization to the electronic payment module, and because a POSITA would have found it obvious to transmit that authorization when the mobile device is within a second proximity distance as taught by Freeny, Low and Freeny render obvious “*the mobile device forwarding said authorization grant for funds to said adapter module when the mobile device is within said payment zone*” as claimed. See [4(c)].

3. Claim 6

[6] The system of claim 1 having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device.

189. Because a POSITA would have found it obvious to modify Low's system to trigger payment and dispensing of the item automatically as taught by Freeny, Low and Freeny render obvious "*a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device*" as claimed.

190. Low's vending machine 120 ("*payment accepting unit*") dispenses a product or service. *See* [1(e)]; Low at 5:19-35, 9:39-62, 10:55-61, 12:9-19, 12:9-19. The user selects the product or service at the beginning of the transaction, but the product or service is dispensed once the vending machine receives payment authorization from the user device. Low at 9:39-62 ("*After* vending machine 120 receives a payment authorization, vending machine 120 may dispense the purchased item of products 124.>").

191. For at least the reasons explained above and at Sec. B.c, a POSITA would have been motivated to apply Freeny's teaching of automatic hands-free activation of payment to Low's vending machines with a reasonable expectation of success, as Freeny discusses using this method with various analogous devices.

192. If claim 6 requires a product or service to be dispensed without any user interaction with the mobile device during the entire transaction, a POSITA would have found it obvious to modify Low's vending machine to do so as taught by Freeny. In Freeny, authorization information may be stored such that the proximity authorization unit 2910 ("*mobile device*") can "automatically sense and determine the required signal type and/or protocol to be sent to one of the proximity service units 2920" and thus complete a payment without user interaction with the mobile device. Freeny at 33:37-53, 13:2-37 (describing hands-free operation of a "predetermined toll service").

193. Freeny teaches that although the proximity service unit may be a vending machine, the automatic hands-free operation of payment is also particularly applicable to toll booths. Freeny at 32:31-42. As such, Freeny's disclosure is particularly relevant to the teachings of the '045 patent, which discloses that the payment accepting unit may be any machine which accepts payment, including both vending machines and toll booths. '045 patent at 1:31-58, 12:55-60. As such, a POSITA would have been further motivated to apply Freeny's teachings to Low's vending machines.

4. Claim 21

[21(a)] The method of claim 18 further comprising: (a) surrounding said adapter module with two zones, a payment zone and an authorization zone,

194. Because a POSITA would have found it obvious to surround Low's electronic payment module with a payment zone and an authorization zone as taught by Freeny, Low and Freeny render obvious "*surrounding said adapter module with two zones, a payment zone and an authorization zone*" as claimed. See [4(a)].

[21(a.i)] wherein said payment zone is within said authorization zone;

195. Because Freeny's "second proximity distance" is closer than the "first proximity distance," Low and Freeny render obvious "*wherein said payment zone is within said authorization zone*" as claimed. See [4(a.i)].

[21(b)] said adapter module sending said authorization request when the mobile device is within said authorization zone; and

196. Because Low discloses the electronic payment module transmitting a payment authorization request to a user's device, and because a POSITA would have found it obvious to transmit that request when the mobile device is within a first proximity distance as taught by Freeny, Low and Freeny render obvious "*said adapter module sending said authorization request when the mobile device is within said authorization zone*" as claimed. See [4(b)].

[21(c)] the mobile device forwarding said authorization grant for funds to said adapter module when the mobile device is within said payment zone.

197. Because Low discloses the user device forwarding a purchase authorization to the electronic payment module, and because a POSITA would have found it

obvious to transmit that authorization when the mobile device is within a second proximity distance as taught by Freeny, Low and Freeny render obvious “*the mobile device forwarding said authorization grant for funds to said adapter module when the mobile device is within said payment zone*” as claimed. See [4(c)].

5. Claim 22

[22(a)] The method of claim 18 further comprising: (a) surrounding said adapter module with three zones, a payment zone, an authorization zone, and a communication zone,

198. Because a POSITA would have found it obvious to surround Low’s electronic payment module with a payment zone and an authorization zone as taught by Freeny, and because a “communication zone” is inherent in Low, Low and Freeny render obvious “*surrounding said adapter module with three zones, a payment zone, an authorization zone, and a communication zone*” as claimed. See [5(a)].

[22(a.i)] wherein said payment zone is within said authorization zone and said authorization zone is within said communication zone;

199. Because a POSITA would have found it obvious to make the payment zone within the authorization zone as taught by Freeny, and because the authorization zone being within the communication zone is inherent in Low, Low and Freeny render obvious “*wherein said payment zone is within said authorization zone and said authorization zone is within said communication zone*” as claimed. See [5(a.i)].

[22(b)] the mobile device receiving advertising broadcast signals from said adapter module within said communication zone;

200. Because Low discloses the vending machine sending advertising broadcast signals to the user device while the user device is in communication range, Low discloses “*the mobile device receiving advertising broadcast signals from said adapter module within said communication zone*” as claimed. See [5(b)].

[22(c)] said adapter module sending said authorization request when the mobile device is within said authorization zone; and

201. Because Low discloses the electronic payment module transmitting a payment authorization request to a user’s device, and because a POSITA would have found it obvious to transmit that request when the mobile device is within a first proximity distance as taught by Freeny, Low and Freeny render obvious “*said adapter module sending said authorization request when the mobile device is within said authorization zone*” as claimed. See [4(b)].

[22(d)] the mobile device forwarding said authorization grant for funds to said adapter module when the mobile device is within said payment zone.

202. Because Low discloses the user device forwarding a purchase authorization to the electronic payment module, and because a POSITA would have found it obvious to transmit that authorization when the mobile device is within a second proximity distance as taught by Freeny, Low and Freeny render obvious “*the mobile*

device forwarding said authorization grant for funds to said adapter module when the mobile device is within said payment zone” as claimed. See [4(c)].

6. Claim 23

[23] The method of claim 18 having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device.

203. Because a POSITA would have found it obvious to modify Low’s system to trigger payment and dispensing of the item automatically as taught by Freeny, Low and Freeny render obvious “*a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device*” as claimed. See [6].

F. Ground 4: Claims 10-14 are obvious under 35 U.S.C. § 103 over Low in view of Skowronek and Freeny

1. Claim 10

[10(pre)] A mobile-device-to-machine payment system for facilitating a cashless transaction for purchase of at least one product or service by a user from a payment accepting unit having input mechanisms,

204. Because Low describes a system for cashless, electronic payments on a vending machine using a mobile device, wherein the machine accepts user inputs via the vending machine’s input mechanisms to purchase products, Low discloses a “*mobile-device-to-machine payment system for facilitating a cashless transaction for purchase of at least one product or service by a user from a payment accepting unit having input mechanisms*” as claimed. See [1(pre)].

[10(pre.i)] the user having a mobile device having both short-range communication technology and long-range communication technology,

205. Because Low's system includes a user device which may communicate via both long-range and short-range technologies, Low discloses "*the user having a mobile device having both short-range communication technology and long-range communication technology*" as claimed. See [1(pre.i)].

[10(pre.ii)] the payment accepting unit capable of dispensing at least one product or service, said system comprising:

206. Because Low's vending machine is capable of dispensing products, Low discloses "*the payment accepting unit capable of dispensing at least one product or service*" as claimed. See [1(pre.ii)].

[10(a)] an adapter module associated with the payment accepting unit, said adapter having short-range communication technology for communicating with the short-range communication technology of the mobile device,

207. Because Low describes a vending machine including an electronic payment module which communicates with a user's device via short-range communication technology, Low discloses "*an adapter module associated with the payment accepting unit, said adapter having short-range communication technology for communicating with the short-range communication technology of the mobile device*" as claimed. See [1(a)].

[10(a.i)] said adapter module having security technology

208. Because Low describes the electronic payment module and the vendor server having technology to encrypt and decrypt messages, Low discloses “*said adapter module having security technology*” as claimed. See [2].

[10(a.ii)] said adapter module surrounded by two zones, a payment zone and an authorization zone,

209. Because a POSITA would have found it obvious to surround Low’s electronic payment module with a payment zone and an authorization zone as taught by Freeny, Low and Freeny render obvious “*said adapter module surrounded by two zones, a payment zone and an authorization zone*” as claimed. See [4(a)].

[10(a.iii)] wherein said payment zone is within said authorization zone;

210. Because Freeny’s “second proximity distance” is closer than the “first proximity distance,” Low and Freeny render obvious “*said payment zone is within said authorization zone*” as claimed. See [4(a.i)].

[10(b)] a server having long-range communication technology for communicating with the long-range communication technology of the mobile device,

211. Because Low describes servers which communicate with a user device via a network interface using long-range communication technology, Low discloses “*a server having long-range communication technology for communicating with the long-range communication technology of the mobile device*” as claimed. See [1(b)].

[10(b.i)] said server having security technology;

212. Because Low describes the electronic payment module and the vendor server having technology to encrypt and decrypt messages, Low discloses “*said server having security technology*” as claimed. See [2].

[10(c)] said adapter module for sending a secured authorization request for funds secured by said adapter module security technology to the mobile device using short-range communication technology when the mobile device is within said authorization zone,

213. Because Freeny discloses the authorization request being transmitted when the mobile device is within the authorization zone, and because Low describes an electronic payment module which includes a payment verification application to send a purchase request to the user device using short-range communications technologies, and because a POSITA would have found it obvious to secure said purchase request as taught by Skowronek, Low, Skowronek, and Freeny render obvious “*said adapter module for sending a secured authorization request for funds secured by said adapter module security technology to the mobile device using short-range communication technology when the mobile device is within said authorization zone*” as claimed.

214. Freeny discloses the “*adapter module sending said authorization request when the mobile device is within said authorization zone.*” See [4(b)].

215. Low’s electronic payment module (“*adapter module*”) has short-range communication technology for communicating with the short-range communication

technology of the mobile device. Low at 4:57-5:3, 6:9-16; *see* [1(a)], [1(c)]. Low's payment verification application (part of the electronic payment module) may transmit a "purchase request" ("*authorization request for funds*") to the user device, including "a product name, product price, product code, a machine identifier, and/or a transaction number to user device 110." Low at 5:66-6:3, 2:38-46.

216. At least for the reasons given above in B.b, it would have been obvious to a POSITA for the adapter module to secure the purchase request ("*secured authorization request for funds by said adapter module security technology*"), as taught by Skowronek. *See* [2(i)].

[10(c.i)] the mobile device forwarding said secured authorization request for funds to said server using long-range communication technology;

217. Because Low discloses a user device transmitting a purchase request to the payment provider server using long-range communications technologies, and a POSITA would have found it obvious to secure said purchase request as taught by Skowronek, Low and Skowronek render obvious "*the mobile device forwarding said secured authorization request for funds to said server using long-range communication technology*" as claimed.

218. After the user device receives Low's purchase request ("*authorization request for funds*"), it is transmitted ("*forward[ed]*") to payment provider server 140 using long-range communication technology. Low at 5:61-6:9, 7:40-50; *see* [1(c)].

219. It would have been obvious to a POSITA to secure the purchase request by encryption (“*secured authorization request for funds*”), as taught by Skowronek. Skowronek’s unattended retail device 102 (“*payment accepting unit*”) compiles transaction information into a packet of information and encrypts (“*secures*”) said information before transmitting it to the mobile appliance (“*mobile device*”). Skowronek at [0026]; *see* [2(i)].

[10(d)] said server for sending a secured authorization grant for funds secured by said server security technology to the mobile device using long-range communication technology,

220. Because Low describes the payment provider server communicating a payment authorization to the user device via long-range communications technologies, and because Low’s payment authorization may be encrypted by the vendor server, Low discloses “*said server for sending a secured authorization grant for funds secured by said server security technology to the mobile device using long-range communication technology*” as claimed. *See* [1(d)], [2(ii)].

[10(d.i)] the mobile device forwarding said secured authorization grant for funds to said adapter module using short-range communication technology when the mobile device is within said payment zone;

221. Because Low describes the payment authorization being forwarded from the user device to the vending machine’s electronic payment module via short-range communications technologies, and because a POSITA would have found it obvious to transmit that authorization when the mobile device is within a second proximity

distance as taught by Freeny, Low and Freeny render obvious “*the mobile device forwarding said secured authorization grant for funds to said adapter module using short-range communication technology when the mobile device is within said payment zone*” as claimed. See [1(d)], [4(c)].

[10(e)] wherein the payment accepting unit dispenses the at least one product or service in response to receiving user input to the payment accepting unit input mechanism if said adapter module has received said secured authorization grant.

222. Because Low describe a vending machine which dispenses a product in response to the user’s selection of a product if the electronic payment module has received a payment authorization, Low discloses “*wherein the payment accepting unit dispenses the at least one product or service in response to receiving user input to the payment accepting unit input mechanism if said adapter module has received said secured authorization grant*” as claimed. See [1(e)].

2. Claim 11

[11] The system of claim 10, said secured authorization grant being undecipherable to the mobile device.

223. Because Low describes a payment request and payment authorization, and a POSITA would have found it obvious to make those communications undecipherable to the user’s device as taught by Skowronek, Low and Skowronek render obvious “*said secured authorization grant being undecipherable to the mobile device*” as claimed. See [2.iii].

3. Claim 12

[12] The system of claim 10, said adapter module and said server sharing a unique private key,

224. Because Low describes the electronic payment module and vendor server using a key to encrypt and decrypt messages, and because a POSITA would have found it obvious to use symmetrical encryption to encrypt the messages as taught by Skowronek, Low and Skowronek render obvious “*said adapter module and said server sharing a unique private key*” as claimed. See [3].

[12.i] said adapter module security technology being encryption/decryption technology and said server security technology being encryption/decryption technology,

225. Because Low describes the electronic payment module and vendor server able to encrypt/decrypt the payment authorization, Low discloses “*said adapter module security technology being encryption/decryption technology and said server security technology being encryption/decryption technology*” as claimed. See [3.i].

[12.ii] said secured authorization request being encrypted by said adapter module encryption/decryption technology using said unique private key to create an encrypted secured authorization request,

226. Because Low describes an electronic payment module and vendor server using a key to encrypt and decrypt messages, and because a POSITA would have found it obvious for the electronic payment module to secure the purchase request using symmetrical encryption as taught by Skowronek, Low and Skowronek render

obvious “*said secured authorization request being encrypted by said adapter module encryption/decryption technology using said unique private key to create an encrypted secured authorization request*” as claimed. See [2.i], [3], [3.ii].

[12.iii] said encrypted secured authorization request being decrypted by said server encryption/decryption technology using said unique private key,

227. Because Low describes an electronic payment module and vendor server using a key to encrypt and decrypt messages, and because a POSITA would have found it obvious for the electronic payment module to secure the purchase request using symmetrical encryption as taught by Skowronek, Low and Skowronek render obvious “*said encrypted secured authorization request being decrypted by said server encryption/decryption technology using said unique private key*” as claimed. See [2.i], [3], [3.iii].

[12.iv] said secured authorization grant being encrypted by said server encryption/decryption technology using said unique private key to create an encrypted secured authorization grant,

228. Because Low describes the electronic payment module and vendor server using a key to encrypt and decrypt the payment authorization, and because a POSITA would have found it obvious to use symmetrical encryption to encrypt the payment authorization as taught by Skowronek, Low and Skowronek render obvious “*said secured authorization grant being encrypted by said server*

encryption/decryption technology using said unique private key to create an encrypted secured authorization grant” as claimed. See [3], [3.i], [3.iv].

[12.v] said encrypted secured authorization grant being decrypted by said adapter module encryption/decryption technology using said unique private key, and

229. Because Low describes the electronic payment module and vendor server using a key to encrypt and decrypt the payment authorization, and because a POSITA would have found it obvious to use symmetrical encryption to encrypt the payment authorization as taught by Skowronek, Low and Skowronek render obvious “*said encrypted secured authorization grant being decrypted by said adapter module encryption/decryption technology using said unique private key*” as claimed. See [3], [3.i], [3.v].

[12.vi] said encrypted secured authorization request and said encrypted secured authorization grant being undecipherable to the mobile device.

230. Because Low describes a payment request and payment authorization, and a POSITA would have found it obvious to make those communications undecipherable to the user’s device as taught by Skowronek, Low and Skowronek render obvious “*said encrypted secured authorization request and said encrypted secured authorization grant being undecipherable to the mobile device*” as claimed. See [2.iii], [3.vi].

4. Claim 13

[13(a)] The system of claim 10 further comprising: (a) said adapter module being surrounded by three zones, said payment zone, said authorization zone, and a communication zone,

231. Because a POSITA would have found it obvious to surround Low's electronic payment module with a payment and authorization zone as taught by Freeny, and because a "communication zone" is inherent in Low, Low and Freeny render obvious "said adapter module being surrounded by three zones, said payment zone, said authorization zone, and a communication zone" as claimed. See [5(a)].

[13(a.i)] wherein said authorization zone is within said communication zone; and

232. Because a POSITA would have found it obvious to make the payment zone within the authorization zone as taught by Freeny, and because the authorization zone being within the communication zone is inherent in Low, Low and Freeny render obvious "wherein said authorization zone is within said communication zone" as claimed. See [5(a.i)].

[13(b)] the mobile device receiving advertising broadcast signals from said adapter module within said communication zone.

233. Because Low discloses the vending machine sending advertising broadcast signals to the user device while the user device is in communication range, Low discloses "the mobile device receiving advertising broadcast signals from said adapter module within said communication zone" as claimed. See [5(b)].

5. Claim 14

[14] The system of claim 10 having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device.

234. Because a POSITA would have found it obvious to modify Low's system to trigger payment and dispensing of the item automatically as taught by Freeny, Low and Freeny render obvious "*a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device*" as claimed. See [6].

G. Ground 5: Claims 8-9 and 25-26 are obvious under 35 U.S.C. § 103 over Low in view of Wilson

1. Claim 8

[8] The system of claim 1 wherein said adapter module is an in-line dongle for in-line insertion within a multi-drop bus of the payment accepting unit.

235. Because a POSITA would have found it obvious to make the adapter module an in-line dongle adapted to connect through the MDB interface, as taught by Wilson, Low and Wilson render obvious "*said adapter module is an in-line dongle for in-line insertion within a multi-drop bus of the payment accepting unit*" as claimed.

236. Low's vending machine ("*payment accepting unit*") has an electronic payment module ("*adapter module*"). Low at 4:64-67, 5:14-17, 5:49-53; see [1(a)].

237. For at least the reasons explained above at Sec. B.d, a POSITA would have been motivated to implement Wilson's teaching of the adapter module being an in-line dongle adapted to connect through the MDB interface in Low, as Wilson discusses using this method for an analogous device.

238. Wilson's NetVend cashless interface is an "*in-line dongle*" for a vending machine. It communicates with the Multi-Drop Bus (MDB) standard interface to the vending machine ("*payment accepting unit*") controller. Wilson at 2:34-43 ("[E]ach vending machine contains a vending machine interface, known as NetVend, which connects to the VMC through its MDB interface."), Abstract, 2:28-33, 4:15-25, 7:3-14. The interface is a "retrofitted piece of equipment on the vending machine," which a POSITA would have understood to mean that it could be added to an existing vending machine. Wilson at 4:20-25.

2. Claim 9

[9(a)] The system of claim 1: (a) the payment accepting unit having a multi-drop bus to a payment receiving mechanism,

239. Because a POSITA would have found it obvious to connect an MDB interface of the vending machine to a cashless device mechanism, as taught by Wilson, Low and Wilson render obvious "*the payment accepting unit having a multi-drop bus to a payment receiving mechanism*" as claimed.

240. It would have been obvious to a POSITA to make the adapter module connect through the MDB interface as taught by Wilson. *See* [8].

241. For at least the reasons explained above at Sec. B.d, a POSITA would have been further motivated to implement Wilson's teaching of connecting the MDB to a cashless device mechanism, as it discusses using this method for an analogous device.

242. Wilson's NetVend interface uses the MDB/ICP Specification. The MDB/ICP Specification discloses communication between a vending machine ("*payment accepting unit*") controller and a cashless device ("*payment receiving mechanism*") such as a card-based or mobile-phone based system using a Multi-drop Bus:

This section defines the communications bytes sent and received between the cashless device(s) and the Vending Machine Controller (VMC). As defined in Section 2.3, there are two cashless device addresses; Cashless #1, 00010xxxB (10H) and Cashless #2, 1100xxxB (60H). The second address has been assigned to allow for two unique forms of cashless devices to be resident in the vending machine simultaneously. An example would be a card based system as Cashless Device #1 (10H) and a mobile phone based system as Cashless Device #2 (60H). **Everything defined in this section will be common to the two cashless devices – only the addresses will be different.**

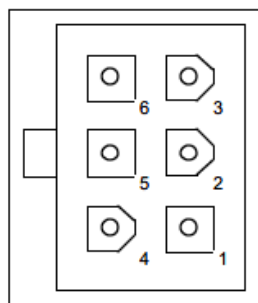
MDB/ICP Specification at 94.

[9(a.i)] the multi-drop bus having a male adapter and a female adapter;

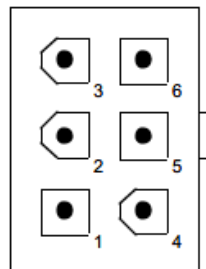
243. Because a POSITA would have found it obvious for the MDB to have a male and a female adapter, Low and Wilson render obvious "*the multi-drop bus having a male adapter and a female adapter*" as claimed.

244. Wilson uses a standard Multi-Drop Bus interface in accordance with the MDB/ICP Specification. *See* [8]; *see also* Wilson at 2:34-43, 4:26-31. As shown in

the figure below, the standard interface includes peripheral connectors having pins and sockets, which a POSITA would have understood to be “*male and female adapter[s]*”:



Peripheral Connector
Face View
Receptacle
(Sockets)



VMC / Bus Connector
Face View
Header
(Pins)

MDB/ICP Specification at 7.

245. These standard MDB male and female connectors used by Wilson (from the MDB/ICP Specification) are consistent with those used by the embodiments of the ‘045 patent:

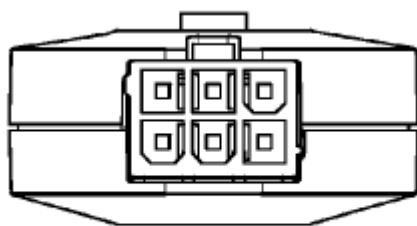


FIG. 15

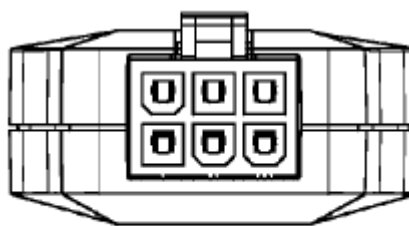


FIG. 16

‘045 patent at Figs. 15-16.

246. For at least the reasons explained above at Sec. B.d, a POSITA would have been motivated to implement Wilson's MDB configuration, including its standard male and female adapters for the MDB, in Low.

[9(b)] said adapter module having a male adapter and a female adapter; and

247. Because a POSITA would have found it obvious for the adapter module to have a male and a female adapter as is inherent in Wilson, Low and Wilson render obvious "*said adapter module having a male adapter and a female adapter*" as claimed.

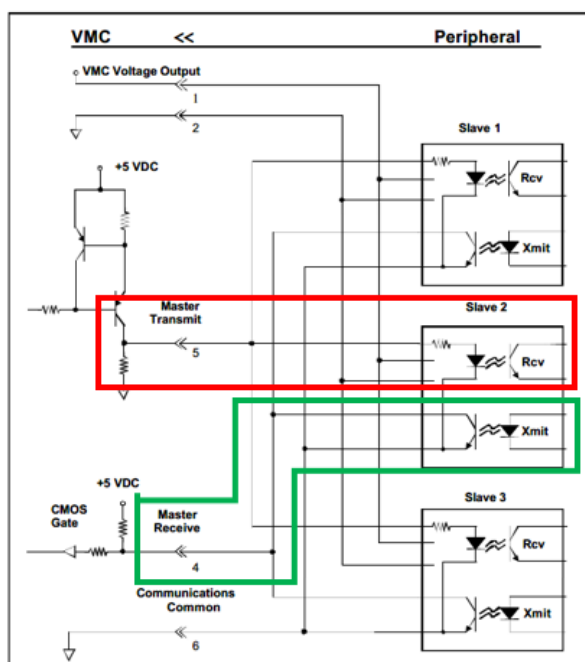
248. In Wilson's standard MDB interface (in accordance with the MDB/ICP Specification), the MDB has male and female adapters. Wilson at 2:34-43, 4:26-31; MDB/ICP Specification at 52; *see* [9(a.i)]. The NetVend cashless interface ("*adapter module*") is expressly designed to connect with this standard MDB interface (Wilson at 2:34-43, 4:26-31), so it must necessarily have a corresponding male and female adapter to attach to the MDB interface.

249. For at least the reasons explained above at Sec. B.d, a POSITA would have been motivated to implement Wilson's adapter module configuration in Low.

[9(c)] said adapter module insertable in serial with the multi-drop bus by connecting said male adapter of said adapter module to the female adapter of the multi-drop bus and by connecting said female adapter of said adapter module to the male adapter of the multi-drop bus.

250. Because Wilson discloses a serial bus interface which would allow Low's adapter module to be intermateable in serial with the MDB via male and female adapters, Low and Wilson render obvious "*said adapter module insertable in serial with the multi-drop bus by connecting said male adapter of said adapter module to the female adapter of the multi-drop bus and by connecting said female adapter of said adapter module to the male adapter of the multi-drop bus*" as claimed.

251. Wilson's NetVend cashless interface ("*adapter module*") is described as connecting to a standard MDB interface. Wilson at 2:34-43, 4:26-31; *see* [8], [9(a)]. This is described as a "serial bus interface," which allows a Vending Machine Controller (VMC) to control peripheral devices electronically, in the MDB/ICP Specification. MDB/ICP Specification at 18. The standard MDB interface peripheral connectors (adapters of the "*adapter module*") are described as "intermateable" ("*insertable*") in serial with the MDB by connecting the corresponding "transmit" and "receive" lines of the VMC/Bus and Peripheral connectors ("*male and female adapter[s]*"). MDB/ICP Specification at 47, 52-53. The schematic below illustrates these connections:



MDB/ICP Specification at 8 (annotated).

252. The adapter module having male and female adapters to connect with the male and female adapters of the MDB is inherently disclosed in Wilson, as Wilson's adapter module connects to the MDB having those standard adapters. *See* [9(b)].

253. For at least the reasons explained above at Sec. B.d, a POSITA would have been motivated to implement Wilson's adapter module configuration in Low.

3. Claim 25

[25] The method of claim 18 further comprising the step of inserting said adapter module as an in-line dongle for in-line insertion within a multi-drop bus of the payment accepting unit.

254. Because a POSITA would have found it obvious to make the adapter module an in-line dongle adapted to connect through the MDB interface, as taught by Wilson, Low and Wilson render obvious *“the step of inserting said adapter*

module as an in-line dongle for in-line insertion within a multi-drop bus of the payment accepting unit” as claimed. See [8].

4. Claim 26

[26] The method of claim 18, the payment accepting unit having a multi-drop bus to a payment receiving mechanism,

255. Because a POSITA would have found it obvious to connect an MDB interface of the vending machine to a cashless device mechanism, as taught by Wilson, Low and Wilson render obvious “the payment accepting unit having a multi-drop bus to a payment receiving mechanism” as claimed. See [9(a)].

[26.i] the multi-drop bus having a male adapter and a female adapter, and

256. Because a POSITA would have found it obvious for the MDB to have a male and a female adapter, Low and Wilson render obvious “*the multi-drop bus having a male adapter and a female adapter*” as claimed. See [9(a.i)].

[26.ii] said adapter module having a male adapter and a female adapter,

257. Because a POSITA would have found it obvious for the adapter module to have a male and a female adapter as is inherent in Wilson, Low and Wilson render obvious “*said adapter module having a male adapter and a female adapter*” as claimed. See [9(b)].

[26.iii] said method further comprising the step of inserting said adapter module in serial with the multi-drop bus by connecting said male adapter of said adapter

module to the female adapter of the multi-drop bus and by connecting said female adapter of said adapter module to the male adapter of the multi-drop bus.

258. Because Wilson discloses a serial bus interface which would allow Low's adapter module to be intermateable in serial with the MDB via male and female adapters, Low and Wilson render obvious "*said method further comprising the step of inserting said adapter module in serial with the multi-drop bus by connecting said male adapter of said adapter module to the female adapter of the multi-drop bus and by connecting said female adapter of said adapter module to the male adapter of the multi-drop bus*" as claimed. See [9(c)].

H. Ground 6: Claims 7 and 24 are obvious under 35 U.S.C. § 103 over Low in view of Freeny and Wilson

5. Claim 7

[7] The system of claim 1 having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device, said system further comprising:

259. Because a POSITA would have found it obvious to modify Low's system to trigger payment and dispensing of the item automatically as taught by Freeny, Low and Freeny render obvious "*a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device*" as claimed. See [6].

[7(a)] a display of the payment accepting unit for displaying funds available based on information from said authorization grant; and

260. Because Low discloses a user interface on the vending machine for completing a purchase, and because a POSITA would have found it obvious to apply Wilson's teaching of the vending machine displaying the available credit/cash to the user based on access being granted to the vending machine, Low and Wilson render obvious "*a display of the payment accepting unit for displaying funds available based on information from said authorization grant*" as claimed.

261. Low's vending machine ("*payment accepting unit*") has "a product payment and dispensing module . . . for a user to make selections, purchase, and dispense products 124," including "means to select a product, such as using a keypad, touchscreen, **display**, or other selection means." Low at 5:19-35, 6:64-67.

262. For at least the reasons explained above at Sec. B.d, a POSITA would have been motivated to apply Wilson's teaching of displaying available funds based on the information in the authorization grant with a reasonable expectation of success, as Wilson discusses using this method with various analogous devices.

263. As taught by Wilson, it would have been obvious to a POSITA for Low's display to show the funds available based on information from the payment authorization ("*authorization grant*"). Like in Low, in Wilson, the cashless vending machine ("*payment accepting unit*") has a "user interface known as the **display**/reader." Wilson at 2:52-56.

264. Wilson's NetVend interface "communicates with at least one central server" to authenticate ("authorize") a transaction. Wilson at Abstract, 3:4-19, 9:66-10:11. The authenticating central server "contains a database for storing user Identifiers and an associated allowable credit or available cash data for each user Identifier[.]" Wilson at Abstract, 3:4-19, 9:66-10:11. The central server "either grants or denies the user access to the vending machine 110" ("authorization grant") based on the user's information stored in the database. Wilson at 5:39-42. After users are granted access ("authorization grant"), they are "shown their available credit/cash on the display/reader 116" of the vending machine. Wilson at 5:43-45.

[7(b)] input mechanisms of the payment accepting unit for receiving user selection input when the user interacts with the input mechanisms to select the at least one product or service to be dispensed.

265. Because Low describes a vending machine which dispenses a product in response to the user's selection of a product on the display via input mechanisms, Low discloses "input mechanisms of the payment accepting unit for receiving user selection input when the user interacts with the input mechanisms to select the at least one product or service to be dispensed" as claimed. See [1(e)].

6. Claim 24

[24] The method of claim 18 having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device, said method further comprising the steps of:

266. Because a POSITA would have found it obvious to modify Low's system to trigger payment and dispensing of the item automatically as taught by Freeny, Low and Freeny render obvious "*a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device*" as claimed. See [6].

[24(a)] displaying funds available on a display of the payment accepting unit, said funds available being based on information from said authorization grant; and

267. Because Low discloses a user interface on the vending machine for completing a purchase, and because a POSITA would have found it obvious to apply Wilson's teaching of the vending machine displaying the available credit/cash to the user based on access being granted to the vending machine, Low and Wilson disclose or render obvious "*displaying funds available on a display of the payment accepting unit, said funds available being based on information from said authorization grant*" as claimed. See [7(a)].

[24(b)] receiving user selection input when the user interacts with input mechanisms of the payment accepting unit to select the at least one product or service to be dispensed.

268. Because Low describes a vending machine which dispenses a product in response to the user's selection of a product on the display via input mechanisms, Low discloses "*receiving user selection input when the user interacts with input*

mechanisms of the payment accepting unit to select the at least one product or service to be dispensed” as claimed. See [1(e)], [7(b)].

I. Ground 7: Claims 15-17 are obvious under 35 U.S.C. § 103 over Low in view of Skowronek, Freeny, and Wilson

1. Claim 15

[15] The system of claim 10 having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device, said system further comprising:

269. Because a POSITA would have found it obvious to modify Low’s system to trigger payment and dispensing of the item automatically as taught by Freeny, Low and Freeny render obvious “*a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device*” as claimed. See [6].

[15(a)] a display of the payment accepting unit for displaying funds available based on information from said secured authorization grant; and

270. Because Low discloses a user interface on the vending machine for completing a purchase, and because a POSITA would have found it obvious to apply Wilson’s teaching of the vending machine displaying the available credit/cash to the user based on access being granted to the vending machine, Low and Wilson render obvious “*a display of the payment accepting unit for displaying funds available based on information from said secured authorization grant*” as claimed. See [7(a)].

[15(b)] input mechanisms of the payment accepting unit for receiving user selection input when the user interacts with the input mechanisms to select the at least one product or service to be dispensed.

271. Because Low describes a vending machine which dispenses a product in response to the user's selection of a product on the display via input mechanisms, Low discloses "*input mechanisms of the payment accepting unit for receiving user selection input when the user interacts with the input mechanisms to select the at least one product or service to be dispensed*" as claimed. See [1(e)], [1(pre)], [7(b)].

2. Claim 16

[16] The system of claim 10 wherein said adapter module is an in-line dongle for in-line insertion within a multi-drop bus of the payment accepting unit.

272. Because a POSITA would have found it obvious to make the adapter module an in-line dongle adapted to connect through the MDB interface, as taught by Wilson, Low and Wilson render obvious "*said adapter module is an in-line dongle for in-line insertion within a multi-drop bus of the payment accepting unit*" as claimed. See [8].

3. Claim 17

[17(a)] The system of claim 10: (a) the payment accepting unit having a multi-drop bus to a payment receiving mechanism,

273. Because a POSITA would have found it obvious to connect an MDB interface of the vending machine to a cashless device mechanism, as taught by

Wilson, Low and Wilson render obvious “*the payment accepting unit having a multi-drop bus to a payment receiving mechanism*” as claimed. See [9(a)].

[17(a.i)] the multi-drop bus having a male adapter and a female adapter;

274. Because a POSITA would have found it obvious for the MDB to have a male and a female adapter as shown in the MDB/ICP Specification used by Wilson, Low and Wilson render obvious “*the multi-drop bus having a male adapter and a female adapter*” as claimed. See [9(a.i)].

[17(b)] said adapter module having a male adapter and a female adapter;

275. Because a POSITA would have found it obvious for the adapter module to have a male and a female adapter as is inherent in Wilson, Low and Wilson render obvious “*said adapter module having a male adapter and a female adapter*” as claimed. See [9(b)].

[17(c)] said adapter module insertable in serial with the multi-drop bus by connecting said male adapter of said adapter module to the female adapter of the multi-drop bus and by connecting said female adapter of said adapter module to the male adapter of the multi-drop bus.

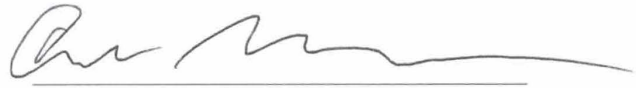
276. Because Wilson discloses a serial bus interface which would allow Low’s adapter module to be intermateable in serial with the MDB via male and female adapters, Low and Wilson render obvious “*said adapter module insertable in serial with the multi-drop bus by connecting said male adapter of said adapter module to the female adapter of the multi-drop bus and by connecting said female adapter of*

said adapter module to the male adapter of the multi-drop bus” as claimed. See [9(c)].

IX. CONCLUSION

277. This declaration and my opinions herein are made to the best of my knowledge and understanding, and based on the material available to me, at the time of signing this declaration. I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 or Title 18 of the United States Code.

Date: 7/15/2023


B. Clifford Neuman