

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ASKELADDEN, L.L.C.

Petitioner

v.
OHVA, INC

Patent Owner

IPR2023-00921
U.S. Patent 9,679,286

DECLARATION OF BRUCE MCNAIR UNDER 37 C.F.R. § 1.68 IN SUPPORT

OF PETITION FOR *INTER PARTES* REVIEW OF

U.S. PATENT 9,679,286

CHALLENGING CLAIMS 1-4

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I, Bruce McNair, do hereby declare as follows:

I. INTRODUCTION

1. I have been retained by counsel for Askeladden, L.L.C. (“Askeladden”) as an independent expert witness for the above-captioned Petition for *Inter Partes* Review (“IPR”) of U.S. Patent No. 9,679,286 (“the ’286 Patent”). I am being compensated at my usual and customary rate for the time I spend in connection with this IPR. My compensation is not affected by the outcome of this IPR.

2. I have been asked to provide my opinions regarding whether claims 1-4 (the “Challenged Claims”) of the ’286 Patent are invalid as they would have been obvious to a person having ordinary skill in the art (“POSITA”) as of the earliest claimed priority date. It is my opinion that the Challenged Claims would have been obvious to a POSITA after reviewing the prior art discussed below.

3. In preparing this Declaration, I have reviewed:

- EX1001, the ’286 Patent;
- EX1002, the file history of the ’286 Patent;
- the prior art references discussed below:
 - EX1005, U.S. Patent No. 9,330,385 to Cho et al.
 (“Cho”);
 - EX1006, U.S. Patent Publication No. 2013/0185208 to
 Aaron et al. (“Aaron”);

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- EX1007, U.S. Patent Publication No. 2014/0008432 to de Geer et al. (“de Geer”);
- EX1008, U.S. Patent Publication No. 2013/0124606 to Carpenter et al. (“Carpenter”);
- the following materials:
 - EX1011, U.S. Application No. 14/524,842 (“’842 Application”);
 - EX1031, U.S. Patent No. 9,003,508 to Colnot et al. (“’508 Patent”);
 - EX1012, U.S. Application No. 11/533,030 (“’030 Application”);
 - EX1032, U.S. Patent Publication No. 2007/0064833 to Colnot et al. (“’833 Publication”);
 - EX1013, U.S. Provisional Application No. 60/719,273 (“’273 Provisional”);
 - EX1014, comparing the ’672 Application with the ’842 Application;
 - EX1015, comparing the ’672 Application with the ’030 Application;

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- EX1016, comparing the '842 Application with the '030 Application;
- EX1017, U.S. Patent No. 9,436,855 to Marcus et al. (“Marcus”);
- EX1018, U.S. Patent No. 8,302,860 to McKelvey (“McKelvey”);
- EX1019, KR 2003 0076045 (“Bluetooth”);
- EX1020, U.S. Patent No. 6,607,136 to Atsmon et al. (“Atsmon”);
- EX1021, U.S. Patent No. 7,761,374 to Sahota et al. (“Sahota”);
- EX1022, U.S. Application No. 2004/0093436 to Colnot (“Colnot”);
- EX1023, U.S. Patent Application No. 2005/0075134 to Steenstra et al. (“Steenstra”);
- EX1024, “Turning your mobile into a magnetic stripe reader,” Deepquest (“Deepquest”);
- EX1025, U.S. Patent Application No. 2004/0230489 to Goldthwaite et al. (“Goldthwaite”);

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- EX1026, U.S. Patent Application No. 2004/039919 to Takayama et al. (“Takayama”);
- EX1027, U.S. Patent No. 9,016,572 to Babu et al. (“Babu”);
- EX1028, U.S. Patent No. 7,490,777 to Walsh (“Walsh”);
- EX1029, U.S. Patent No. 7,240,836 to Vrotsos et al. (“Vrotsos”);
- EX1030, “Application Programmer’s Guide, IBM, 2011;
- EX1035, Apple Store, (September 14, 2005, Internet Archive Capture), available at [https://web.archive.org/web/20050914225016/http://store.apple.com:80/1-800-MY-APPLE/WebObjects/AppleStore.woa](https://web.archive.org/web/20050914225016/http://store.apple.com:80/1-800-MY-APPLE/WebObjects/AppleStore.woa;);
- EX1036, Identify your iPod Model, Apple, available at <https://support.apple.com/en-us/HT204217>;
- EX1037, Apple Announces iPhone 2.0 Software Beta, Apple Press Release, March 6, 2008, available at <https://www.apple.com/newsroom/2008/03/06Apple-Announces-iPhone-2-0-Software-Beta/>;

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- EX1038, iPhone App Store Downloads Top 10 Million in First Weekend, Apple Press Release, July 14, 2008, available at <https://www.apple.com/newsroom/2008/07/14iPhone-App-Store-Downloads-Top-10-Million-in-First-Weekend/>;
- EX1039, Identify your iPhone model, Apple, available at <https://support.apple.com/en-us/HT201296>; and
- any other document cited below.

4. I understand that the '286 Patent was issued on June 13, 2017, from U.S. Patent Application No. 14/636,674 (“the '674 Application”), filed March 3, 2015. The face of the '286 Patent lists Vincent Cedric Colnot and Ty Fellers as the inventors. I have been informed by counsel that, according to assignment records, OHVA, Inc. is the current assignee of the '286 Patent.

5. In forming the opinions expressed in this Declaration, I relied upon my education and experience in the relevant field of art, and have considered the viewpoint of a person of ordinary skill in the art (“POSITA”), as of the March 3, 2015, filing date of the '286 Patent. As I explain in Section VIII below, the subject matter recited in the Challenged Claims is not supported in any earlier priority application of the '286 Patent. The subject matter of the Challenged Claims is

supported only in the '674 Application from which the '286 Patent issued. Therefore, I considered the viewpoint of a POSITA as of March 3, 2015, the filing date of the '286 Patent. For the reasons provided in Section VIII below, the “priority date of the '286 Patent,” as discussed in my analysis below, is March 3, 2015.

6. In forming the opinions expressed in this Declaration, I have also considered:

- a) the documents listed above,
- b) any additional documents and references cited in the analysis below,
- c) the relevant legal standards, including the standard for obviousness, and
- d) my knowledge and experience based upon my work in this area as described below.

II. BACKGROUND AND QUALIFICATIONS

7. My qualifications are set forth in my curriculum vitae, a copy of which is submitted as Exhibit 1004 in this proceeding. As set forth in my curriculum vitae:

8. I have over 55 years of experience in the areas of electronic circuits, starting as an amateur radio operator in 1963 and including seven years as a GS-0855 Electronic Engineer working for the US Army Electronics Command, 24 years as a Member of Technical Staff at AT&T/Bell Laboratories, and 15 years as a full-

time faculty member of the Electrical and Computer Engineering Department at Stevens Institute of Technology.

9. While I was working for the US Army Electronics Command at Fort Monmouth, NJ, I was responsible for support of TSEC/KG-27 bulk encryptor, a classified encryption device used by the Army for protecting multi-channel digital voice communication lines. Also, while I was at Fort Monmouth, my responsibilities included research and development for the data transmission, electronic counter-counter measures (ECCM), and cryptographic aspects of SINCGARS, the Single Channel Ground/Airborne Radio System. As part of this work, I extensively studied how FSK data transmission could be optimized. I also built microprocessor-based systems, digital hardware and analog circuits to accomplish my research.

10. At Bell Labs, I worked on several projects involving public data networks, encryption, analog modems, network security and wireless systems. This included security for an X.25 pre-Internet public data network (Advanced Communications Service/Net-1000). I designed digital hardware and microprocessor-based systems to improve the operation of analog modems. I also initiated and led an IR&D (independent research and development) project to investigate and prototype a secure voice terminal based on newly evolving AT&T high-speed digital services. This involved analog and digital hardware design, microprocessor programming, and controlling systems through a signaling and

control network. Part of this work involved interfacing with the analog telephone network, interfacing with audio input and output devices and digital speech and signal processing. I then led a group developing encryption add-ons for analog modems. Finally, I led the Bell Labs Security Architecture Group, setting security and encryption standards for all AT&T products and services. I hold several US patents in encryption and other security technologies, including challenge-response systems. I also was involved in telecommunications fraud control techniques, including means to authenticate users and allow signaling over the voice telephone network. Among others, this led to U.S. Patent No. 5,450,491 (“Authenticator Card and System”) and U.S. Patent No. 5,392,357 (“Secure Telecommunications”), which are closely related to the patents in suit. While I was at Bell Labs, I performed research into future wireless systems, including modulation techniques and voice coding to maximize performance.

11. At Stevens Institute of Technology, I taught graduate courses (EE584 – Wireless System Security and CpE691 – Information Systems Security) which have heavy emphasis on the application of cryptography, including challenge-response systems and public-key cryptography. I also taught undergraduate courses, including Electronic Circuits (EE359) dealing with the types of analog circuits depicted in the patents in suit. I also have taught a graduate course, EE517, Digital and Computer Systems Architecture and undergraduate courses, CpE450,

Architecture, Design and Implementation of Embedded Systems for Real-Time Applications and CpE-358, Switching Theory and Logical Design, involving microprocessor design and interfacing.

III. UNDERSTANDING OF PATENT LAW

12. I am not an attorney. For the purposes of this declaration, I have been informed about certain aspects of the law that are relevant to my opinions. My understanding of the law was provided to me by Petitioner's attorneys.

13. I have been asked to provide my opinions regarding whether claims 1-4 of the '286 Patent would have been anticipated by the prior art or would have been obvious to a POSITA at the time of the alleged invention in light of the prior art.

14. I understand that prior art to the '286 Patent includes patents and printed publications in the relevant art that predate the priority date of the '286 Patent.

15. It is my understanding that for a patent to claim priority to the filing date of an earlier application, each application in the chain leading back to the earlier application must comply with the written description requirement of 35 U.S.C. § 112. To satisfy the written description requirement, the specification of the earlier application must contain a written description of the invention claimed and the manner and process of making and using it, in such full, clear, concise, and exact terms to enable an ordinarily skilled artisan to practice the invention claimed in the later-filed application claiming priority to the earlier application. Moreover, the

earlier application must describe the later claimed invention in sufficient detail that a POSITA can clearly conclude that the inventor invented the claimed invention as of the filing date sought. I have been informed that a disclosure satisfies the written description requirement if it reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the date in question. It is my understanding that one shows that one is in possession of the claimed invention by describing the invention, with all its claimed limitations, and that this requirement is not satisfied by a description which makes the claimed invention obvious.

16. It is my understanding that, to anticipate a claim under 35 U.S.C. § 102, a reference must disclose each and every element of the claim.

17. I understand that a claim is also unpatentable if it would have been obvious. Obviousness of a claim requires that the claim would have been obvious from the perspective of a POSITA at the time the alleged invention was made. I understand that a claim could have been obvious from a single prior art reference or from a combination of two or more prior art references.

18. I understand that an obviousness analysis requires an understanding of the scope and content of the prior art, any differences between the alleged invention and the prior art, and the level of ordinary skill in evaluating the pertinent art.

19. I further understand that a claim would have been obvious if it unites old elements with no change to their respective functions, or alters prior art by mere

substitution of one element for another known in the field and that combination yields predictable results. Also, I understand that obviousness does not require physical combination/bodily incorporation, but rather consideration of what the combined teachings would have suggested to persons of ordinary skill in the art at the time of the alleged invention. I understand that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.

20. As mentioned above, I understand that a claim would have been obvious if it unites old elements with no change to their respective functions, or alters prior art by mere substitution of one element for another known in the field and that combination yields predictable results. While it may be helpful to identify a reason for this combination, I understand that there is no rigid requirement of finding an express teaching, suggestion, or motivation to combine within the references. When a product is available, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a POSITA can implement a predictable variation, obviousness likely bars its patentability. For the same reason, if a technique has been used to improve one device and a POSITA would recognize that it would improve similar devices in the same way, using the technique would have been obvious. I understand that a claim would have been

obvious if common sense directs one to combine multiple prior art references or add missing features to reproduce the alleged invention recited in the claims.

21. I further understand that certain factors may support or rebut the obviousness of a claim. I understand that such secondary considerations include, among other things, commercial success of the patented invention, skepticism of those having ordinary skill in the art at the time of invention, unexpected results of the invention, any long-felt but unsolved need in the art that was satisfied by the alleged invention, the failure of others to make the alleged invention, praise of the alleged invention by those having ordinary skill in the art, and copying of the alleged invention by others in the field. I understand that there must be a nexus—a connection—between any such secondary considerations and the alleged invention. I also understand that contemporaneous and independent invention by others is a secondary consideration tending to show obviousness.

22. I am not aware of any allegations by the named inventors of the '286 Patent or any assignee of the '286 Patent that any secondary considerations tend to rebut the obviousness of the Challenged Claims of the '286 Patent.

23. I understand that in considering obviousness, it is important not to determine obviousness using the benefit of hindsight derived from the patent being considered.

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24. I understand that other challenges to the validity of a patent, including patent ineligibility, enablement, written description, and definiteness, cannot be raised in *inter partes* review proceedings before the Board to challenge the validity of the '286 Patent. Accordingly, I did not consider those other challenges.

25. I understand that Petitioner has the burden of proving unpatentability by a preponderance of evidence, which means that the claims are more likely than not unpatentable.

26. I understand that the claims are to be construed according to the same claim construction standard that district courts use wherein claim terms are given their ordinary and customary meaning from the perspective of a person of ordinary skill in the art at the time of the invention.

27. The analysis in this declaration is in accordance with the above-stated legal principles.

IV. TECHNICAL BACKGROUND

A. Security, Authentication and Encryption

28. There are multiple aspects¹ of security in any system, depending on the requirements of the designer, operator and user. At the basis of all security is Identity, the ability to identify who or what is making a request or performing an action. In the case of a credit card-based financial system or something similar, the identity is generally the name of the account holder or their account number. Identity alone is not enough to secure a system since an imposter may simply copy a transaction and replay it, claiming to be the user. The next layer of security is Authentication, a means to verify the identification of an entity. In the case of a credit card, the expiration date and/or CVV (card verification value) may be used to

¹ Six of the seven security functions/services listed here were defined in *ISO 7498-2, Information Processing Systems – Open Systems Interconnect – Basic Reference Model – Part 2: Security Architecture*, standardized by the International Organization for Standardization (ISO) in 1989. The author of this declaration added Availability to the set of services and created the layered structure as part of his work in the Bell Labs Security and System Reliability Architecture Group. ISO 7498-2:1989 is currently available at <https://webstore.ansi.org/Standards/ISO/ISO74981989>, accessed April 6, 2023.

authenticate the card. For a credit card, the CVV code may exist in several forms, including the three or four digit numbers marked on the front or back of the card or one of the fields on the magnetic stripe on the card. Another example of authentication in computer systems is the user password with the user name being the identifier.

29. With these two fundamental security bases, additional security functions can be described. The next layer is Access Control or a definition of what system facilities the authenticated user may be allowed to access. For a financial transaction system, this might be the credit line dollar amount the user is authorized to charge. For an ATM card, it might be the specific accounts the user may access or the amount or number of transactions they may be allowed.

30. All secure systems require, at least, the functions described above. Additional security functionality will depend on the specific application, but the next layer security functions include Confidentiality, Integrity, and Availability. Confidentiality, as the name implies, deals with keeping information confidential or limiting who may read the information. Integrity deals with preventing unauthorized modification of information while Availability deals with whether information or resources will be available and accessible when needed. For financial transactions, confidentiality of user transactions are important for privacy while integrity of transactions are important to protect the user and financial organization against

fraud. Availability is a function that is of the greatest concern for military operations and reliable network providers.

31. The last security function required for some systems is Non-Repudiation. Non-Repudiation protects against an entity engaging in a transaction and later denying having done so. Of necessity, Non-Repudiation must be built on top of Integrity because it is not possible to protect a transaction against repudiation unless the integrity of the transaction can first be assured. In classic non-electronic financial and legal transactions Non-Repudiation functionality has been provided by dual signing of contracts with indelible ink and notarization of a document by a third party.

32. A variety of mechanisms exist to provide the security functionality described above. Encryption is one such mechanism. By modifying stored or transmitted information in a manner that is difficult for an adversary to undo, that is, encrypting the information, it is possible to provide Confidentiality, Integrity, and Non-Repudiation. Encryption can also be used in support of Authentication.

33. By its very nature, encrypting information with a function or parameter unknown to an adversary provides Confidentiality. This is the classic use of encryption. By creating a message summary or digest using a cryptographic algorithm, information integrity can be assured since modification of the information without changing the checksum will flag the information as having been modified.

Similarly, cryptographic protocols have been designed to allow information to be digitally “signed” in a way that only the intended entity could have done so. Finally, so-called Challenge-Response systems use a randomly generated challenge which must be properly encrypted to create a valid response allowing one entity to authenticate itself to another.

B. Hashing

34. Hashing is an important aspect of any security protocol, but has long historic use in computing systems. A hash function provides an abbreviated digest of a message, for instance, summing a digital representation of a series of letters in a message. The hash function summarizes the information content allowing, for instance, a shorter search string to be compared to a desired value rather than needing to compare the entire information content. Hashing first saw use in database searching, but also provides a means of generating a “check-sum” or a value that summarizes the content of an information element.

35. A desirable characteristic of all hash functions is to avoid so-called hashing collisions where two different messages or information records will generate the same hash value. When this occurs in database searches, it reduces the efficiency of the search, the very reason a hash value was calculated. In security protocols, hash collisions may allow an attacker to create a fictitious record with a matching hash value that can replace the desired record. For this reason, extensive research has

been done to find hash functions that have low probability of collisions and, in addition, are difficult to invert, or to find the message that produced a particular hash value. One well known hashing function is known as MD-5, a message digest algorithm created by security researcher Ron Rivest at MIT in 1991².

C. Challenge-Response systems

36. Challenge-response systems are another means to authenticate a user to ensure they are who they claim to be. The trivial challenge-response system is actually just a basic password or personal identification number (PIN) system. The challenge is the request for a PIN or password and the response is the PIN or password. The limitation of these basic challenge-response systems is that an eavesdropper listening to the exchange can record the PIN or password and use it as a later time to masquerade as the intended authorized user.

37. One way to overcome the problem of monitoring is by the use of encryption where the authentication phrase is enciphered. One of the earliest computer systems to use PINs for authentication was the Atalla box, a hardware security module which launched in 1973 and quickly gained popularity for use with ATMs. The Atalla box, which is patented in U.S. Patent No. 3,938,091, did not

² MD-5 was standardized by the Internet Engineering Task Force (IETF) as RFC (request for comments) 1321 in 1992.

directly send user PINs but rather first encrypted a user's PIN and sent the encrypted PIN to a, for example, bank teller. EX1010. The teller would then confirm the authenticity of the PIN by encrypting the teller's copy of the user's PIN and comparing the output with the received encoded PIN.

38. However, if encryption uses a symmetric cryptosystem where the message is encrypted and decrypted with the same shared key, prior arrangement to distribute the encryption key between the parties is needed. One way would be for the user to share its secret key with every server it may wish to access, but such a method can be cumbersome and vulnerable to attack. An alternative method is the use of trusted key distribution servers which, if properly designed, may overcome the issue of the unauthorized third-party monitoring communications. One such system is the Kerberos system which was first used by MIT for their Project Athena local network in the early 1980s. Kerberos v4 was widely distributed for public use in the late 1980s and Kerberos v5 became an Internet standard in 1993 (RFC 1510).

39. While the initial versions of Kerberos were based on DES, by the mid-1990s, it was recognized that the rapid evolution of technology created vulnerabilities in DES and required its replacement. Moreover, Kerberos's use of symmetric encryption posed scalability and security problems, such as the centralized sever being a single point of failure, e.g. an attacker who compromised the server would have access to every secret key used by every single user. Several

alternatives to DES, including public key cryptosystems, for use in Kerberos were introduced in the mid-1990s, such as SESAME V4 in 1995 and initial drafts of PKINIT (to later become RFC 4556) in 1997.

D. CVV

40. A Card Verification Value (CVV) is a number associated with a credit card to allow a merchant to quickly verify if a card has a valid number and to provide added assurance that the card is in the possession of the person presenting it. For Mastercard, Visa, and Discover branded credit or debit cards, it is the three digit number printed in the signature block on the back of the card. American Express credit and debit cards include the same three digit CVV in the signature block but also include a four digit CVV number on the face of the card. CVV numbers are also known as Card Security Codes (CSC) and were originally introduced by Experian in 1995 to reduce credit card fraud. CVVs are never embossed on the card, as the account number, name and expiration date frequently are, so that imprinting a copy of a card with a credit card embossing machine will not capture the CVV.

41. CVV numbers are generated by encrypting the card number and expiration date using an encryption key known only to the issuing bank. The resulting information is converted to a three or four digit number using a hashing function.

42. For contactless and chip cards, dynamically generated CVV numbers have been used to allow additional card authentication where the merchant does not need to manually process the card information.

E. Analog modulation and modems

43. A modem (short for **modulator-demodulator**) is a device or function that is capable of (1) converting a digital signal into an analog signal by *modulating* a carrier signal with the digital information and/or (2) converting a modulated analog signal back to the corresponding digital signal by demodulating the analog signal.

44. A carrier signal, typically a sinusoidal waveform, may be changed, or modulated, typically in three fundamental ways: the amplitude of the carrier may be modified (amplitude modulation or AM), the frequency of the carrier may be modified (frequency modulation or FM) or the phase of the carrier may be modified (phase modulation or PM). While AM, FM, or PM can refer to a system where the carrier is modified by a continuously changing, i.e., analog, modulating signal, there is no restriction that prevents the modulating signal from being a signal that takes on discrete values, i.e., a binary or n-ary signal. When the modulating signal is binary, that is either a 0 or 1, the systems are known as amplitude shift keying (ASK), frequency shift keying (FSK) or phase shift keying (PSK). As an example, N-ary frequency modulation, that is frequency modulation by a signal that takes on N discrete values, is typically referred to as N-ary FSK. Where a specific number of

signal levels is identified, for instance, eight, rather than an arbitrary number of levels, N, an eight level FSK system might be referred to as 8FSK.

45. Typically, modems are designed to accommodate the requirements of the information source as well as the characteristics of the transmission channel. Information source requirements include data transmission rate, and tolerable error rate. Transmission channel characteristics include allowable bandwidth, signal-to-noise performance of the channel, and other channel impairments, such as time dispersion of signals, drop-outs, and distortion.

46. While the discussion above refers to generic modems, modems may also be designed for specific purposes with special design constraints in mind. For instance, where small amounts of information need to be transmitted at low data rates, simple dual-tone multifrequency (DTMF) signaling, such as that used by TouchTone® telephones may be used or the binary FSK signaling used for over a half a century in amateur radio radiotelegraphy (RTTY) or the original Bell 103® modem may be used.

V. THE '286 PATENT

47. The '286 Patent relates to network-based transactions, and more specifically, to “[m]ethods and [a]pparatus for [e]nabling [s]ecure [n]etwork-based [t]ransactions.” EX1001, Title. The claims of the '286 Patent relate to a card reader that “accepts the data from the output interface of [a] transaction card” and sends the

data as an analog signal to a smartphone via a microphone port. EX1001, Abstract, Claim 1. The data is then converted from analog data to digital data by the smartphone according to coded instructions, a direct data exchange is established between the smartphone and an Internet-connected server, and the digital data is transmitted to the Internet-connected server to facilitate transactions or purchases. EX1001, 2:43-55, Claim 1.

48. As I noted in Section I above, the '286 Patent issued from U.S. Patent Application No. 14/636,674 (“the '674 Application”), which was filed March 3, 2015. As described in further detail in Section VIII below, the '286 Patent claims priority to U.S. Patent No. 9,003,508 (EX1031),³ which claims priority to U.S. Patent Application No. 11/533,030 (EX1012), which in turn claims priority to U.S. Provisional Application No. 60/719,273 (EX1013). For each subsequent application following the '030 Application, the “Brief Summary of the Invention” section of the specification of the prior application was replaced with a new “Brief Summary of the Invention” section. *See* EX1016 (comparing the specification filed for the '508 Patent in 2014 with the specification filed in the '030 Application in 2006); EX1014 (comparing the specification filed for the '286 Patent in 2015 with the specification

³ I understand that U.S. Patent No. 9,003,508 (EX1031) was filed as Application No. 14/524,842 (EX1011).

filed for the '508 Patent in 2014); EX1015 (comparing the specification filed for the '286 Patent in 2015 with the specification filed for the '030 Application in 2006).

49. EX1014 provides a comparison of the filed specification of the '674 Application (EX1002, 430-455), which was filed in 2015 and issued as the '286 Patent (EX1001), with the filed specification of the '842 Application (EX1011), which was filed in 2014 and issued as the '508 Patent (EX1031). The comparison shown in EX1014 is a redline comparison, where the '842 Application specification was treated as the original document, and the '674 Application specification was treated as the modified document. Accordingly, underlined blue text indicates new additions to the '674 Application specification not contained in the '842 Application specification, while red strike-through text indicates text that was contained in the '842 Application specification but not included in (e.g., deleted from) the '674 Application specification. As EX1014 reflects, differences between the two documents include the following:

- Updated the “Cross-Reference to Related Applications” section (EX1014, 1);
- Modified the “Brief Summary of the Invention” section (EX1014, 2-4);
- Replaced the word “secrete” with “secret” in one instance of the word appearing (EX1014, 12); and

- Replaced the word “give” with “given” in one instance of the word (EX1014, 18).

50. EX1015 provides a comparison of the filed specification of the '674 Application (EX1002, 430-455), which was filed in 2015 and issued as the '286 Patent (EX1001), with the filed specification of the '030 Application (EX1012), which was filed in 2006 and published as the '833 Publication (EX1032). The comparison shown in EX1015 follows the same format as the comparison discussed above for EX1014, except that for EX1015, the '030 Application specification was treated as the original document, while the '674 Application specification was treated as the modified document. As EX1015 reflects, differences between the two documents include the following:

- Updated the “Cross-Reference to Related Applications” section (EX1015, 1);
- Modified the “Brief Summary of the Invention” section (EX1015, 2-4);
- Replaced the word “secrete” with “secret” in one instance of the word (EX1015, 11);
- Replaced the word “ser4vice” with “service” in one instance of the word (EX1015, 15); and
- Replaced the word “give” with “given” in one instance of the word (EX1015, 18).

51. EX1016 provides a comparison of the filed specification of the '842 Application (EX1011), which was filed in 2014 and issued as the '508 Patent (EX1031), with the filed specification of the '030 Application (EX1012), which was filed in 2006 and published as the '833 Publication (EX1032). The comparison shown in EX1016 follows the same format as the comparison discussed above for EX1014, except that for EX1016, the '030 Application specification was treated as the original document, while the '842 Application specification was treated as the modified document. As EX1016 reflects, differences between the two documents include the following:

- Updated the “Cross-Reference to Related Applications” section (EX1016, 1);
- Modified the “Brief Summary of the Invention” section (EX1016, 2-4); and
- Replaced the word “ser4vice” with “service” in one instance of the word (EX1016, 16).

VI. PROSECUTION HISTORY OF THE '286 PATENT

52. Application No. 14/636,674 (“the '674 Application”), which issued as the '286 Patent, was filed on March 3, 2015. EX1002, 479. Five office actions were issued during prosecution of the '674 Application. Accordingly, numerous amendments occurred during the prosecution of the '674 Application, and the issued

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claims of the '286 Patent are significantly different than what was originally filed. Over the course of prosecution, the applicant changed the focus of the claims from a “computerized appliance” to a “smart telephone” that operates in connection with a “card reader,” as described in more detail below.

53. In the Notice of Allowance, the Examiner made the following amendments to the features of claim 1, which correspond to limitations [1.1.1] and [1.1.2] of issued claim 1:

a card reader having an input interface configured to accept transaction data from an output interface of a transaction card, and an output pin, as a part of the card reader, configured to directly connect the card reader ~~in~~ to a microphone port of a smart telephone, the card reader providing the transaction data accepted from the output interface of the transaction card to the output pin, and hence to the microphone port, as an analog variable voltage audio signal; and

EX1002, 34.

54. The Examiner also made the following amendment to the features of claim 1, which corresponds to limitation [1.3.1] of issued claim 1:

wherein the coded instructions, when executed on a processor in the smart telephone, convert the analog variable voltage audio signal received ~~at~~ on the microphone port to the transaction data as digital data, establish direct data exchange between the smart telephone and a second Internet-connected server and facilitate transactions by a financial institution, or purchases from an online-merchant, using the transaction data.

EX1002, 34.

55. The Examiner also made the following amendments to the features of claim 3, which correspond to limitations [3.2] and [3.3] of issued claim 1:

receiving the transaction data in the smart telephone as an analog variable
voltage audio signal from the microphone port of the smart telephone;

~~converting the transaction data as an analog variable voltage signal in the smart
telephone to digital data;~~

converting the analog variable voltage audio signal received at the microphone
port to the transaction data as digital data;

EX1002, 35.

56. In the Notice of Allowance, the Examiner found that the prior art of record did not teach “a card reader having an input interface configured to accept transaction data from an output interface of a transaction card, and an output pin, as part of the card reader, configured to directly connect the card reader to a microphone port of a smart telephone.” EX1002, 36; *see also* EX1002, 36-38 (citing EX1025 (Goldthwaite), EX1028 (Walsh), and EX1029 (Vrotsos) as the closest prior art of record).

VII. LEVEL OF ORDINARY SKILL IN THE PERTINENT ART

57. I understand that the level of ordinary skill may be reflected by the prior art of record, and that a POSITA to which the claimed subject matter pertains would have the capability of understanding the scientific and engineering principles

applicable to the pertinent art. I understand that one of ordinary skill in the art has ordinary creativity, and is not a robot.

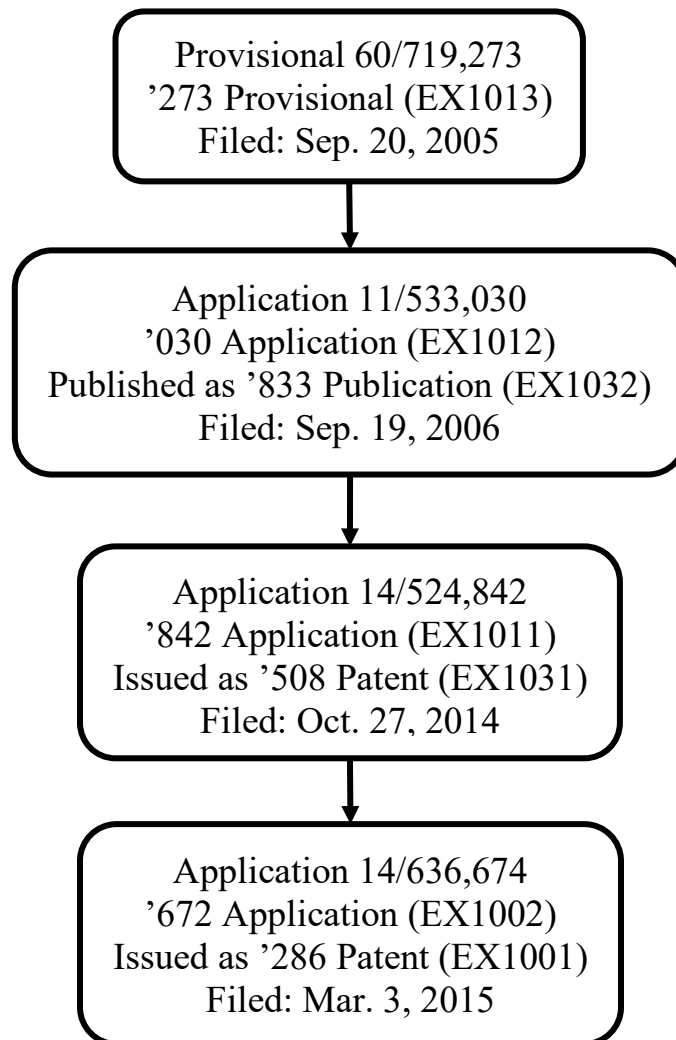
58. I understand there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the levels of education and experience of persons working in the field at the time of the invention; (2) the sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems. There are likely a wide range of educational backgrounds in the technology fields pertinent to the '286 Patent.

59. In my opinion, the level of a person of ordinary skill in the art needed to have the capability of understanding the card transaction apparatus and method in the '286 Patent is (i) a bachelor's degree in electrical engineering, computer science, computer engineering, or a related subject, and one to two years of work experience in mobile payment transactions or a related field. A lack of work experience can be remedied with additional education (e.g., a Master's degree), and likewise, less education can be remedied with additional work experience (e.g., 5-6 years). Such academic and industry experience would be necessary to appreciate what was obvious and/or anticipated in the industry and what a person of ordinary skill in the art would have thought and understood at the time. I believe I possess such experience and knowledge, and am qualified to opine on the '286 Patent from the perspective of a person of ordinary skill in the art.

60. For purposes of this Declaration, in general, and unless otherwise noted, my testimony below refers to the knowledge of one of ordinary skill in the art during the time period around the priority date of the '286 Patent. I would have been a person with at least ordinary skill in the art at that time.

VIII. PRIORITY DATE

61. It is my opinion that the earliest effective filing date of claims 1-4 of the '286 Patent is March 3, 2015, the filing date of the '674 Application that resulted in the '286 Patent. The chart below shows the alleged priority documents and their relationship to the '286 Patent:



62. While the '286 Patent claims priority to several other applications (14/524,842 (“the '842 Application,” (EX1011, 50-94)), 11/533,030 (“the '030 Application,” (EX1012, 321-366)), and 60/719,273 (“the '273 Provisional,” (EX1013))), the Challenged Claims of the '286 Patent are not entitled to a priority date of these earlier applications because the subject matter recited in the Challenged Claims is not supported by the '842 Application, the '030 Application, or the '273 Provisional.

A. The file history of the '286 Patent supports its being afforded only its March 3, 2015, filing date as the priority date

63. The issued claims of the '286 Patent are significantly different than what was originally filed. The comparison below shows how apparatus claims 1 and 2 changed from what was filed to what was issued. Red strike-through text indicates claim language that was in the originally-filed claims but not in the issued claims, blue underlined text indicates claim language that was added to the issued claims that did not appear in the originally-filed claims, and green text is claim language that moved during claim amendments:

1. An apparatus comprising:

~~a transaction card bearing data and having an output interface capable of transmitting the data;~~

a card reader having an input interface ~~enabled~~configured to accept ~~the~~transaction data from ~~the~~an output interface of ~~the~~a transaction card;

~~conversion circuitry converting the card data to an analog modulated signal;~~
and an output pin ~~from,~~ as a part of the card reader ~~adapted to engage in,~~
configured to directly connect the card reader to a microphone port of a ~~computerized appliance~~smart telephone, the ~~output pin~~card reader providing the transaction data accepted from the output interface of the transaction card to the

output pin, and hence to the microphone port, as an analog variable voltage audio signal; and

coded instructions stored in a non-transitory medium of a first Internet-connected server, and accessible by a user of the card reader;

wherein the coded instructions, when executed on a processor in the smart telephone, convert the analog ~~modulated~~ variable voltage audio signal ~~to~~ received at the microphone port, ~~and thence to the computerized appliance~~ to the transaction data as digital data, establish direct data exchange between the smart telephone and a second Internet-connected server and ~~facilitate transactions by a financial institution, or purchases from an online-merchant, using the transaction data.~~

2. The apparatus of claim 1 wherein the ~~computerized appliance is enabled to communicate on a network, and has sound conversion circuitry converting the analog modulated signal to digital data.~~

~~3. The apparatus of claim 2 wherein the computerized appliance comprise a processor executing coded instructions from a non-transitory medium, and the coded instruction, when executed by the on a processor cause in the data to be used in a communication on the network.~~

~~4. The apparatus of claim 1 wherein the transaction card comprises an electronic chip having a digital memory, and the card value is stored as a sequence of bits in the digital memory.~~

~~5. The apparatus of claim 4 wherein the analog modulated signal is derived from the card value stored in the digital memory.~~

~~6. The apparatus of claim 5 wherein the conversion circuitry is a part of the circuitry of the electronic chip.~~

~~7. The apparatus of claim 3 wherein the coded instructions provide two-way communication with a server hosted by a financial institution or an on-line merchant, and the two communication facilitate transactions by an owner of the card with the financial institution or purchases by the owner of the card with an on-line merchant.~~

~~8. The apparatus of claim 7 wherein the coded instructions operate to accept smart telephone, retrieve a card verification code (CVV) ~~in the card data~~, ~~to~~ and use the~~

CVV in ~~the purchases or transactions, and for each transaction or purchase accomplished, a new CVV is created and stored in the card data.~~

See EX1002, 456-457 (originally-filed apparatus claims 1-8); EX1001, Claims 1-2 (issued apparatus claims). Similar amendments were made to the method claims that resulted in issued claims 3 and 4. See EX1002, 457-458 (originally-filed method claims 9-16); EX1001, Claims 3-4 (issued method claims).

64. As reflected in the comparison above, the claims originally described a “computerized appliance,” but issued claiming a “smart telephone.” EX1002, 456 (original claims reciting “computerized appliance”), 34 (claims in Notice of Allowance reciting “smart telephone”); *see also* EX1001, Claim 1. After the first rejection, the claimed “computerized appliance” was amended to claim a “personal computing device or a smart telephone.” EX1002, 360, 320. Later, the claims were amended to encompass just a “smart telephone” as the Examiner presented prior art showing “a personal computing device,” including art by the same inventor as the ’286 Patent. EX1002, 307. In the final office action before allowance, the Examiner addressed the priority date of the ’674 Application:

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Priority

This application repeats a substantial portion of prior Application No. 11/533,030, filed on 9/19/06, and adds disclosure not presented in the prior application. Because this application names the inventor or at least one joint inventor named in the prior application, it may constitute a continuation-in-part of the prior application. Should applicant desire to claim the benefit of the filing date of the prior application, attention is directed to 35 U.S.C. 120, 37 CFR 1.78, and MPEP § 211 *et seq.*

The specification has new matter from the original filing and therefore is not a continuation but a CIP.

Applicant states on page 1 of the instant application, that the instant invention is a continuation of application (14/524,842), filed on 10/27/14, which is a continuation of application (11/533,830), filed on 9/19/06, which claims priority to provisional application 60/719,273 (filed on 9/20/05).

EX1002, 115.

65. The Examiner confirmed that the '674 Application (and thus, the '286 Patent) should only be entitled its March 3, 2015, filing date as its priority date:

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However, upon examination of the amended claims, examiner has discovered that applicant has added new matter to the claims.

Now turning to the instant application, pages 2, lines 21-28, and pages 3, lines 1-28, and page 4, lines 1-12, from the instant specification as filed, constitute new matter.

This part of the disclosure was not included in the prior filed application as filed (application 11/533,030).

Because of these findings, the claims no longer receive the early filing date, since the application is a CIP and not a continuation. Applicant will receive the filing date of the instant application (3/03/15).

EX1002, 116; *see also* EX1002, 109 (“the filing date of the instant application is used for prior art purposes”).

66. As reflected above, the Examiner noted that the applicant added new matter to the claims, and that “pages 2, lines 21-28, and pages 3, lines 1-28, and page 4, lines 1-12, from the instant specification as filed, constitute new matter...not included in the prior filed application as filed.” EX1002, 115-116; *see also* EX1014 (comparing the ’674 Application specification to the ’842 Application specification). This text (page 2, lines 21-28, page 3, lines 1-28, and page 4, lines 1-12) of the ’674 Application identified by the Examiner corresponds to the “Brief Summary of the Invention” section of the ’286 Patent (column 1, line 65 to column 2, line 67). EX1002, 431-433; EX1001, 1:65-2:67.

67. The timing of the Examiner’s statements regarding the priority date of the challenged claims makes sense: the Examiner’s statements occurred in the office

action that issued after the applicant amended the claims during prosecution to positively claim a “smart telephone.” In the previous response, the applicant had amended the claims due to an intended use rejection for the “smart telephone” element. EX1002, 292 (applicant arguing with respect to then-pending claims that “[a] smart telephone is not positively recited,”) 214 (Examiner acknowledging applicant’s argument that “[a] smart telephone is not positively recited”), 216 (Examiner noting that the smart telephone claim language “is directed to intended use language” (emphasis omitted)). In the previous rejections, the claim language referred to a “computerized appliance”—e.g., a personal computer (PC), according to the priority applications—and not solely a “smart telephone.” EX1002, 456, 360, 288 (original claims and subsequent claim amendments not positively reciting a “smart telephone”). It was not until the applicant amended the claims in response to the last final rejection to positively recite a “smart telephone,” at which point the Examiner indicated that this subject matter was not supported in the earlier priority applications. EX1002, 113-116, 193 (applicant amending claims prior to rejection).

68. The applicant did not contest the Examiner’s finding regarding the priority date—there are no other statements on the record by the applicant following the Examiner’s statement on the priority date of the application. Nor did the Examiner indicate any change in this finding in the Notice of Allowance. Accordingly, the file history of the ’286 Patent, including the statements by the

Examiner and applicant, support the '286 Patent being afforded only its March 3, 2015, filing date as its earliest effective filing date.

69. As I explain in further detail below, a POSITA would have understood the “smart telephone” element executing coded instructions to convert analog data to digital data and process transaction data amended into the claims to be supported only by the new matter that was added in the “Brief Summary of the Invention” section of the '286 Patent specification (EX1001, 1:63-2:67).

B. Support for the challenged claims is found only in the “Brief Summary of the Invention” section of the '286 Patent

70. The subject matter in claims 1-4 of the '286 Patent is supported only by the “Brief Summary of the Invention” section of the '286 Patent, as shown below. EX1001, 1:63-2:67. Independent claim 1 recites a “smart telephone” that executes “coded instructions” to “convert the analog variable voltage audio signal received at the microphone port to the transaction data as digital data,” as recited in limitation [1.3.1] below. In addition, claim 1 recites that the “smart telephone” executes “coded instructions” to “establish direct data exchange between the smart telephone and a second Internet-connected server and facilitate transactions by a financial institution, or purchases from an online-merchant, using the transaction data,” as recited in limitation [1.3.2] below. Independent claim 3 recites substantially identical features. *See* limitations [3.3]-[3.4]. Support for limitations [1.3.1], [1.3.2], and [3.3]-[3.4]

can only be found in the “Brief Summary of the Invention” section of the ’286 Patent. *See* EX1001, 2:8-20 (describing an apparatus embodiment that includes “sound conversion circuitry converting the analog modulated signal to digital data,” and “a processor executing coded instructions from a non-transitory medium, and the coded instruction executed by the processor cause the data to be used in a communication on the network.”), 2:43-55 (providing the same disclosure for a method embodiment). The content of this “Brief Summary of the Invention” section was added for the first time when the ’674 Application was filed, as described in Section VIII.C below.

C. No other portion of the ’286 Patent provides support for the entirety of the challenged claims

71. The “Brief Summary of the Invention” section of the ’286 Patent differs from the “Brief Summary of the Invention” sections of the ’842 Application (filed in 2014) and the ’030 Application (filed in 2006). Specifically, when the ’674 Application (’286 Patent) was filed, the applicant replaced the “Brief Summary of the Invention” section of the ’842 Application with a new section. EX1014 (comparison of ’674 Application specification and ’842 Application specification). Similarly, when the ’842 Application was filed, the applicant replaced the “Brief Summary of the Invention” section of the ’030 Application with a new section. EX1016 (comparison of ’842 Application specification and ’030 Application

specification).⁴ As noted above in Section V, minor typo corrections were also made in each of the subsequent applications following the '030 Application (the '842 Application and '674 Application). Because the specification of the '674 Application is nearly identical to both the '842 Application and '030 Application outside of the “Brief Summary of the Invention” section, my priority analysis focuses on the portion of the specification carried over from the '030 Application and shows why the claims of the '286 Patent do not have written description support of the carried-over material.

72. As noted in the discussion of the file history of the '286 Patent (*see* Section VIII.A), the Examiner determined that the '674 Application was a continuation-in-part and was entitled only to the filing date of the '674 Application, i.e., March 3, 2015. EX1002, 115-116. Not surprisingly, Patent Owner did not contest this finding on the record during prosecution. The “Brief Summary of the Invention Section” for both the '842 Application (2014) and the '030 Application (2006) do not support the claims of the '286 Patent.

⁴ The '842 Application, filed in 2014, further added an additional inventor not named on the '030 Application or '273 Provisional—Ty Fellers. The '286 Patent similarly lists both Colnot (listed on each application) and Fellers (listed only on the '842 Application) as its named inventors.

73. At most, the '842 Application (2014) describes features related to the use of a user-specific token and independent verification in the log-in and data exchange process. EX1031, Abstract, 1:62-3:23. “smart telephone” element executing coded instructions to convert analog data to digital data and process transaction data because the '842 Application at most contemplates log-in mechanisms unrelated to card-based transactions. EX1031, Claim 1. Like the '286 Patent, the '842 Application is titled “[m]ethods and apparatus for enabling secure network-based transactions.” EX1011, 65; EX1031, code (54). The '842 Application's abstract explains that it describes:

A security process involves log-in and data exchange between a server and a user operating a computerized appliance. The process requires a user-specific token, independent verification of the server execution within a programmed time window. A hash created at the client side is reproduced at the server side from separate data and compared to the client hash. Too much time or incorrect hash denies access.

EX1031, Abstract.

74. The “Brief Summary of the Invention” section of the '030 Application describes features related to data transmitted as sound to a PC for authentication. EX1032, ¶¶ 10-13; *see also* EX1032, Claims 1, 10, 11, ¶¶ 69-70, 78-79, 86. This does not provide written description support for the '286 Patent's “smart telephone” element executing coded instructions to convert analog data to digital data and process transaction data because the '030 Application at most contemplates using a

PC to perform authentication using sound transmitted from a device such as a mobile phone. EX1032, Claims 1, 10, 11. Like the '286 Patent and the '842 Application, the '030 Application is titled “[m]ethods and [a]pparatus for [e]nabling [s]ecure [n]etwork-[b]ased [t]ransactions.” EX1012, 321; EX1032, code (54). The '030 Application's abstract explains that it describes:

A system for enabling secure transacting over a network has a network se[r]ver application for storing client information and activating clients for secure transacting, a software driver for performing authentication, the software driver accessible to the network server, a software applet for creating a secure data record and for managing transmission and update of the contents of the record, and a sound source in the form of a file or a sound generating device, the sound source being part of or having access to the secure data record.

EX1032, Abstract.

75. Accordingly, these features do not provide written description support for limitations [1.3.1]-[1.3.2] and [3.3]-[3.4] of the '286 Patent, which claim the use of “*coded instructions...executed on a processor in the smart telephone [to] convert the analog variable voltage audio signal...to the transaction data as digital data*” and to “*establish [a] direct data exchange between the smart telephone*” and a server. Likewise, the '273 Provisional does not provide support for limitations [1.3.1]-[1.3.2] and [3.3]-[3.4]. The '273 Provisional simply presents disclosure of “examples of a system the authors term the SoundPass system,” which contains significant overlap with the material included in the '030 Application. EX1013, 4.

76. As noted above, the “Brief Summary of the Invention” sections are the only differences between each of the applications. Support for limitations [1.3.1]-[1.3.2] and [3.3]-[3.4] is not found outside of the “Brief Summary of the Invention” section of the ’286 Patent. For instance, no discussion supporting the use of “*coded instructions...executed on a processor in the smart telephone [to] convert the analog variable voltage audio signal...to the transaction data as digital data*” appears anywhere in the ’286 Patent other than the “Brief Summary of the Invention” section of the ’286 Patent. Indeed, the concepts of “conversion of” or “converting” analog data to digital data appear nowhere else, and “digital” only appears in the context of a “personal digital assistant” (PDA). *See* EX1001, 7:4-7. While the ’286 Patent discusses modulation of an encoded bit flow “using a frequency-shift keying (FSK) modulation technique,” the discussed technique “creat[es] an analog waveform” to generate an audible sound. EX1001, 5:18-31. To the extent Patent Owner argues that the ’286 Patent’s discussion of demodulation provides support for “*coded instructions...executed on a processor in the smart telephone [to] convert the analog variable voltage audio signal...to the transaction data as digital data*,” the discussion of demodulation in the ’286 Patent occurs on a PC (EX1001, 5:47-48, 5:58-61) or a server (EX1001, 5:30-31), not in a smart telephone, and there is no conversion of this sound data to digital data representing transaction data.

77. Accordingly, as the material in the “Brief Summary of the Invention” section of the ’286 Patent is new and does not appear in the prior applications, the support for limitations [1.3.1]-[1.3.2] and [3.3]-[3.4] (and thus the challenged claims) is not contained in the ’842 Application (filed 2014), the ’030 Application (filed 2006), or the ’273 Provisional (filed 2005). EX1014 (comparing ’674 Application to ’842 Application); EX1015 (comparing ’674 Application to ’030 Application).

D. The ’674 Application’s “smart telephone” elements are distinct from the disclosure of the earlier applications

78. Over the course of prosecution, the claims that eventually issued changed scope numerous times before allowance, when the original claims first recited a “computerized appliance,” and that concept eventually morphed into the claimed “smart telephone.” *See* Section VIII.A, *supra*. The ’674 Application’s claimed “smart telephone” elements do not find support in the disclosure of the ’030 Application to which it claims priority. The ’030 Application does not use the term “computerized appliance” that appeared in the originally-filed claims. While it does use the similar term “computing appliance,” the ’030 Application only describes a PC as an example of a “computing appliance.” EX1012, 327 (“Package 100 is assembled at a client-operated personal computing appliance (PC)”), 333 (discussing

“a PC or other computing appliance”), 334 (“computing appliance such as a PC”);
EX1032, ¶¶ 37, 57, 60.⁵

79. The only mention of a “smart telephone” in the specification of the ’030 Application appears in connection with Fig. 4 (below), where the ’030 Application discusses that a “key jack may be plugged into the sound input or headset connector jack associated with a mobile smart telephone or PDA enabling authentication through a telephone network.” EX1012, 331-332, 355; EX1032, ¶ 53, Fig. 4.

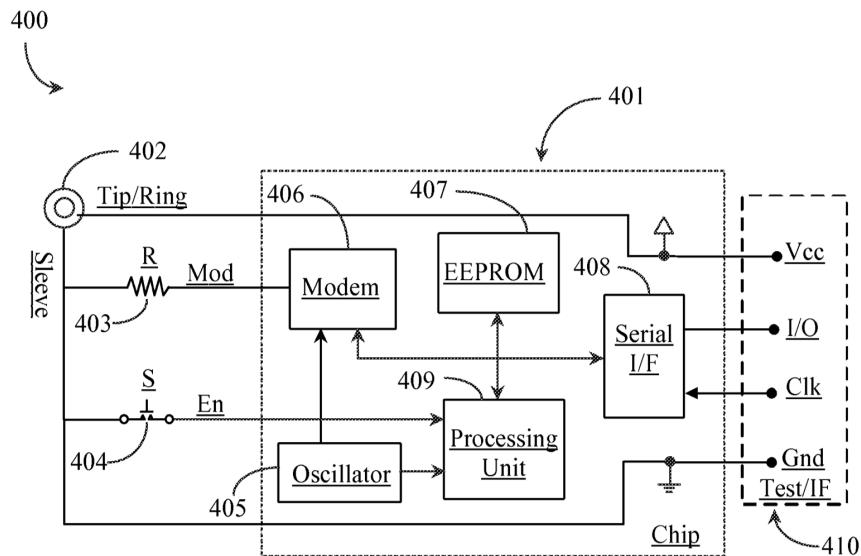


Fig. 4

EX1012, 355; EX1032, Fig. 4

⁵ Parallel citations to the publication of the ’030 Application (the ’833 Publication, EX1032) are provided for convenience.

80. However, Fig. 5 shows the discussed “key jack,” which is not a card reader, but instead a “signal generator.” EX1012, 333, 356; EX1032, ¶ 57, Fig. 5.

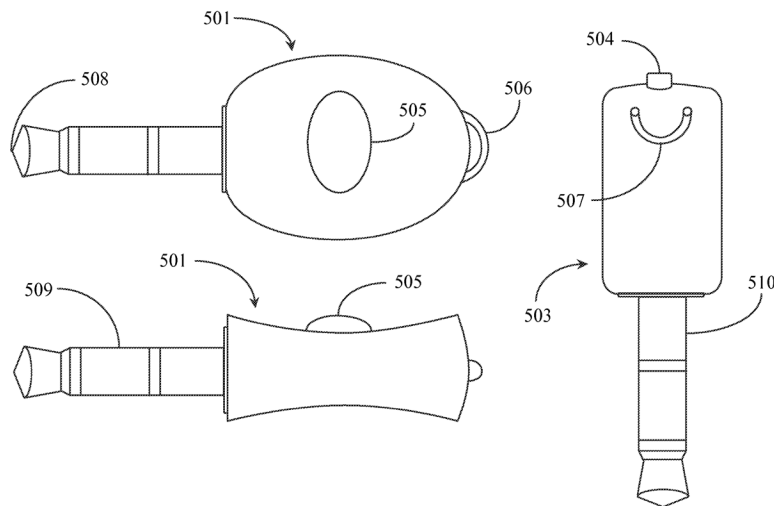


Fig. 5

EX1012, 356; EX1032, Fig. 5

81. This device generates a “sound pass or signal” that is sent “to the sound card on the PC” when a “user push[es] a button, switch, or other mechanism on the external surface of the device.” EX1012, 332; EX1032, ¶ 56. While Fig. 6 of the ’030 Application shows “a smart card signal generator 601 coupled to a card reader 602,” it is described as using components “essentially identical” to those shown in Fig. 5, above. EX1012, 334; EX1032, ¶ 61. The discussion surrounding this Fig. 6 disclosure further contemplates providing an audio signal to a PC. EX1012, 334 (the card reader is “connected to the sound card on the computing appliance such as a PC”); EX1032, ¶¶ 60-61.

82. The '030 Application refers to the key jack above as a “mobile device,” much like it refers to “smart phones” with respect to the Fig. 7 embodiment. EX1012, 332-333 (key jack is mobile device), 335 (“a mobile device 701”), 336 (“a modulated audio signal is generated by a sound-generating applet installed on and executable from mobile device 701, which is a smart phone in this example”), Fig. 7 (labeling device 701 as a “smart phone”); EX1032, ¶¶56, 67, 68, Fig. 7.

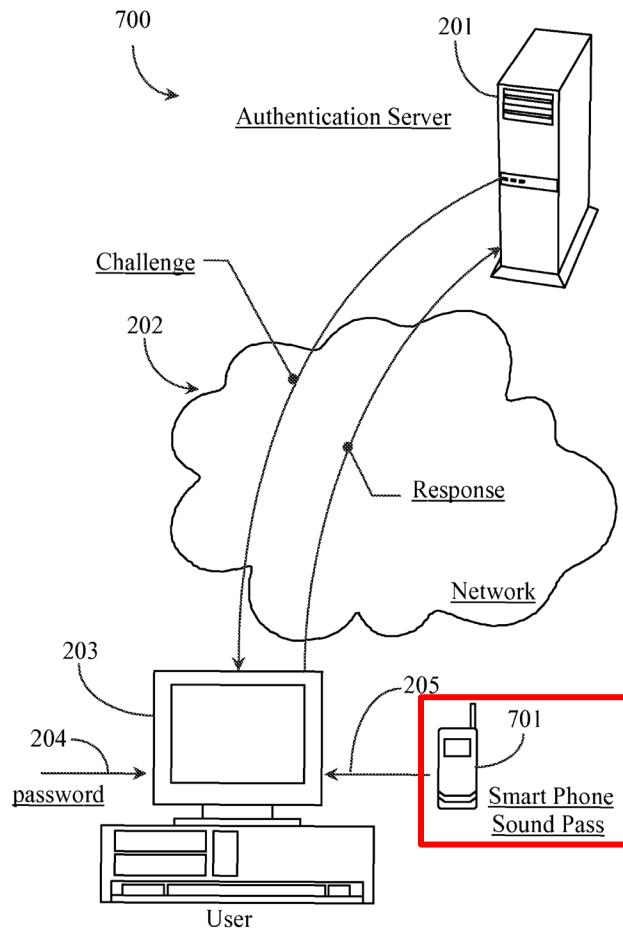


Fig. 7

EX1012, 358; EX1032, Fig. 7 (Annotated)

83. The '030 Application's specification discusses a smart telephone **generating** "the modulated sound pass," not "*accept[ing] transaction data from an output interface of a transaction card*" from a card reader via the microphone port. EX1012, 335 ("a mobile device 701 for signal generation"); EX1032, ¶ 67. Indeed, the mobile device transmits a signal acoustically or using "a hardwire cable that connects the speaker or headset output to the microphone input" **of a PC**. EX1012, 336; EX1032, ¶ 70.

84. While Patent Owner may argue that the "computerized appliance" language of the specification provides support for the "smart telephone" element, this support at most comes from the new specification material added in the "Brief Summary of the Invention" section when the '674 Application was filed. Given the disclosure discussed above, the portions of the specification of the '674 Application from the previous applications—the portions not contained in the "Brief Summary of the Invention" section of the '674 Application—would not in any way suggest to a POSITA that the "computerized appliance" discussed in 2006 would encompass a "smart telephone" in 2015.

85. On the contrary, the specification explains that the smartphone 701 shown in Fig. 7 may instead be "a hand-held music layer such as an iPod™." EX1001, 9:48-49. By September 20, 2005 (the priority date of the '273 Provisional), iPods available for sale were the iPod shuffle, iPod nano, and iPod classic. *See*

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EX1035 (Internet Archive capture of the Apple Store on Sep. 14, 2005, showing
available iPods for sale).



EX1035 (Annotated).

86. The iPod touch was not released until 2007, and the software development kit (SDK) to build third party applications for the iPod touch was not announced until 2008. *See* EX1036 (listing iPods by release date); EX1037 (press

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release announcing SDK in 2008); *see also* EX1038 (confirming the App Store launched in 2008).

iPod touch

- Navigation: Multi-Touch display
- Capacity: 8, 16, and 32 GB
- Model numbers and dates introduced:
 - A1213: February 2008
 - A1213: September 2007

iPod touch features a 3.5-inch (diagonal) widescreen Multi-Touch display and 8 GB, 16 GB, or 32 GB flash drive. You can browse the web with Safari and watch YouTube videos on the first-ever Wi-Fi iPod. You can also search, preview, and buy songs from the iTunes Wi-Fi Music Store on iPod touch.



EX1036 (Annotated).

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CUPERTINO, California—March 6, 2008—Apple® today previewed its iPhone™ 2.0 software, scheduled for release this June, and announced the immediate availability of a beta release of the software to selected developers and enterprise customers. The iPhone 2.0 beta release includes both the iPhone Software Development Kit (SDK) as well as new enterprise features such as support for [Microsoft Exchange ActiveSync](#) to provide secure, over-the-air push email, contacts and calendars as well as remote wipe, and the addition of Cisco IPsec VPN for encrypted access to private corporate networks.



With the iPhone SDK, third party developers will be able to build native applications for the iPhone with a rich set of APIs, including programming interfaces for Core OS, Core Services, Media and Cocoa Touch technologies. The iPhone SDK will allow developers to create amazing applications that leverage the iPhone's groundbreaking Multi-Touch™ user interface, animation technology, large storage, built-in three-axis accelerometer and geographical location technology to deliver truly innovative mobile applications.



The iPhone 2.0 software release will contain the App Store, a new application that lets users browse, search, purchase and wirelessly download third party applications directly onto their iPhone or iPod touch. The App Store enables developers to reach every iPhone and iPod touch user. Developers set the price for their applications—including free—and retain 70 percent of all sales revenues. Users can download free applications at no charge to either the user or developer, or purchase priced applications with just one click. Enterprise customers will be able to create a secure, private page on the App Store accessible only by their employees. Apple will cover all credit card, web hosting, infrastructure and DRM costs associated with offering applications on the App Store. Third party iPhone and iPod touch applications must be approved by Apple and will be available exclusively through the App Store.

EX1037 (Annotated).

87. Third-party apps were not available for other iPod devices, such as the iPod shuffle, iPod nano, and iPod classic. *See* EX1037 (SDK is for creating applications for iPhone and iPod touch). Accordingly, when this portion of the

specification of the '030 Application was drafted, the only capability of an iPod would have been to output audio.

88. In the '030 Application, the specification does not suggest that the “smart phone” would operate as anything other than a medium for providing a sound file to a PC. Indeed, the '030 Application repeatedly refers to the actions of the PC, done via an applet, while the only mention of an applet in the context of a “smart phone” is to generate sounds for a PC. EX1032, ¶¶ 52 (“As long as the sound file can be input into the PC and recognized by the applet running on the PC the present invention can be practiced successfully.”), 68 (“a modulated audio signal is generated by a sound-generating applet installed on and executable from mobile device 701, which is a smart phone in this example”). The claims of the '030 Application support this understanding: a “sound file [is] stored on a machine peripheral to the machine used to secure authentication,” EX1012, 349; EX1032, Claim 10, “wherein the peripheral machine is one of a cellular telephone, a personal digital assistant, or a hand held music player,” EX1032, Claim 11.

89. The '273 Provisional likewise does not have any disclosure of coded instructions, instead describing Fig. 7 as “an embodiment of the SoundPass system with audio provided from a mobile device.” EX1013, 7. Like the '030 Application, the '273 Provisional discloses that whatever device is generating the sound (a PDA or “smart phone”) “transmits the SoundPass signal to the PC acoustically via a

microphone plugged into the sound card,” or through a wired connection. EX1013, 7-8. The ’273 Provisional is clear that the “smart phone” or other mobile device is merely playing audio for a PC to process. Indeed, the ’273 Provisional explains:

Essentially any device which can play a sound may become a SoundPass token: the modulated sound may be generated, for example, by a specific device like a smartcard, **or stored on an existing device (PDA, smart phone) in a sound file format.**

EX1013, 6. The ’273 Provisional envisions its “smart phone” as storing a SoundPass token in a sound file format to be played to a PC. EX1013, 6-8. The ’030 Application confirms that the disclosure of a “smart phone” simply envisions it as a device to output sound to a PC. *E.g.*, EX1032, ¶¶ 68 (“a modulated audio signal is generated by a sound-generating applet installed on and executable from a mobile device 701, which is a smart phone in this example”), 69 (“the output speaker system of mobile device 701 may be leveraged to play the modulated sound pass into a microphone plugged into PC 203”).

90. Thus, a POSITA would have understood that the use of “smart phone” and “mobile phone” in the specification of the ’842 Application, ’030 Application, and ’273 Provisional does not provide written description or enabling support for the use of “smart telephone” in the claims of the ’286 Patent. At most, the elements of the ’286 Patent’s specification carried over from the earlier applications suggest the use of a mobile phone as an alternative way of transmitting an audio signal to a PC

Declaration of Bruce McNair Under 37 C.F.R. § 1.68 in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,679,286

for authentication. *See* EX1012, 349; EX1032, Claims 10, 11 (claiming storing sound files on a cellular telephone). The “smart phone” discussed in the ’030 Application is used for “authentication through a telephone network,” Accordingly, the ’286 Patent constitutes a continuation-in-part not entitled to the filing dates of the 2005 provisional, ’030 Application, and ’842 Application.

91. However, even if the ’286 Patent were entitled to the date of the ’842 Application—which it is not, as the ’286 Patent only carries over the specification elements found in the ’030 Application—the analysis presented in this Declaration utilizes prior art that pre-dates the priority of the ’842 Application, as shown in further detail in the table below.

Document	Date
’273 Provisional (EX1013)	September 20, 2005
’030 Application (EX1012)	September 19, 2006
Carpenter (EX1008)	May 16, 2013
Aaron (EX1006)	July 18, 2013
Cho (EX1005)	August 29, 2013
de Geer (EX1007)	January 9, 2014
’842 Application (EX1011)	October 27, 2014
’286 Patent (EX1001)	March 3, 2015

92. As shown in the above table, each of Cho (EX1005), Aaron (EX1006), de Geer (EX1007), and Carpenter (EX1008) pre-date both the '286 Patent and the '842 Application (filed 2014). For the '286 Patent, each prior art reference has a priority date more than one year prior. For the '842 Application, each prior art reference has a priority date at least nine months earlier, with all but de Geer pre-dating the '842 Application by over one year.

IX. CLAIM CONSTRUCTION

93. It is my understanding that in order to properly evaluate the '286 Patent, the terms of the claims must first be interpreted. It is my understanding that the claims are to be construed according to the same claim construction standard that district courts use. Under the claim construction standard that district courts use, claim terms are given their ordinary and customary meaning from the perspective of a person of ordinary skill in the art at the time of the invention.

94. In order to construe the Challenged Claims of the '286 Patent, I have reviewed the entirety of the '286 Patent along with portions of the prosecution history of the '286 Patent (EX1002). Consistent with the '286 Patent disclosure, I have interpreted the terms in the Challenged Claims according to their plain and ordinary meaning as understood by a person of ordinary skill in the art, and considered any explicit definitions provided by the specification of the '286 Patent, where applicable.

95. Based on my review of the '286 Patent, it is my opinion that a person of ordinary skill in the art would have understood each of the terms of the Challenged Claims of the '286 Patent according to their ordinary and customary meaning.

X. DETAILED INVALIDITY ANALYSIS

96. I have been asked to provide my opinion as to whether the Challenged Claims of the '286 Patent would have been anticipated by the prior art or would have been obvious in view of the prior art. The discussion below provides a detailed analysis of how the prior art references I reviewed disclose, teach, or suggest the limitations of the Challenged Claims of the '286 Patent.

97. As part of my analysis, I have considered the scope and content of the prior art and any potential differences between the claimed subject matter and the prior art. I conducted my analysis as of the priority date of the '286 Patent: March 3, 2015. I have also considered the level of ordinary skill in the pertinent art as of that date.⁶

⁶ As noted above in Section VIII.D, even if the '286 Patent were entitled to the date of the '842 Application—which it is not, as the '286 Patent only carries over the specification elements found in the '030 Application—the analysis presented in this Declaration utilizes prior art that pre-dates the priority of the '842 Application.

98. I describe in detail below the scope and content of the prior art, as well as any differences between the claimed subject matter and the prior art, on an element-by-element basis for the Challenged Claims of the '286 Patent. This analysis supports my finding that the limitations of the Challenged Claims of the '286 Patent are disclosed in the prior art, or that the differences between the Challenged Claims of the '286 Patent and the prior art discussed herein are such that the subject matter as a whole would have been obvious at the time of the filing of the '286 Patent to a person having ordinary skill in the art to which the subject matter pertains.

99. As described in detail below, the claimed subject matter of the Challenged Claims would have been obvious in view of the teachings of the identified prior art references as well as the knowledge of a POSITA.

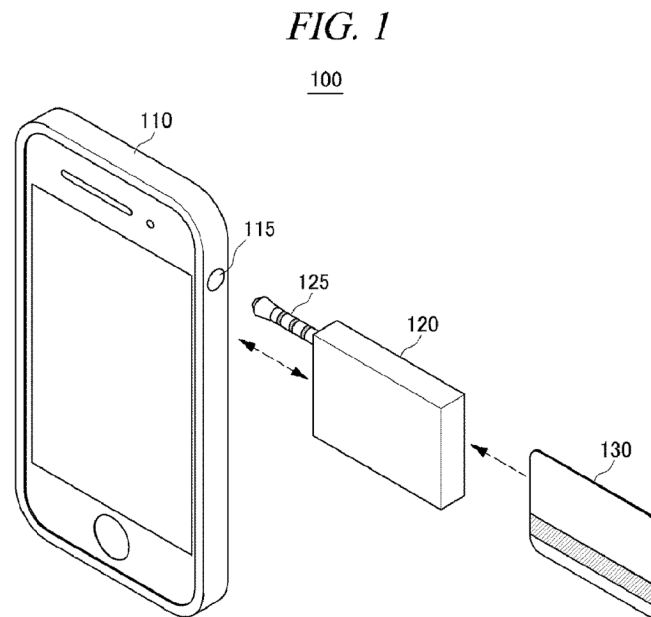
100. I will now describe, in the grounds below, on an element-by-element basis how the prior art discloses or teaches all elements of the Challenged Claims. Unless otherwise noted, all *italics* refers to claim language, and **bold** or ***bold italics*** is added for emphasis.

A. Ground 1: Claim 1 is rendered obvious over Cho in view of Aaron and Carpenter

101. It is my opinion that the combined teachings of Cho, Aaron, and Carpenter disclose or render obvious, to a POSITA, the subject matter of each and every element of claim 1 of the '286 Patent.

1. Overview of Cho

102. Cho describes a card payment system 100 that includes a card payment apparatus 120, which connects to client device 110 (a smartphone) via an audio jack 125 in a microphone port 115 of the smartphone, as shown in Fig. 1 below. EX1005, Abstract, 3:3-19 (client device 110 is a mobile phone), Fig. 1. The card payment apparatus utilizes “a magnetic strip reader that is configured to read information from a magnetic strip of card 130 or an integrated circuit chip reader that is configured to read information from an integrated circuit chip of card 130.” EX1005, 4:28-32. Account information is then transmitted “via a microphone contact of an audio jack” to a smartphone. EX1005, Abstract. The smartphone may then “execute a card payment based at least in part on the account information through a card payment server” via a wireless network. EX1005, 3:52-56. The card payment apparatus 120 and relation to client device 110 (a smartphone) and card 130 are shown in Fig. 1 below. EX1005, Abstract, 3:3-19.



EX1005, Fig. 1.

2. Overview of Aaron

Aaron relates to “mobile card processing using multiple wireless devices, [] acquisition of card information to enhance user experience, and [] secure communications between devices.” EX1006, ¶ 1. Aaron describes a customer conducting “a point-of-sale electronic payment transaction with a merchant...by personally swiping a card” on a mobile device wirelessly connected to other devices. EX1006, ¶ 9. Specifically, a customer may use “a mobile computing device” such as “a smart phone, tablet computer, laptop, or other data processing apparatus” that is able to be “attached to a credit card reader” via an input such as an audio jack.

EX1006, ¶¶ 58-59. When a card is swiped on the card reader, transaction data may then be communicated to an external payment service system via the Internet to process and authorize the transaction. EX1006, ¶ 68. The payment system in turn processes transactions and communicates with credit card payment networks. EX1006, ¶¶ 69-70. Fig. 7, below, shows the relationship between a customer's mobile computing device (customer-facing device 102), the internet, and external payment systems:

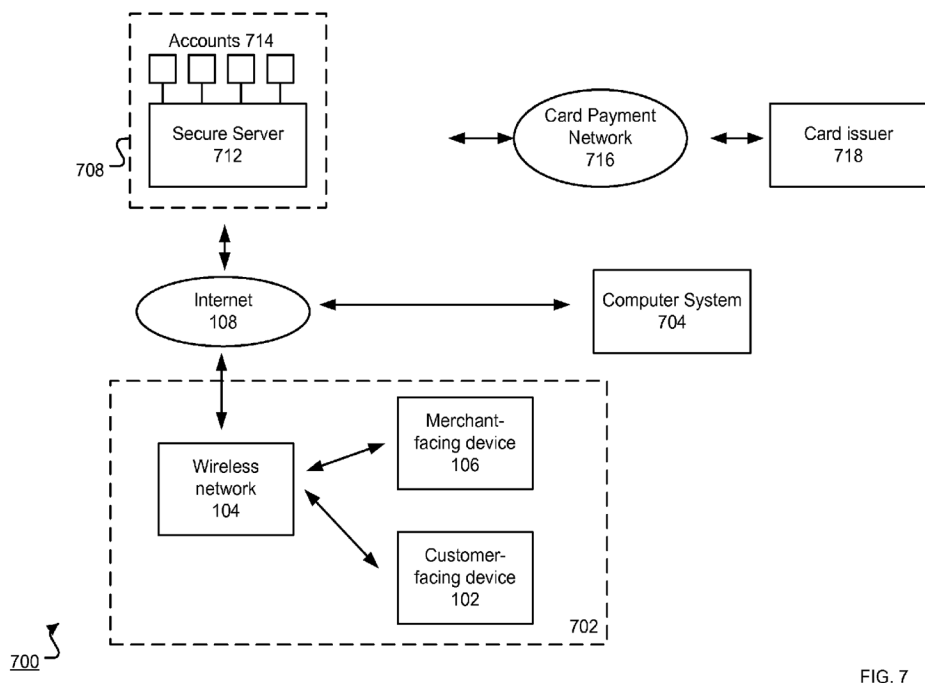


FIG. 7

EX1006, Fig. 7.

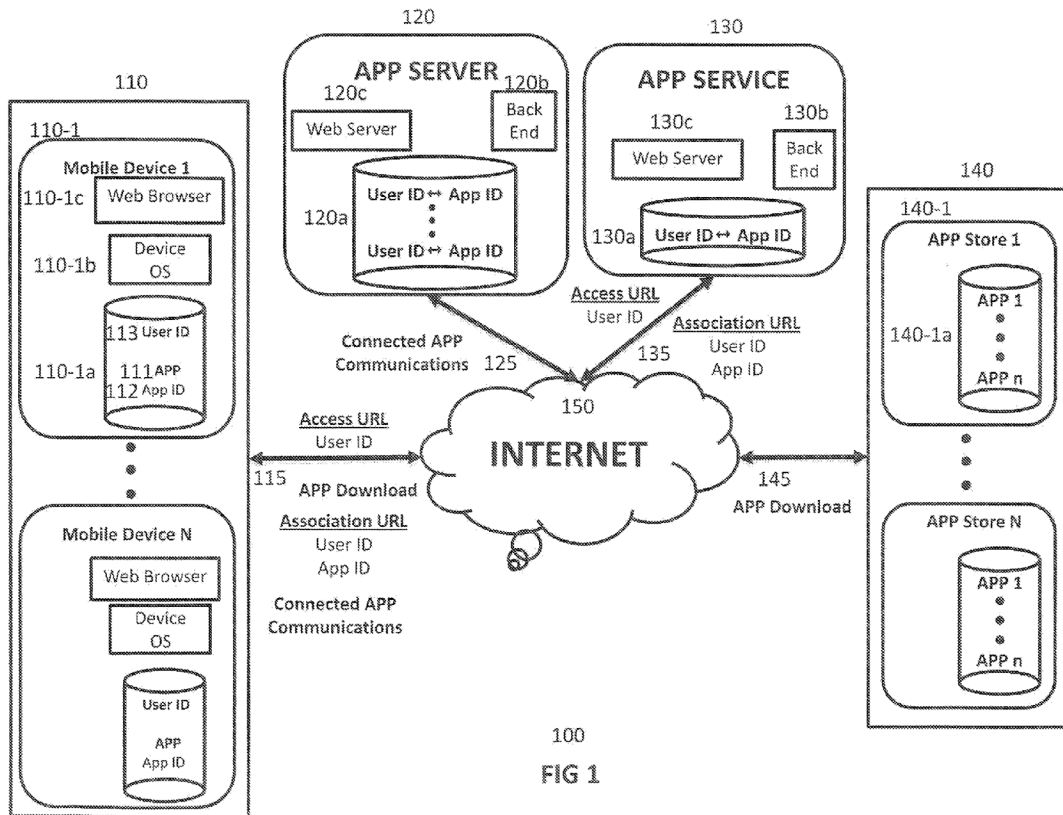
103. Aaron explains how a “customer facing device 122 communicates with the payment service system 708 to submit a request for authorization of the

transaction.” EX1006, ¶ 68.⁷ When a customer swipes their card, the card reader 720 passes card information to the customer facing device 122. EX1006, ¶ 68. This includes processing account information such as “credit card numbers, debit card numbers, bank accounts, user accounts, user identifying information or other sensitive information.” EX1006, ¶ 69.

3. Overview of Carpenter

104. Carpenter describes the implementation of mobile application (“app”) stores, and the relationship between mobile devices such as smartphones and app stores from which mobile apps are downloaded. EX1008, ¶¶ 14, 18-19, 22-23. Carpenter’s Fig. 1, below, shows an architecture where mobile devices 110, such as smartphones, communicate via the internet and download apps via app stores. EX1008, ¶¶ 14, 18-19, 22-23.

⁷ A POSITA would have recognized that Aaron’s discussion of “customer facing device 122” in the cited paragraph references Fig. 7’s “customer-facing device 102.”



EX1008, Fig. 1.

105. Carpenter explains that “certain generic functions are common to many apps, such as the need to be downloaded from an App Store 140.” EX1008, ¶ 23. Mobile app 111 is stored in database 140-1 *a* of app store 140-1, and is downloaded from app store 140-1, via connection 145 and connection 115, to smartphone 110-1. EX1008, ¶ 26. In this manner, Carpenter explains the implementation details as to the relationship between mobile devices and app stores.

4. Motivation to Combine Cho and Aaron

106. **First**, Cho is analogous art to the '286 Patent. The '286 Patent relates to a method and apparatus for facilitating transactions using data read from a card with a card reader. EX1001, 1:65-2:67, claim 1. Cho is within the same field of endeavor, as it pertains to “a card payment system” that executes card payments based on information read from a card via a card payment apparatus. EX1005, 1:5-6, 1:17-28, 3:52-56. Thus, Cho is analogous art to the '286 Patent because it is in the same field of endeavor (i.e., a smartphone executing an application to conduct transactions) and is reasonably pertinent to the particular problem with which the inventor is involved (i.e., facilitating transactions using a card reader with a mobile phone).

107. Similarly, Aaron is also analogous art to the '286 Patent. As I noted above, the '286 Patent relates to a method and apparatus for facilitating transactions using data read from a card with a card reader. EX1001, 1:65-2:67, claim 1. Likewise, Aaron relates to “mobile card processing” and the “acquisition of card information” as part of transaction facilitation. EX1006, ¶¶ 1, 2. Aaron is analogous art to the '286 Patent because it is in the same field of endeavor (i.e., card payment systems) and is reasonably pertinent to the particular problem with which the inventor is involved (i.e., facilitating transactions using a card reader with a mobile phone).

108. **Second**, a POSITA would have been motivated to modify Cho's card payment system with the conventional implementation details of Aaron to execute transactions over a wireless network, because Aaron discloses the advantage of processing payment requests using an external server over the internet. Cho explains how account information is read from a transaction card onto client device 110 using card payment apparatus 120, and the use of software such as "card payment executor 1030 [that] may be further configured to execute a card payment based on the account information between a card payment server which is communicatively coupled to client device 110," but does not expressly describe how such transactions would occur with a payment processing server. EX1005, 11:40-44. Aaron explains what information is sent in transactions: "credit card numbers, debit card numbers, bank accounts, user accounts, user identifying information or other sensitive information." EX1006, ¶ 69. Aaron also explains how Aaron's card payment server would operate to execute the card payment, "submit[ting] a request for authorization of a transaction" to Aaron's payment service system over the internet using the information collected via a card reader. EX1006, ¶¶ 68-70. Aaron's payment service system processes a payment transaction "by sending a record to the computer system of the card payment network," such as Visa or Mastercard, to "send[] the record to the card issuer," such as a bank. EX1006, ¶ 87. Aaron's payment service system then communicates with the client device whether the payment succeeded or failed.

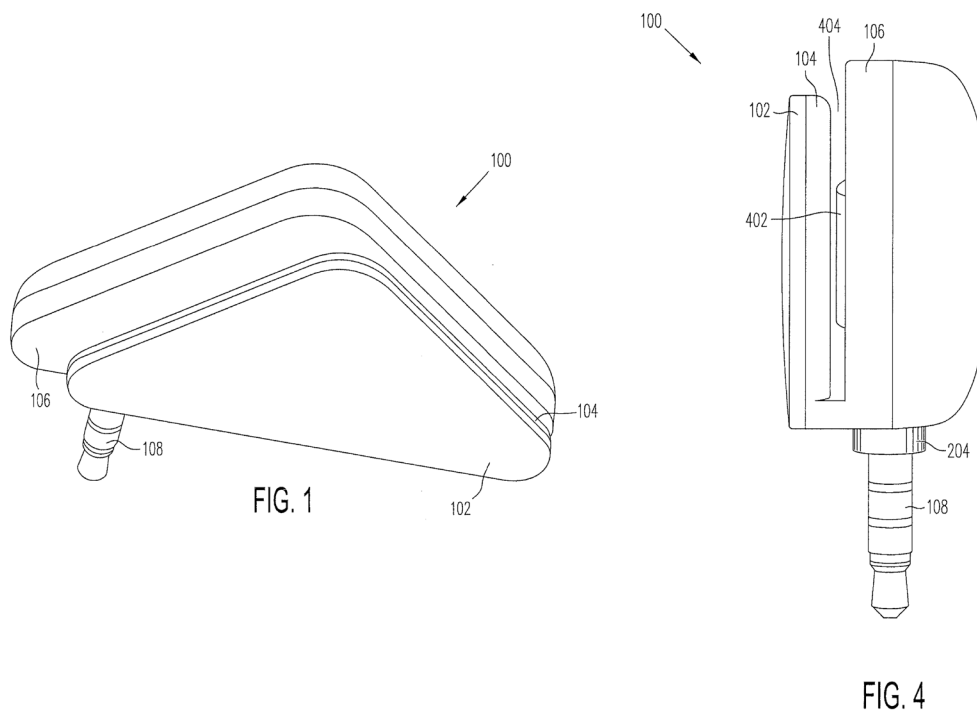
EX1006, ¶¶ 88-89. As such, the combination of Cho and Aaron would have been the combination of prior art elements (Cho's card payment system to collect and process account information from cards, with Aaron's execution of transactions over a network) according to known methods (executing transactions over a network through submission of transaction information to a server over the internet, as taught by Aaron, using information collected with Cho's card payment apparatus 120 and processed with Cho's card payment executor 1030) to yield predictable results of conducting a transaction with a smartphone over a wireless network.

109. Using a card reader and conducting transactions wirelessly were well-known by the priority date of the '286 Patent. For instance, U.S. Patent No. 9,436,855 ("Marcus," EX1017), which was filed on June 30, 2014, discloses a "card reader for use with a mobile device." EX1017, Abstract. Marcus focuses on the card reader aspect, but notes that information that is read is communicated to a payment processor to process payments using card swipes:

Payment card readers enable a user to make a payment at a point of sale by simply **swiping the card in the reader** so that the magnetic strip is read by the reader, typically having the strip come in contact with a metal head in the reader. **Information contained in the strip, such as card number, card holder name, etc., is electronically communicated to a payment processor, who can process the**

information and effect payment on behalf of the user to a payee,
such as a merchant.

EX1017, 1:27-35. Marcus's disclosed card reader is specifically aimed at mobile
devices and improving convenience with mobile card readers. EX1017, 1:55-59. An
example of Marcus's card reader is shown in Figs. 1 and 4, below:



EX1017, Figs. 1, 4.

110. Similarly, U.S. Patent No. 8,302,860 (“McKelvey,” EX1018), which
was filed on March 8, 2011, discloses a card reader “configured to be coupled to a
mobile device.” EX1018, Abstract. McKelvey more specifically contemplates how
the data read using a card reader is processed and sent to a mobile device:

In another embodiment of the present invention, a method is provided for **reading a financial transaction card having data stored on a magnetic stripe** incorporated into the financial transaction card. A read head is provided that includes **an output jack coupled to at least one of an audio jack or a microphone input port of a mobile device**. The read head has a slot with a width no greater than 1 mm. The financial transaction card is swiped through the slot. In response to a successful swipe of the financial transaction card in the card reader, data stored in the magnetic stripe is read and a **signal is generated that is indicative of data stored in the magnetic stripe. This signal is provided to the mobile device and decoded at the mobile device.**

EX1018, 2:43-55. McKelvey discloses that its “mobile device [] then decodes the incoming signal from the card reader and acts as a point-of-sale device to complete the financial transaction.” EX1018,

In one embodiment of the present invention a system is provided with transaction engine 130 running on mobile device 100. In response to a financial transaction between a buyer and a seller, the **mobile device 100 accepts information selected including but not limited to information from financial transaction** or information pertaining to financial transaction card used by the buyer in the transaction. Additionally, a financial transaction device can be utilized. Non-limiting examples of financial transaction devices include but are not limited to a, wristband, RFID chip, cell phone, biometric marker and the like. At least a portion of **this information**

is communicated with a third party financial institution or payment network to authorize the transaction. The buyer receives confirmation of the payment. Payment confirmation can be in real time.

EX1018, 5:5-20.

In the example of FIG. 1, **transaction engine 130 takes as its input the decoded credit card information from decoding engine 110 and transaction amount from user interaction engine 120.** Transaction engine 130 then contacts third party financial institutions such as an acquiring bank that handles such authorization request, which may then communicate with the card issuing bank to either authorize or deny the transaction. If the third party authorizes the transaction, then transaction engine 130 will transfer the amount of money deducted from the account of the card holder (e.g., the buyer) to an account of the merchant and provide the transaction results to user interaction engine 120 for presentation to the buyer and the merchant. In this manner, the merchant may accept a payment from the buyer via card reader 10 and mobile device 100.

EX1018, 15:33-47. An example of McKelvey's card reader being used with a smartphone to swipe a card is provided in Fig. 16C, below:

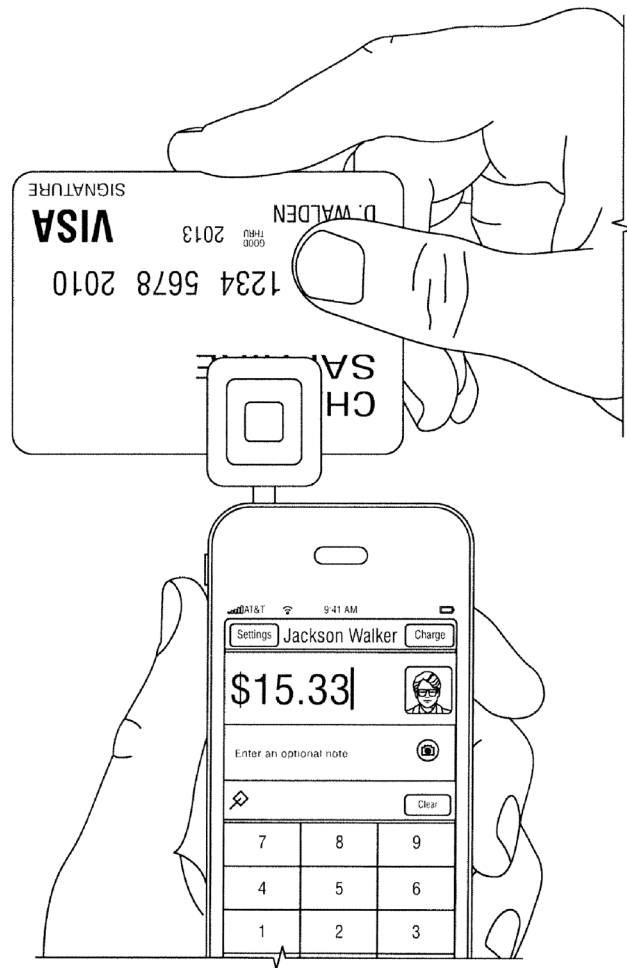


FIG. 16C

EX1018, Fig. 16C.

111. Further, a POSITA would have had a reasonable expectation of success in modifying Cho's card payment system to implement Aaron's payment processing over a network because Cho's card payment executor 1030 utilizes the same information that Aaron's payment processing collects and sends. Specifically, both Cho and Aaron receive information from a credit card reader. EX1005, 5:58-60

(“card reader 230 may read the account information from a magnetic strip of card 130”); EX1006, ¶ 59 (describing the use of a card reader “attached to an input, e.g., an audio jack”). Cho uses account information to “execute a card payment...between a card payment server which is communicatively coupled to client device 110.” EX1005, 11:40-44. Similarly, Aaron explains how a “customer facing device 122 communicates with the payment service system 708 to submit a request for authorization of the transaction.” EX1006, ¶ 68. This includes processing account information such as “credit card numbers, debit card numbers, bank accounts, user accounts, user identifying information or other sensitive information.” EX1006, ¶ 69. Thus, a POSITA would have had a reasonable expectation of success in combining Cho and Aaron because both describe processing transactions using account information received from cards swiped on a user device, and Aaron merely provides additional detail as to how transactions would be processed.

5. Motivation to Combine Cho and Aaron with Carpenter

112. **First**, Carpenter is analogous art to the '286 Patent. The '286 Patent relates to a method and apparatus for facilitating transactions using data read from a card with a card reader via coded instructions stored on a server and executable on a smartphone. EX1001, 1:65-2:67, claim 1. Carpenter is within the same field of endeavor, as it pertains to mobile devices such as smartphones executing applications to carry out specific functions, including downloading the applications

from an app store before the applications are executed. EX1008, ¶¶ 14, 18-19, 22-23. Further, Carpenter is reasonably pertinent to a particular problem with which the inventor is involved (i.e., coded instructions stored on a server and executable on a smartphone). Thus, Carpenter is analogous art to the '286 Patent.

113. **Second**, a POSITA would have been motivated to modify the Cho-Aaron combination to incorporate the conventional implementation details described in Carpenter of a smartphone downloading an application from an app store to conduct financial transactions with a smartphone. Specifically, Cho describes elements implemented via software as a phone application. EX1005, 10:58-61 (“one or more of signal generator 1010, transceiver 1020, and card payment executor 1030 may be included in an instance of **an application hosted by client device 110**”). Aaron confirms that applications are downloaded to a device for use with a wireless payment system, such as the generator 1010, transceiver 1020, and card payment executor 1030 contemplated by Cho. EX1006, ¶ 71. Aaron explains that “before a transaction between the user and the merchant can be performed” via a wireless payment system, “one or more applications are downloaded” to a merchant and/or customer device, such as a smartphone. EX1006, ¶ 71. Carpenter provides implementation details for how such applications, hosted by an app store and stored in a server, would be downloaded to a mobile device such as a smartphone via the Internet. EX1008, ¶¶ 23, 25.

114. A POSITA would have had a reasonable expectation of success in incorporating Carpenter's implementation details for providing applications to smartphones in the Cho-Aaron combination because Carpenter teaches how applications would be available for use in the Cho-Aaron combination because a POSITA would have understood how to download an application for use in the smartphone in the Cho-Aaron combination, as taught by Carpenter. Specifically, Carpenter teaches how applications, such as Cho's application of signal generator 1010, transceiver 1020, and card payment executor 1030, would be hosted on a server and provided for download to a device. EX1005, 10:58-61; EX1008, ¶¶ 18-19, 22-23, 25. Further, Aaron confirms that applications are downloaded to a device for use with a wireless payment system. EX1006, ¶ 71. Accordingly, a POSITA would have had a reasonable expectation of success in combining Carpenter with Cho or the Cho-Aaron combination.

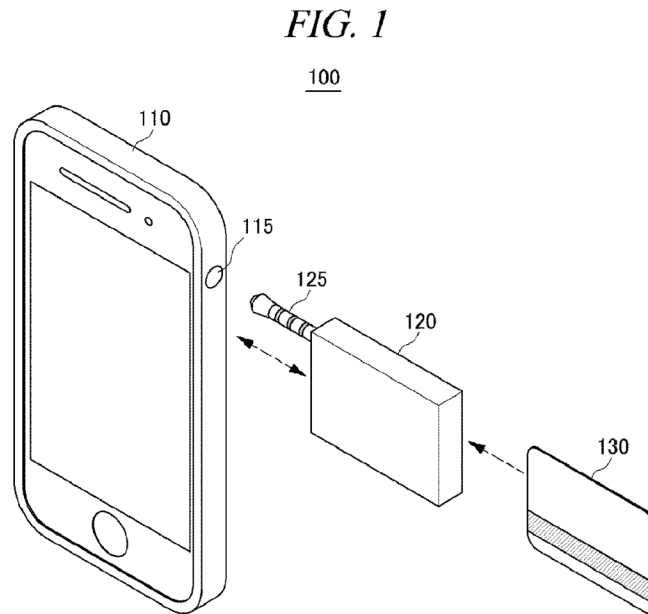
6. Analysis

a) Claim 1

[1.0] An apparatus comprising:

115. I have been informed that the preamble of claim 1 is not limiting. To the extent that the preamble is limiting, Cho discloses or at least renders obvious *an apparatus*. Specifically, Cho describes a "system configuration 100 in which one or more embodiments of a card payment system may be implemented." EX1005, 3:3-

5. Cho's system configuration 100 includes "a client device 110, and a card payment apparatus 120," as shown below in Fig. 1. EX1005, 3:5-7.



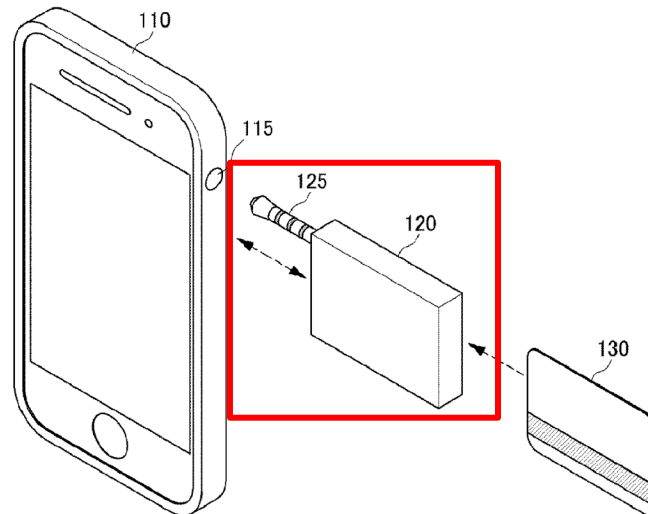
116. Accordingly, Cho discloses or renders obvious *an apparatus* (card payment apparatus 120), as described in further detail below.

[1.1.1] a card reader having an input interface configured to accept transaction data from an output interface of a transaction card,

117. Cho discloses or renders obvious limitation [1.1.1].

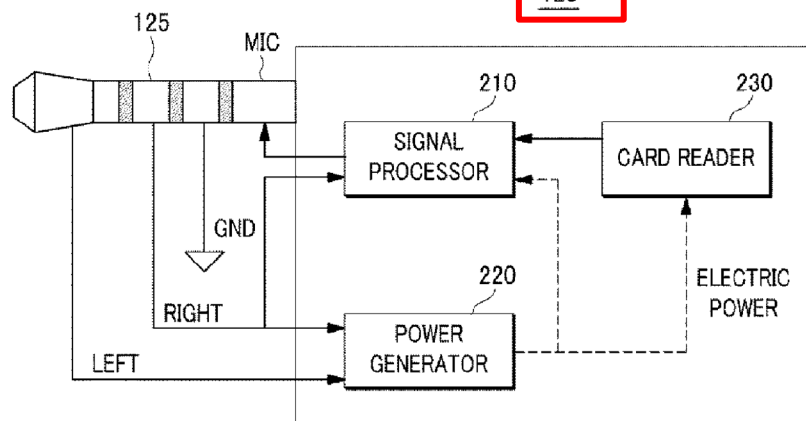
118. **First**, Cho discloses "a card payment apparatus 120" (*a card reader*), shown below in Fig. 1 and in further detail in Fig. 2:

100



EX1005, Fig. 1 (Annotated).

120



EX1005, Fig. 2 (Annotated).

transmits analog signals to the client device that contain “account information **which may be read from a card 130 by card payment apparatus 120.**” EX1005, 3:20-24.

119. **Second**, Cho’s card payment apparatus 120 utilizes “a magnetic strip reader that is configured to read information from a magnetic strip of card 130 or an integrated circuit chip reader that is configured to read information from an integrated circuit chip of card 130.” EX1005, 4:28-32, 5:58-60, 10:10-14; *see also* EX1005, 3:20-27 (“account information may be read from a card 130 by card payment apparatus 120”). Card 130 (*a transaction card*) includes a magnetic strip or integrated circuit chip (each *an output interface*) from which account information is read. EX1005, 4:28-32, 5:58-60, 10:10-14. Both the magnetic strip reader and the integrated circuit chip reader are *input interface[s]* of card reader 120 for the respective *output interface[s]* of the card 130, because card reader 120 uses the magnetic strip reader or integrated circuit chip reader to read the output from the respective interfaces of card 130. EX1005, 4:28-32, 5:58-60, 10:10-14.

120. Accordingly, Cho’s card payment apparatus 120 (*a card reader*) reads account information using a magnetic strip reader or integrated circuit chip reader (*having an input interface configured to accept transaction data*) from the magnetic strip or integrated circuit chip of card 130 (*from an output interface of a transaction card*).

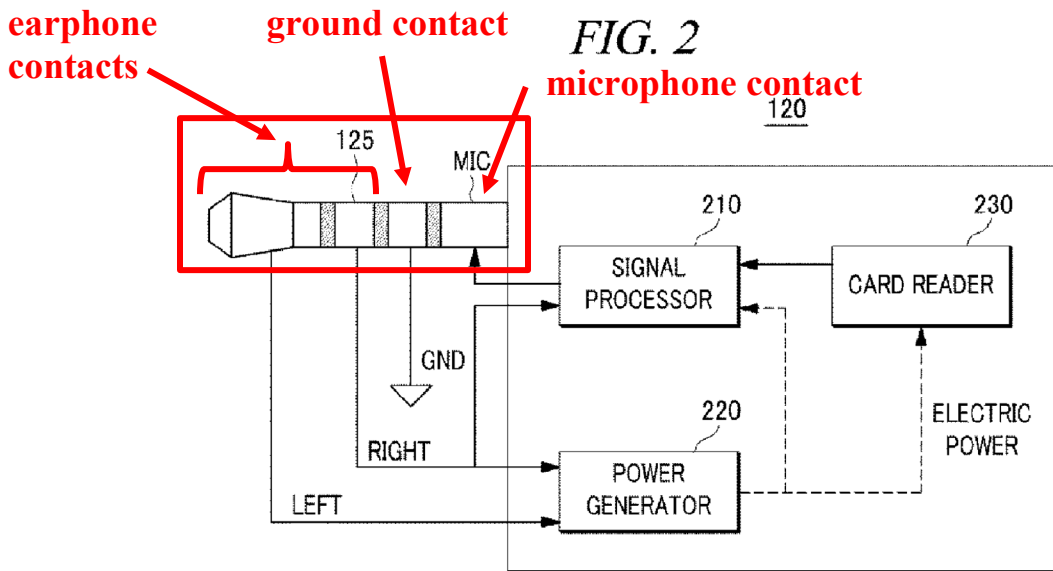
121. Thus, Cho discloses or renders obvious this limitation.

[1.1.2] and an output pin, as a part of the card reader, configured to directly connect the card reader to a microphone port of a smart telephone,

122. Cho discloses or renders obvious limitation [1.1.2].

123. **First**, Cho's card payment apparatus 120 (*card reader*) includes audio jack 125 (*an output pin, as a part of the card reader*), which comprises "at least one earphone contact, a ground contact and a microphone contact." EX1005, 4:58-60.

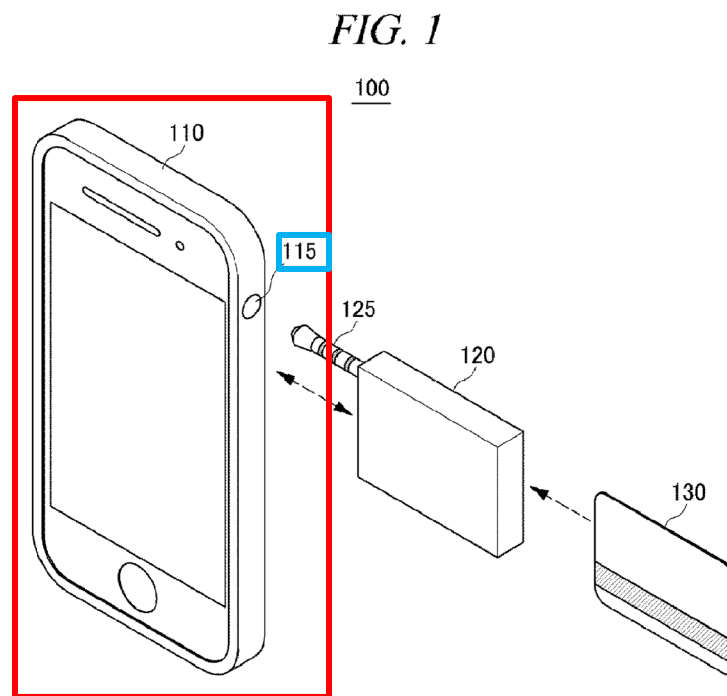
This is detailed further in Cho's Fig. 2, below:



EX1005, Fig. 2 (Annotated).

124. **Second**, audio jack 125 on Cho's card payment apparatus "may be inserted into audio jack socket 115 that is installed on a surface of client device 110"

where “at least one analog signal may be transmitted from card payment apparatus 120 to client device 110 via **the microphone contact.**” EX1005, 4:60-65. Thus, the audio jack 125 is *configured to directly connect the card reader to a microphone port of a smart telephone*. EX1005, 4:60-65. This is further detailed in Fig. 1, below, which depicts **client device 110** (*smart telephone*) containing **audio jack socket 115** (*microphone port*):



EX1005, Fig. 1 (Annotated).

125. Cho explains that client device 110 is “a device that has an audio jack socket 115, such as **a mobile phone**, a portable device, a notebook, or even a

personal computer or a personal communication terminal, such as PCS (Personal Communication System), GMS (Global System for Mobile communications), PDC (Personal Digital Cellular), PDA (Personal Digital Assistant), IMT (International Mobile Telecommunication)-2000.” EX1005, 3:7-15. A POSITA would have understood that Cho’s client device 110, a mobile phone, is a *smart telephone* based on the disclosure that client device 110 implements a card payment system via software “included in an instance of an application hosted by client device 110,” as well as the clear resemblance between the device shown in Fig. 1 and well-known mobile phones, at the time of priority of the ’286 Patent. EX1005, 3:7-15, 10:58-61, Fig. 1. When Cho was filed in 2013, the smartphone depicted in Cho’s Fig. 1 resembled the Apple iPhone released that same year, where both have a similar rectangular shape with rounded corners, a speaker, sensors, a camera depicted at the top of the phone, and a circular home button depicted at the bottom of the phone:



EX1005, Fig. 1 (Partial View); EX1039.

126. Accordingly, Cho's card payment apparatus 120 (*a card reader*) includes an audio jack 125 (*an output pin, as a part of the card reader*) which is inserted into audio jack socket 115 of client device 110 (*configured to directly connect the card reader to a microphone port of a smart telephone*).

127. Thus, Cho discloses or renders obvious this limitation.

[1.1.3] the card reader providing the transaction data accepted from the output interface of the transaction card to the output pin, and hence to the microphone port, as an analog variable voltage audio signal; and

128. Cho discloses or renders obvious limitation [1.1.3].

129. Cho's card payment apparatus 120 (*card reader*) transmits an analog signal (*an analog variable voltage audio signal*) to client device 110 (*smart telephone*). EX1005, 3:20-22 ("Client device 110 may be configured to receive, from

card payment apparatus 120 via audio jack 125, a first analog signal to which a first digital signal is converted.”). This analog signal includes account information read from a card (*transaction data accepted from the output interface of the transaction card*). EX1005, 3:22-27 (“The first digital signal may include account information which may be read from a card 130 by card payment apparatus 120. By way of example, but not limitation, the account information may include at least one of an account number, a card expiration date, etc.”). This information is transmitted using audio jack 125 (*output pin*). EX1005, 3:27-31 (“Card payment apparatus 120 may be configured to convert the read account information into the first analog signal by using any well-known digital-analog converting scheme and to transmit the converted first analog signal to client device 110 via audio jack 125.”).

130. Further, as discussed above in [1.1.2], client device 110 receives information from Cho’s card payment apparatus via audio jack socket 115 (*microphone port*). See Section X.A.6.a[1.1.2], *supra*; see also EX1005, 4:60-67 (“Audio jack 125 may be inserted into audio jack socket 115 that is installed on a surface of client device 110...[and] at least one analog signal may be transmitted from card payment apparatus 120 to client device 110 via the microphone contact.”).

131. Accordingly, Cho’s card payment apparatus 120 (*card reader*) transmits account information read from card 130 (*providing the transaction data accepted from the output interface of the transaction card*) via audio jack 125 to

audio jack socket 115 (*to the output pin, and hence to the microphone port*) in the form of an analog signal (*as an analog variable voltage audio signal*).

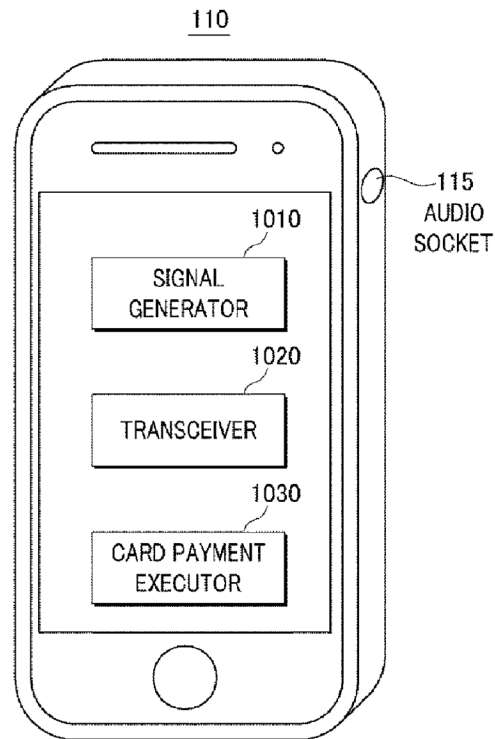
132. Thus, Cho discloses or renders obvious this limitation.

[1.2] coded instructions stored in a non-transitory medium of a first Internet-connected server, and accessible by a user of the card reader;

133. Cho in view of Aaron and Carpenter renders obvious limitation [1.2].

134. **First**, Cho describes a “configuration of client device 110 by which at least portions of a card payment system may be implemented” via software, such as “an instance of an application hosted by client device 110.” EX1005, 10:46-61. This includes the functionality of “a signal generator 1010, a transceiver 1020, and a card payment executor 1030” (collectively, *coded instructions*). EX1005, 10:48-51. Fig. 10, below, shows an arrangement of such a configuration:

FIG. 10

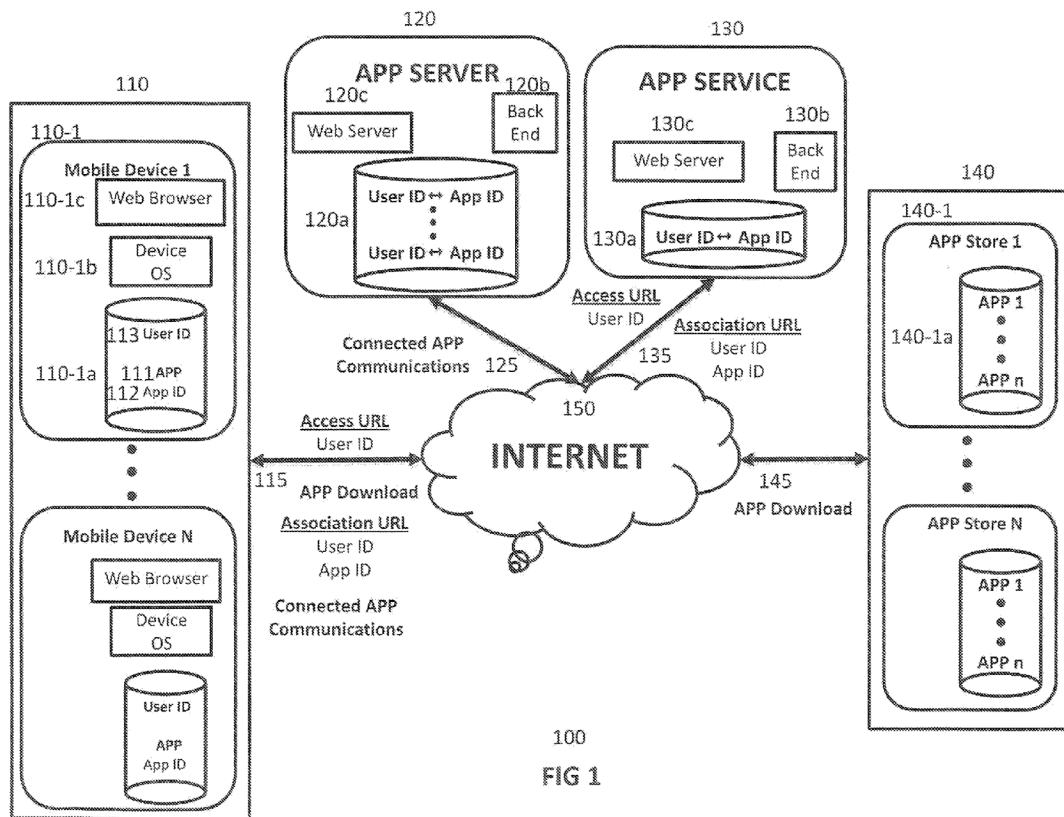


EX1005, Fig. 10.

135. **Second**, a POSITA would have understood that Cho’s signal generator 1010, transceiver 1020, and card payment executor 1030 collectively operate as *coded instructions* because they are implemented via software as a phone application. EX1005, 10:58-61 (“one or more of signal generator 1010, transceiver 1020, and card payment executor 1030 may be included in an instance of **an application hosted by client device 110**”). Aaron confirms that such software would be an application downloaded to a device for use with a wireless payment system, such as contemplated by Cho. EX1006, ¶ 71. Aaron explains that “before a

transaction between the user and the merchant can be performed” via a wireless payment system, “one or more applications are downloaded” to a merchant and/or customer device, such as a smartphone. EX1006, ¶ 71.

136. A POSITA would have understood that in Aaron’s implementation of a downloadable application, the application would have been hosted in a server because Aaron explains that the applications are downloaded from an application store. EX1006, ¶ 71. To the extent that Patent Owner argues Aaron does not explicitly disclose that applications are stored in the database of an app store (e.g., *stored in a non-transitory medium of a first Internet-connected server*), this is how apps were stored and made available to mobile devices, as evidenced by Carpenter. Carpenter’s Fig. 1, below, shows an architecture where mobile devices 110, such as smartphones, communicate via the internet and download apps via app stores. EX1008, ¶¶ 14, 18-19, 22-23.



EX1008, Fig. 1.

137. Carpenter explains that “certain generic functions are common to many apps, such as the need to be downloaded from an App Store 140.” EX1008, ¶ 23. Different app stores are associated with different mobile operating systems, where for a particular app store, a mobile app 111 is stored in database 140-1 a. EX1008, ¶ 23. Accordingly, Carpenter confirms that it was well-known at the priority date of the ’286 Patent that mobile phones utilized apps that were available from app stores (e.g., stored in a non-transitory medium of a first Internet-connected server) and

downloaded onto users' phones for use. EX1005, 10:58-61; EX1006, ¶ 71; EX1008, ¶ 23.

138. As discussed above in Sections X.A.4-X.A.5, a POSITA would have been motivated to combine Cho with Aaron and Carpenter, and would have had a reasonable expectation of success in doing so. Cho explains that its signal generator 1010, transceiver 1020, and card payment executor 1030 are hosted on an application (e.g., *coded instructions*) on Cho's client device 110. EX1005, 10:58-61. A POSITA would have been motivated to download the application on Cho's client device 110, as confirmed by Aaron. EX1006, ¶ 71. And Carpenter confirms that such applications (*coded instructions*) are available from app stores (e.g., *stored in a non-transitory medium of a first Internet-connected server*). EX1008, ¶ 23. Thus, a POSITA would have understood that—and would have been motivated to implement—Cho's application (*coded instructions*), including signal generator 1010, transceiver 1020, and card payment executor 1030, would be downloaded to Cho's client device 110 from an app store (e.g., the application is *stored in a non-transitory medium of a first Internet-connected server, and accessible by a user of the card reader* via downloading the application), as taught by Carpenter. EX1005, 10:58-61; EX1006, ¶ 71; EX1008, ¶ 23.

139. **Third**, Cho's signal generator 1010, transceiver 1020, and card payment executor 1030 would have been accessible *by a user of the card reader*

because they are executed on client device 110. EX1005, 10:58-61. Client device 110 receives account data from the card reader. EX1005, 3:20-24. Signal generator 1010 initiates a request for card information to be read using card payment apparatus 120. EX1005, 11:6-9. Transceiver 1020 receives the analog signal from card payment apparatus 120. EX1005, 11:27-29. Card payment executor 1030 utilizes the data received from the card reader to execute a card payment. EX1005, 11:40-44. Because the signal generator 1010, transceiver 1020, and card payment executor 1030 run on client device 110 to collectively obtain and use information received from the card reader, a POSITA would have understood that the signal generator 1010, transceiver 1020, and card payment executor 1030 are *accessible by a user of the card reader*.

140. Accordingly, a POSITA would have recognized that the application including signal generator 1010, transceiver 1020, and card payment executor 1030 (*coded instructions*), which would have been obtained from an app store or other server (*stored in a non-transitory medium of a first Internet-connected server*), would run on client device 110 (*accessible by a user of the card reader*).

141. Thus, Cho in view of Aaron and Carpenter renders obvious this limitation.

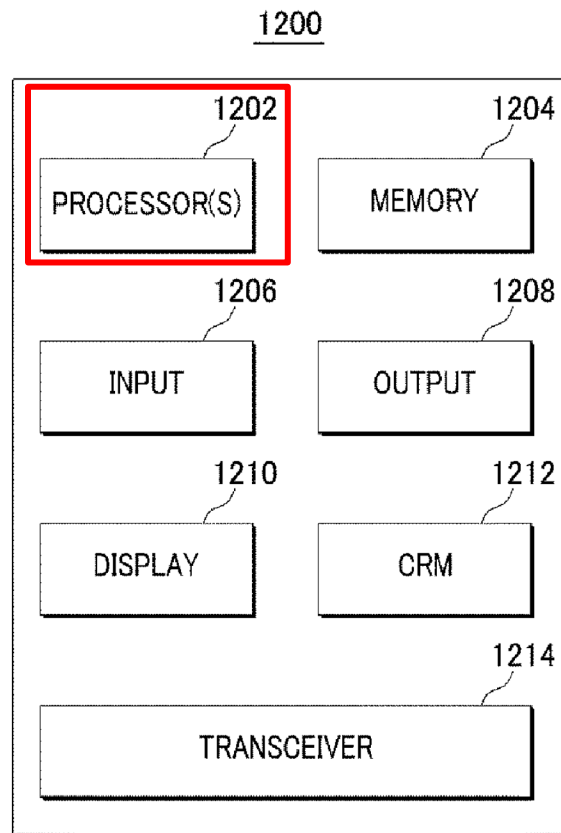
[1.3.1] wherein the coded instructions, when executed on a processor in the smart telephone, convert the analog variable voltage audio signal received at the microphone port to the transaction data as digital data,

142. Cho discloses or renders obvious limitation [1.3.1].

143. **First**, as discussed above in [1.2], Cho's signal generator 1010, transceiver 1020, and card payment executor 1030 are collectively an instance of an application which operates as *coded instructions*. See Section X.A.6.a[1.2], *supra*. These components operate on client device 110 (*the smart telephone*). EX1005, 10:46-61.

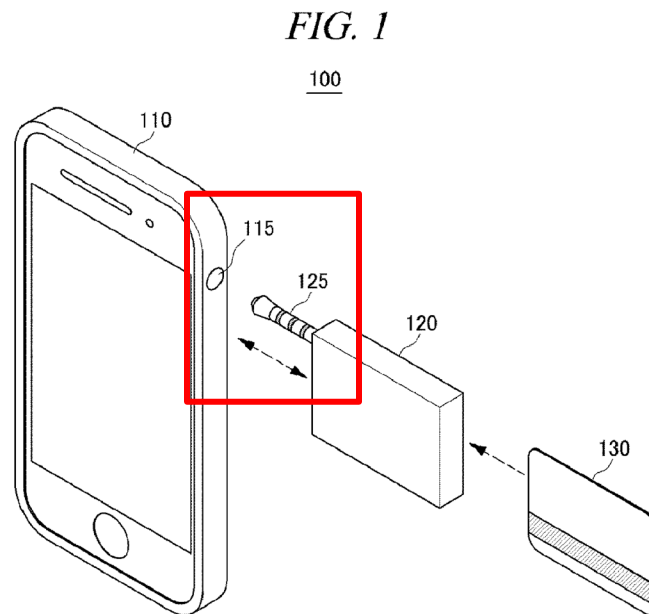
144. Cho explains that "the processes and sub-processes of a card payment system may be implemented as computer-readable instructions stored on a computer-readable medium" which are "**executed by a processor of a device.**" EX1005, 13:8-17. Fig. 12, below, shows an example of a computing embodiment, such as client device 110, including *a processor in the smart telephone*:

FIG. 12



EX1005, Fig. 12 (Annotated).

145. **Second**, as discussed above in [1.1.3], Cho describes the use of audio jack socket 115 (*microphone port*) to transmit an analog signal “from card payment apparatus 120 to client device 110 via the microphone contact” (*audio signal received at the microphone port*). EX1005, 4:60-67; *see* Section X.A.6.a[1.1.3], *supra*. A representation of the relationship between card payment apparatus 120 and client device 110, including audio jack 125 and audio jack socket 115, is shown in Fig. 1, below:



EX1005, Fig. 1 (Annotated).

146. **Third**, Cho's transceiver 1020 receives the analog signal from card payment apparatus 120 "via a microphone contact of audio jack 125." EX1005, 11:27-29. Card payment executor 1030 converts this "analog signal into the first digital signal that includes the account information by using any well-known analog-digital converting scheme." EX1005, 11:35-38.

147. Accordingly, Cho's card payment executor 1030 (part of the *coded instructions*), which is executed on a processor of client device 110 (*when executed on a processor in the smart telephone*), converts the analog signal received by audio jack socket 115 to a digital signal (*convert the analog variable voltage audio signal received at the microphone port to the transaction data as digital data*).

148. Thus, Cho discloses or renders obvious this limitation.

[1.3.2] establish direct data exchange between the smart telephone and a second Internet-connected server and facilitate transactions by a financial institution, or purchases from an online-merchant, using the transaction data.

149. Cho alone or Cho in view of Aaron renders obvious limitation [1.3.2].

150. **First**, Cho's card payment executor 1030 "execute[s] a card payment based on the account information between a card payment server which is communicatively coupled to client device 110." EX1005, 11:40-44. Cho explains that "[t]he card payment server may refer to an organization or entity that provides some type of communication service, data storage service, data or information processing service, content service, or any combination thereof to business customers or consumers," such as "a financial service provider, a banking service provider, or a credit card service provider." EX1005, 3:56-4:2.

151. Accordingly, Cho executes a card payment (e.g., facilitate[s] transactions...or purchases) with a server communicatively coupled to the client device (thus establish[ing] direct data exchange between the smart telephone and a second Internet-connected server) such as a financial service provider or credit card service provider (financial institution, or...online-merchant) using the account information (using the transaction data).

152. **Second**, to the extent the Patent Owner argues that Cho does not teach this limitation, Aaron confirms the relationship between a client device and a

transaction server. Aaron explains how a wireless payment system, such as Cho's client device 110, communicates with a payment service system using a network. EX1006, ¶ 66. Aaron explains that a customer-facing device may receive card information through a card swipe on a connected card reader, and communicate with a payment service system to submit a request for authorization of the transaction. EX1006, ¶ 68.

153. This request for authorization *facilitate[s] transactions by a financial institution, or purchases from an online-merchant, using the transaction data.* Specifically, Aaron teaches that the payment service system includes a server to handle all “secure information such as credit card numbers, debit card numbers, bank accounts, user accounts, user identifying information or other sensitive information.” EX1006, ¶ 69. The server then communicates electronically with card payment networks and banks to authorize transactions. EX1006, ¶¶ 68-70.

154. As described above in Section X.A.4, a POSITA would have been motivated to combine Cho and Aaron to execute payments using Cho's card reader over a wireless network, and would have had a reasonable expectation of success in doing so. In the combination, Cho would send account information read from cards to a card payment server to authorize transactions, as described by Aaron. EX1005, 11:40-44 (using account information to “execute a card payment...between a card payment server which is communicatively coupled to client device 110.”); EX1006,

¶¶ 68-70 (explaining how a “customer facing device 122 communicates with the payment service system 708 to submit a request for authorization of the transaction.”); *see* Section X.A.4, *supra*.

155. Accordingly, Aaron teaches communication with a payment service system to submit a request for authorization of the transaction (e.g., *facilitat[ing] transactions...or purchases*), using account information captured via a card swipe as taught by Cho (thus *establish[ing] direct data exchange between the smart telephone and a second Internet-connected server*), to communicate with card payment networks or banks to authorize transactions (*facilitat[ing] transactions by a financial institution, or purchases from an online-merchant, using the transaction data*).

156. Thus, Cho alone or in view of Aaron renders obvious this limitation.

B. Ground 2: Claim 2 is rendered obvious over Cho in view of Aaron, Carpenter, and de Geer

1. Overview of de Geer

157. De Geer describes a method of “conducting an electronic card payment between a merchant...and a cardholder.” EX1007, Abstract. De Geer’s method includes “reading payment card information associated with the payment card using the card reader” and transmitting the card information “to a bank server conducting the card payment.” EX1007, Abstract. Transactions are conducted “using a mobile

communications device such as a mobile phone.” EX1007, ¶¶ 22, 26. De Geer’s method allows “secure and EMV approved credit card payments” to be performed “using a payment card with a magnetic strip and an ordinary unsecure mobile phone with an unsecure card reader device[.]” EX1007, ¶ 8. A payment card is read by swiping a payment card, to obtain card information. EX1007, ¶ 29. This “read payment card information generally comprises a primary account number (PAN), the name of the cardholder and but may also comprise discretionary data. The discretionary data may differ depending on the type of payment card and may be any of a personal identification number (PIN) verification value (PVV), expiry date and a card security code (CSC, also known as CVC, CVV, CVV2, CVD, etc.).” EX1007, ¶ 30.

2. Motivation to Combine Cho, Aaron, and Carpenter with de Geer

158. **First**, de Geer is analogous art to the ’286 Patent. The ’286 Patent relates to a method and apparatus for facilitating transactions using data read from a card with a card reader via coded instructions stored on a server and executable on a smartphone. EX1001, 1:65-2:67, claim 1. De Geer relates to “conducting an electronic card payment between a merchant...and a cardholder.” EX1007, Abstract. These transactions are conducted “using a mobile communications device such as a mobile phone.” EX1007, ¶¶ 22, 26. De Geer is analogous art to the ’286 Patent

because it is in the same field of endeavor (i.e., card payment systems) and is reasonably pertinent to the particular problem with which the inventor is involved (i.e., facilitating transactions using a card reader with a mobile phone).

159. **Second**, a POSITA would have been motivated to modify the Cho-Aaron combination in view of de Geer to include CVV codes with the account information read by Cho and processed by the Cho-Aaron combination. The combination would have been no more than the use of a known technique (the inclusion of CVV codes as part of account information, as taught by de Geer (EX1007, ¶ 30)) to improve similar devices (Cho’s card payment system, which reads account information from cards (EX1005, 5:58-60)) in the same way (by utilizing the CVV codes as part of the account information read by Cho’s card payment system).

160. A POSITA would have had a reasonable expectation of success in using de Geer’s teaching of including CVV codes with account information—doing so merely incorporates data that was already well-known to be included in a card’s magnetic strip, and thus the combination would simply include CVV codes in the account information that Cho’s card reader 230 receives. Cho explains that “card reader 230 may read the account information from a magnetic strip of card 130[.]” EX1005, 5:58-60. De Geer elaborates on the information that is read from a magnetic strip, explaining that “[t]he magnetic stripe on the payment card usually contain up

to three tracks with payment card information written in different encodings.” EX1007, ¶ 30. This includes “a primary account number” and “the name of the cardholder” as well as “discretionary data.” EX1007, ¶ 30; *see also* EX1005, 5:55-60 (noting that card information includes “at least one of an account number, a card expiration date, etc”). Thus, de Geer simply teaches including additional data in Cho’s account information. Accordingly, a POSITA would have had a reasonable expectation of success in combining de Geer with Cho or the Cho-Aaron combination.

3. Analysis

a) Claim 2

[2.0] The apparatus of claim 1

161. Cho in view of Aaron and Carpenter renders obvious *the apparatus of claim 1*. *See* Section X.A.6.a, *supra*.

[2.1] wherein the coded instructions, when executed on a processor in the smart telephone, retrieve a card verification code (CVV),

162. The Cho-Aaron-Carpenter combination, in view of de Geer, renders obvious limitation [2.1].

163. Limitation [1.3.1], discussed above, recites “*wherein the coded instructions, when executed on a processor in the smart telephone....*” Accordingly, the following analysis of limitation [2.1] interprets the “*processor in the smart telephone*” as corresponding to the processor in limitation [1.3.1].

164. De Geer teaches “a method of conducting an electronic card payment,” where “payment card information associated with the payment card” is read using a card reader. EX1007, Abstract. As discussed above and confirmed by de Geer, payment card information is ready by a card reader using the card’s magnetic strip. EX1007, ¶ 30. De Geer elaborates on what this information entails, explaining that “read payment card information generally comprises a primary account number (PAN), the name of the cardholder and but [sic] may also comprise discretionary data. The discretionary data may differ depending on the type of payment card and may be any of a personal identification number (PIN) verification value (PVV), expiry date and a card security code (CSC, also known as CVC, CVV, CVV2, CVD, etc.).” EX1007, ¶ 30.

165. A POSITA would have been motivated to *retrieve a card verification code*, as detailed in de Geer (e.g., CVV), as part of the card information collected from the apparatus disclosed by Cho for claim 1. De Geer explains that “[t]he magnetic stripe on the payment card usually contain up to three tracks with payment card information written in different encodings.” EX1007, ¶ 30. It was well-known that CVV information “can be encoded on either track 1 or track 2 of a magnetic striped card and [is] used to detect forged cards. EX1030, 57. Accordingly, the inclusion of CVV information, per de Geer, as part of the account information read using Cho’s apparatus would allow the apparatus to “execute a card payment based

on the account information” where CVV information was required, such as for authentication purposes. EX1005, 1:40-44. And as discussed above in Section X.B.2, a POSITA would have been motivated to combine de Geer with Cho and the Cho-Aaron combination. *See* Section X.B.2, *supra*.

166. Thus, Cho in view of de Geer renders obvious this limitation.

[2.2] and use the CVV in purchases or transactions.

167. The Cho-Aaron-Carpenter combination, in view of de Geer, renders obvious limitation [2.2].

168. It was well-known in the art that CCV information, such as the information de Geer teaches collecting, would have been used for purchases or transactions. De Geer explains that magnetic stripe information on a **payment card** includes CVV information. EX1007, ¶ 30. Payment cards are swiped during transactions to read the magnetic stripe information on a merchant’s device. EX1007, ¶ 29. CVV information was known as “a cryptograph method to calculate a value that relates to the personal account number (PAN), the card expiration date, and the service code,” (EX1030, 57), information contemplated by both de Geer and Cho. The CVV information is used to indicate whether a card is authentic for transactions. EX1030, 57. Accordingly, a POSITA would have been motivated to read CVV data, according to de Geer (EX1007, ¶¶ 29-30), as part of the account

information read by Cho's card payment system to verify the authenticity of the card being swiped for a transaction, thus *us[ing] the CVV in purchases or transactions*.

169. Thus, Cho in view of de Geer renders obvious this limitation.

C. Ground 3: Claim 3 is rendered obvious over Cho in view of Aaron

170. It is my opinion that the combined teachings of Cho and Aaron disclose or render obvious, to a POSITA, the subject matter of each and every element of claim 3 of the '286 Patent.

1. Analysis

a) Claim 3

171. Claim 3 is a method claim similar to apparatus claim 1. Accordingly, claim 3 is rendered obvious for the same reasons as claim 1. However, to the extent that differences exist between claims 1 and 3, the analysis below provides additional detail explaining how Cho alone or in view of Aaron further renders obvious the method of claim 3. The table below compares claims 1 and 3:

Claim 1	Claim 3
[1.0] An apparatus comprising:	[3.0] A method comprising:
[1.1.1] a card reader having an input interface configured to accept transaction data from an output interface of a transaction card,	[3.1.1] accepting transaction data from a transaction card at an input interface of a card reader having an output pin as a part of the card reader,

Declaration of Bruce McNair Under 37 C.F.R. § 1.68 in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,679,286

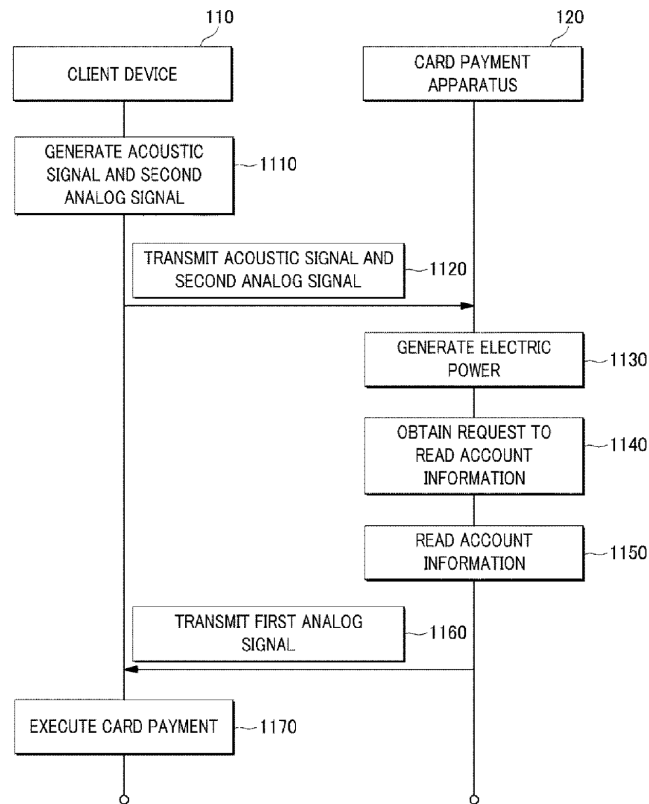
[1.1.2] and an output pin, as a part of the card reader, configured to directly connect the card reader to a microphone port of a smart telephone,	[3.1.2] the output pin directly connecting the card reader in a microphone port of a smart telephone;
[1.1.3] the card reader providing the transaction data accepted from the output interface of the transaction card to the output pin, and hence to the microphone port, as an analog variable voltage audio signal; and	[3.2] receiving the transaction data in the smart telephone as an analog variable voltage audio signal from the microphone port of the smart telephone;
[1.2] coded instructions stored in a non-transitory medium of a first Internet-connected server, and accessible by a user of the card reader;	
[1.3.1] wherein the coded instructions, when executed on a processor in the smart telephone, convert the analog variable voltage audio signal received at the microphone port to the transaction data as digital data,	[3.3] converting the analog variable voltage audio signal received at the microphone port to the transaction data as digital data;
[1.3.2] establish direct data exchange between the smart telephone and a second Internet-connected server and facilitate transactions by a financial institution, or purchases from an online-merchant, using the transaction data.	[3.4] establishing direct data exchange with an Internet-connected server providing services to a financial institution or an on-line merchant by executing coded instructions on a processor in the smart telephone; and facilitating transactions with the financial institution or purchases from the on-line merchant, using the transaction data.

172. As shown in the table, method claim 3 does not include the “*coded instructions stored in a non-transitory medium of a first Internet-connected server*” language found in apparatus claim 1. Because the Carpenter reference is relied on only to show that the “*coded instructions stored in a non-transitory medium of a first Internet-connected server*” element found in claim 1 is well known, references below to the prior analysis of claim 1 are only to portions of grounds 1 and 2 that do not rely on the Carpenter reference.

[3.0] A method comprising:

173. I have been informed that the preamble of claim 3 is not limiting. To the extent that the preamble is limiting, Cho alone or in view of Aaron discloses or renders obvious *a method*. For instance, Cho discloses the process of operations when implementing a card payment system, as shown in Fig. 11, below. EX1005, 2:42-44; 11:48-59.

FIG. 11



EX1005, Fig. 11.

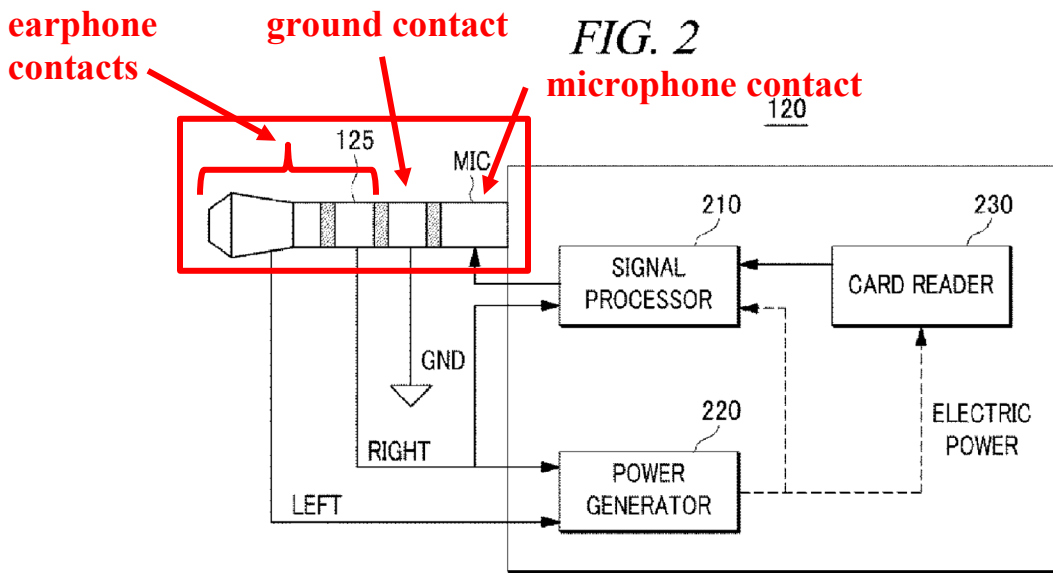
174. Cho and the Cho-Aaron combination explain the processes used by Cho's card payment apparatus to perform transactions. *See* Sections X.C.1.a[3.1.1]-[3.4], *infra*. Accordingly, Cho and the Cho-Aaron combination discloses or renders obvious *a method* as described in further detail below.

[3.1.1] accepting transaction data from a transaction card at an input interface of a card reader having an output pin as a part of the card reader,

175. Cho discloses or renders obvious limitation [3.1.1].

176. **First**, as discussed with respect to limitation [1.1.1], Cho discloses a card payment apparatus 120 (*a card reader*). EX1005, 3:5-7; *see* Section X.A.6.a[1.1.1], *supra*. Cho's card payment apparatus utilizes "a magnetic strip reader that is configured to read information from a magnetic strip of card 130 or an integrated circuit chip reader that is configured to read information from an integrated circuit chip of card 130." EX1005, 4:28-32, 5:58-60, 10:10-14; *see also* EX1005, 3:20-27 ("account information which may be read from a card 130 by card payment apparatus 120"). Both the magnetic strip reader and the integrated circuit chip reader are *input interface[s]* of card reader 120 that use the magnetic strip reader or integrated circuit chip reader to read the account information (*accept[] transaction data*) from the respective interfaces of card 130 (*from a transaction card*). EX1005, 4:28-32, 5:58-60, 10:10-14.

177. **Second**, Cho's card payment apparatus 120 includes audio jack 125 (*an output pin as a part of the card reader*). EX1005, 4:58-60. This is shown in further detail in Fig. 2, below:



EX1005, Fig. 2 (Annotated).

178. Accordingly, Cho's card reader apparatus 120 reads account information from card 130 (*accepting transaction data from a transaction card*) via the magnetic strip reader and the integrated circuit chip reader (*at an input interface of a card reader*), where the card reader includes audio jack 125 (*having an output pin as a part of the card reader*).

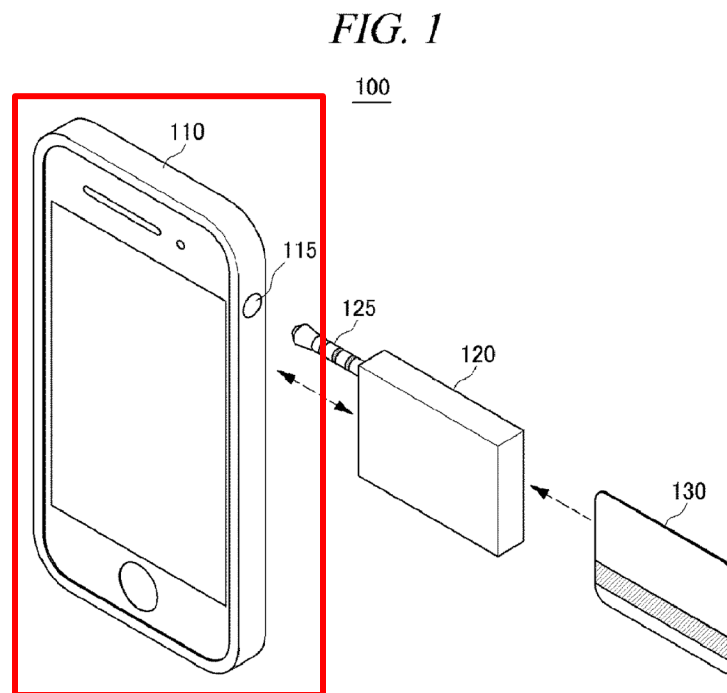
179. Thus, Cho discloses or renders obvious this limitation.

[3.1.2] the output pin directly connecting the card reader in a microphone port of a smart telephone;

180. Cho discloses or renders obvious limitation [3.1.2].

181. As discussed with respect to limitation [1.1.2], Cho's card reader apparatus 120 includes audio jack 125, which "may be inserted into audio jack

socket 115 that is installed on a surface of client device 110” (e.g., *directly connecting the card reader in a microphone port of a smart telephone*). EX1005, 4:60-61; *see* Section X.A.6.a[1.1.2], *supra*. This is further detailed in Fig. 1, below, which depicts client device 110 (*smart telephone*) containing audio jack socket 115 (*microphone port*):



EX1005, Fig. 1 (Annotated).

182. Accordingly, card reader apparatus 120 includes audio jack 125 (*the output pin*), which is inserted into client device 110 via audio jack socket 115 (*directly connecting the card reader in a microphone port of a smart telephone*).

183. Thus, Cho discloses or renders obvious this limitation.

[3.2] receiving the transaction data in the smart telephone as an analog variable voltage audio signal from the microphone port of the smart telephone;

184. Cho discloses or renders obvious limitation [3.2].

185. As discussed with respect to limitation [1.1.3], Cho explains that client device 110 receives account information in the form of an analog signal. EX1005, 3:20-27 (“Client device 110 may be configured to receive, from card payment apparatus 120 via audio jack 125, a first analog signal to which a first digital signal is converted.”); *see* Section X.A.6.a[1.1.3], *supra*. Client device 110 receives information from Cho’s card payment apparatus via audio jack socket 115. *See* Section X.A.6.a[1.1.2], *supra*; *see also* EX1005, 4:60-67 (“Audio jack 125 may be inserted into audio jack socket 115 that is installed on a surface of client device 110...[and] at least one analog signal may be transmitted from card payment apparatus 120 to client device 110 via the microphone contact.”).

186. Accordingly, Cho teaches the receipt of account information by client device 110 (*receiving the transaction data in the smart telephone*) in the form of an analog signal (*as an analog variable voltage audio signal*) via audio jack 125 inserted into audio jack socket 115 (*from the microphone port of the smart telephone*).

187. Thus, Cho discloses or renders obvious this limitation.

[3.3] converting the analog variable voltage audio signal received at the microphone port to the transaction data as digital data;

188. Cho discloses or renders obvious limitation [3.3].

189. As discussed with respect to claim 1, Cho explains the use of components such as card payment executor 1030 to implement a card payment system. EX1005, 10:46-51, Fig. 10. As part of the functionality of card payment executor 1030, Cho describes the conversion of “analog signal into the first digital signal that includes the account information by using any well-known analog-digital converting scheme.” EX1005, 11:35-38. The analog signal that is converted is received by transceiver 1020 from card payment apparatus 120 “via a microphone contact of audio jack 125.” EX1005, 11:27-29.

190. Accordingly, Cho teaches converting an analog signal received via the connection of audio jack 125 and audio jack socket 115 (*converting the analog variable voltage audio signal received at the microphone port*) to a digital signal (*to the transaction data as digital data*).

191. Thus, Cho discloses or renders obvious this limitation.

[3.4] establishing direct data exchange with an Internet-connected server providing services to a financial institution or an on-line merchant by executing coded instructions on a processor in the smart telephone; and facilitating transactions with the financial institution or purchases from the on-line merchant, using the transaction data.

192. Cho alone or Cho in view of Aaron renders obvious limitation [3.4].

193. **First**, Cho uses card payment executor 1030 to “execute a card payment based on the account information between a card payment server which is communicatively coupled to client device 110.” EX1005, 11:40-44. Cho explains that “[t]he card payment server may refer to an organization or entity that provides some type of communication service, data storage service, data or information processing service, content service, or any combination thereof to business customers or consumers,” such as “a financial service provider, a banking service provider, or a credit card service provider.” EX1005, 3:56-4:2.

194. Accordingly, Cho teaches the execution of a card payment (e.g., *facilitating transactions...or purchases*) with a server communicatively coupled to the client device (thus *establishing direct data exchange with an Internet-connected server or an on-line merchant by executing coded instructions on a processor in the smart telephone*) such as a financial service provider or credit card service provider (*financial institution, or...on-line merchant*) using the account information (*using the transaction data*).

195. **Second**, to the extent the Patent Owner argues that Cho does not teach this limitation, Aaron confirms the execution of payments or transactions between a client device and a transaction server. As described above in Section X.A.4, a POSITA would have been motivated to combine Cho and Aaron and would have had a reasonable expectation of success in doing so. *See* Section X.A.4, *supra*.

196. Aaron explains how a wireless payment system, such as Cho's client device 110, communicates with a payment service system using a network. EX1006, ¶ 66. Aaron explains that a customer facing device may receive card information through a card swipe on a connected card reader, and communicate with a payment service system to submit a request for authorization of the transaction. EX1006, ¶ 68.

197. This request for authorization *facilitat[es] transactions by a financial institution, or purchases from an on-line merchant, using the transaction data.* Specifically, Aaron teaches that the payment service system includes a server to handle all "secure information such as credit card numbers, debit card numbers, bank accounts, user accounts, user identifying information or other sensitive information." EX1006, ¶ 69. The server then communicates electronically with card payment networks and banks to authorize transactions. EX1006, ¶¶ 68-70.

198. Accordingly, Aaron teaches communication with a payment service system to submit a request for authorization of the (e.g., *facilitating transactions...or purchases*), using account information captured via a card swipe per Cho (thus *establishing direct data exchange with an Internet-connected server or an on-line merchant by executing coded instructions on a processor in the smart telephone*), to communicate with card payment networks or banks to authorize transactions

(facilitating transactions by a financial institution, or purchases from an online-merchant, using the transaction data).

199. Thus, Cho alone or in view of Aaron renders obvious this limitation.

D. Ground 4: Claim 4 is rendered obvious over Cho in view of Aaron, and de Geer

1. Analysis

a) Claim 4

200. Claim 4 is substantially the same as claim 2, except that claim 4 depends from method claim 3, while claim 2 depends from apparatus claim 1. These similarities are highlighted in the table below:

Claim 2	Claim 4
[2.0] The apparatus of claim 1	[4.0] The method of claim 3
[2.1] wherein the coded instructions, when executed on a processor in the smart telephone, retrieve a card verification code (CVV),	[4.1] wherein the coded instructions, when executed on a processor in the smart telephone, retrieve a card verification code (CVV) from the transaction data received on the microphone port,
[2.2] and use the CVV in purchases or transactions.	[4.2] and use the CVV in the purchases or transactions.

201. To the extent that substantive differences exist between claims 2 and 4, the analysis below provides additional detail explaining how the combination of Cho, Aaron, and de Geer further renders obvious claim 4.

[4.0] The method of claim 3

202. Cho in view of Aaron renders obvious *the method of claim 3*. See Section X.C.1.a, *supra*.

[4.1] wherein the coded instructions, when executed on a processor in the smart telephone, retrieve a card verification code (CVV) from the transaction data received on the microphone port,

203. The Cho-Aaron combination, in view of de Geer, renders obvious limitation [4.1].

204. Limitation [3.4], discussed above, recites “*executing coded instructions on a processor in the smart telephone*” Accordingly, the following analysis of limitation [4.1] interprets the “*processor in the smart telephone*” as corresponding to the processor in limitation [3.4].

205. De Geer teaches “a method of conducting an electronic card payment,” where “payment card information associated with the payment card” is read using a card reader. EX1007, Abstract. As discussed above and confirmed by de Geer, payment card information is ready by a card reader using the card’s magnetic strip. EX1007, ¶ 30. De Geer elaborates on what this information entails, explaining that “read payment card information generally comprises a primary account number

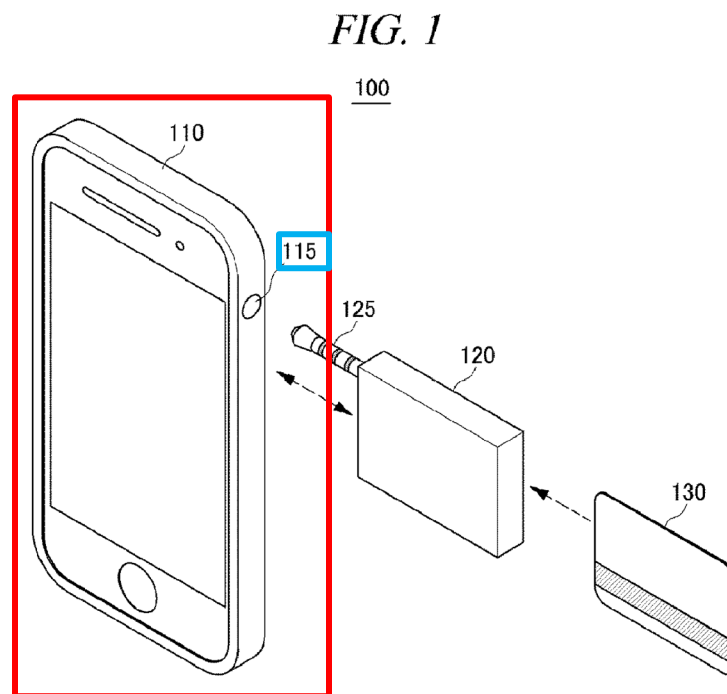
(PAN), the name of the cardholder and but [sic] may also comprise discretionary data. The discretionary data may differ depending on the type of payment card and may be any of a personal identification number (PIN) verification value (PVV), expiry date and a card security code (CSC, also known as CVC, CVV, CVV2, CVD, etc.).” EX1007, ¶ 30.

206. A POSITA would have been motivated to *retrieve a card verification code*, as detailed in de Geer (e.g., CVV), as part of the card information collected from the method disclosed by Cho for claim 3. De Geer explains that “[t]he magnetic stripe on the payment card usually contain up to three tracks with payment card information written in different encodings.” EX1007, ¶ 30. It was well-known that CVV information “can be encoded on either track 1 or track 2 of a magnetic striped card and [is] used to detect forged cards. EX1030, 57. Accordingly, the inclusion of CVV information, per de Geer, as part of the account information read using Cho’s apparatus would allow the method to “execute a card payment based on the account information” where CVV information was required, such as for authentication purposes. EX1005, 1:40-44. And as discussed above in Section X.B.2, a POSITA would have been motivated to combine de Geer with Cho and the Cho-Aaron combination. *See* Section X.B.2, *supra*.

207. Further, Cho teaches that card information (*transaction data*) is *received on the microphone port* of Cho’s smartphone 110. EX1005, 3:20-27

(“Client device 110 may be configured to receive, from card payment apparatus 120 via audio jack 125, a first analog signal to which a first digital signal is converted.”).

Figure 1, below, depicts **client device 110** (*smart telephone*) containing **audio jack socket 115** (*microphone port*):



EX1005, Fig. 1 (Annotated).

208. As discussed in limitation [3.2], Cho teaches the receipt of account information by client device 110 (*receiving the transaction data in the smart telephone*) in the form of an analog signal (*as an analog variable voltage audio*

signal) via audio jack 125 inserted into audio jack socket 115 (*from the microphone port of the smart telephone*). See Section X.C.1.a[3.2], *supra*.

209. Thus, Cho in view of de Geer renders obvious this limitation.

[4.2] and use the CVV in the purchases or transactions.

210. The Cho-Aaron combination, in view of de Geer, renders obvious limitation [4.2].

211. It was well-known in the art that CCV information, such as the information de Geer teaches collecting, would have been used for purchases or transactions. De Geer explains that magnetic stripe information on a **payment card** includes CVV information. EX1007, ¶ 30. Payment cards are swiped during transactions to read the magnetic stripe information on a merchant's device. EX1007, ¶ 29. CVV information was known as "a cryptograph method to calculate a value that relates to the personal account number (PAN), the card expiration date, and the service code," (EX1030, 57), information contemplated by both de Geer and Cho. The CVV information is used to indicate whether a card is authentic for transactions. EX1030, 57. Accordingly, a POSITA would have been motivated to read CVV data, according to de Geer (EX1007, ¶¶ 29-30), as part of the account information read by Cho's card payment system to verify the authenticity of the card being swiped for a transaction, thus *us[ing] the CVV in purchases or transactions*.

212. Thus, Cho in view of de Geer renders obvious this limitation.

XI. AVAILABILITY FOR CROSS-EXAMINATION

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

XII. CONCLUSION

214. I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both. *See* 18 U.S.C. § 1001.

Date: May 16, 2023

Respectfully submitted,



Bruce McNair