

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.
Petitioner

v.

Rally AG LLC
Patent Owner

Case No. IPR2024-01446
U.S. Patent No. 11,361,107

DECLARATION OF LOREN TERVEEN

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I. INTRODUCTION

1. I, Dr. Loren Terveen, have been retained by counsel for Petitioner as a technical expert in the above-captioned case. Specifically, I have been asked to render certain opinions in support of Apple Inc.’s IPR petition, which challenges all claims of U.S. Patent No. 11,361,107 (the “’107 Patent”).

2. My compensation in this matter is not based on the substance of my opinions or the outcome of this matter. I have no financial interest in Petitioner.

3. In writing this declaration, I have considered my own knowledge and experience, including my work experience in the fields of computer science and human-computer interaction; my experience in teaching those subjects; and my experience in working with others involved in those fields, my experience in designing and implementing rule-based agents, communication support systems, user interfaces, and web-based applications. In reaching my opinions in this matter, I have also reviewed the following references and materials:

- Petition for *Inter Partes* Review of U.S. Patent No. 11,361,107 (the “Petition”)
- U.S. Patent No. 11,361,107 (the “’107 Patent”) (Ex. 1001)
- The ’107 Patent File History (Ex. 1002)
- U.S. Patent No. 8,458,264 to Lee, et al. (“*Lee*”) (Ex. 1004)
- U.S. Patent No. 7,783,741 to Hardt (“*Hardt*”) (Ex. 1005)
- U.S. Patent Pub. No. 2016/0323229 to Le Jouan (“*Le Jouan*”) (Ex. 1006)

- Joon S. Park, Hsin-Yang Lu, and Chia-Jung Tsui, *Anti-Spam Approaches: Analyses and Comparisons*, The Open Information Systems Journal 3, 36-47 (2009) (Ex. 1009)
- *Basics: What is a URL?*, <https://zvelo.com/anatomy-of-full-path-url-hostname-protocol-path-more/> (Ex. 1010)
- U.S. Patent Publication No. 2019/0288987 to Paulramachandran et al. (Ex. 1011)
- U.S. Patent No. 7,558,829 to Perlman et al. (Ex. 1012)
- U.S. Patent No. 9,401,886 to Bastide et al. (Ex. 1013)
- U.S. Patent Publication No. 2007/0180039 to Sutidze et al. (Ex. 1014)
- RFC 2822, *Internet Message Format*, The Internet Society, Apr. 2001 (Ex. 1015)

A. Background and Qualifications

4. I have summarized in this section my educational background, career history, and other qualifications relevant to this matter. I have also included a current version of my curriculum vitae in Appendix A.

5. I received a B.A. degree in Computer Science, Mathematics, and History from the University of South Dakota in 1984, followed by a M.S. in Computer Science from the University of Texas in 1988. In 1991, I received a Ph.D., also in Computer Science, from the University of Texas.

6. I am a Distinguished McKnight University Professor at the University of Minnesota in the Department of Computer Science and Engineering, and I have substantial experience with human computer interaction and intelligent systems,

often involving designing software systems and user interfaces, including a number of rule-based communication support systems. I gained this experience well before May 1, 2019, which is the date I have been informed to consider as the invention date for the claims of the '107 Patent at issue in this matter. I was a Member of Technical Staff at AT&T Bell Laboratories from 1991 to 1996, and then a Principal Member of Staff at AT&T Labs – Research from 1996 to 2002. I was honored by the Association for Computing Machinery (ACM) as a Distinguished Scientist in 2009 and served as the president of ACM's Special Interest Group on Computer-Human Interaction (ACM SIGCHI) from 2015-2018, was elected to the ACM SIGCHI Academy in 2019, and received the SIGCHI Lifetime Service Award in 2023.

7. I have taught numerous courses at the University of Minnesota in computer science, human-computer interaction, and user interface design. Additionally, I have published over 150 peer-reviewed articles related to these subjects, a book, contributed chapters in six additional books, and have given over 50 presentations all across the United States and internationally similarly on these topics. My published works revolve around the fields of intelligent systems, computer-mediated communication, user interface design, and social computing. I am also a named inventor on 10 U.S. Patents related to user interfaces, rule-based agents, web-based applications, and methods for selecting and displaying

information to users. My published research and patents have addressed the creation of rule-based agents to support online communication, searching for information on the World Wide Web, creating databases for Web information, and the design and implementation of user interfaces for intelligent systems.

8. I have served as Chair of the leading conferences in Human-Computer Interaction, served on four different editorial boards, and have sat on well over 20 program committees, including multiple times on the ACM Conference on Human Factors in Computing Systems, the ACM Conference on Computer Supported Cooperative Work and Social Computing, the ACM Conference on Recommender Systems, ACM Conference on Intelligent User Interfaces, and the AAAI Conference on Web and Social Media.

II. LEGAL FRAMEWORK

9. I am a technical expert and do not offer any legal opinions. However, counsel has informed me as to certain legal principles regarding patentability and related matters under United States patent law, which I have applied in performing my analysis and arriving at my technical opinions in this matter.

10. I have been informed that the Patent Trial and Appeal Board (“PTAB”) now applies the claim construction standard applied by Article III courts (i.e., the *Phillips* standard) regardless of whether a patent has expired. I have been informed that under the *Phillips* standard, claim terms are to be given the meaning they would

have to a person having ordinary skill in the art at the time of the invention, taking into consideration the patent, its file history, and, secondarily, any applicable extrinsic evidence (e.g., dictionary definitions).

11. I have also been informed that a person cannot obtain a patent on an invention if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. I have been informed that a conclusion of obviousness may be founded upon more than a single item of prior art. I have been further informed that obviousness is determined by evaluating the following factors: (1) the scope and content of the prior art, (2) the differences between the prior art and the claim at issue, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations of non-obviousness. In addition, the obviousness inquiry should not be done in hindsight. Instead, the obviousness inquiry should be done through the eyes of a person having ordinary skill in the relevant art at the time the patent was filed.

12. In considering whether certain prior art renders a particular patent claim obvious, counsel has informed me that I can consider the scope and content of the prior art, including the fact that one of skill in the art would regularly look to the disclosures in patents, trade publications, journal articles, industry standards, product literature and documentation, texts describing competitive technologies,

requests for comment published by standard setting organizations, and materials from industry conferences, as examples. I have been informed that for a prior art reference to be proper for use in an obviousness analysis, the reference must be “analogous art” to the claimed invention. I have been informed that a reference is analogous art to the claimed invention if: (1) the reference is from the same field of endeavor as the claimed invention (even if it addresses a different problem); or (2) the reference is reasonably pertinent to the problem faced by the inventor (even if it is not in the same field of endeavor as the claimed invention). In order for a reference to be “reasonably pertinent” to the problem, it must logically have commended itself to an inventor’s attention in considering his problem. In determining whether a reference is reasonably pertinent, one should consider the problem faced by the inventor, as reflected either explicitly or implicitly, in the specification. I believe that all of the references that my opinions in this IPR are based upon are well within the range of references a person having ordinary skill in the art would consult to address the type of problems described in the Challenged Claims.

13. I have been informed that, in order to establish that a claimed invention was obvious based on a combination of prior art elements, a clear articulation of the reason(s) why a claimed invention would have been obvious must be provided. Specifically, I am informed that, under the U.S. Supreme Court’s *KSR* decision, a combination of multiple items of prior art renders a patent claim obvious when there

was an apparent reason for one of ordinary skill in the art, at the time of the invention, to combine the prior art, which can include, but is not limited to, any of the following rationales: (A) combining prior art methods according to known methods to yield predictable results; (B) substituting one known element for another to obtain predictable results; (C) using a known technique to improve a similar device in the same way; (D) applying a known technique to a known device ready for improvement to yield predictable results; (E) trying a finite number of identified, predictable potential solutions, with a reasonable expectation of success; (F) identifying that known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; or (G) identifying an explicit teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine the prior art references to arrive at the claimed invention.

14. I am informed that the existence of an explicit teaching, suggestion, or motivation to combine known elements of the prior art is a sufficient, but not a necessary, condition to a finding of obviousness. This so-called “teaching suggestion-motivation” test is not the exclusive test and is not to be applied rigidly in an obviousness analysis. In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the

patentee controls. Instead, the important consideration is the objective reach of the claim. In other words, if the claim extends to what is obvious, then the claim is invalid. I am further informed that the obviousness analysis often necessitates consideration of the interrelated teachings of multiple patents, the effects of demands known to the technological community or present in the marketplace, and the background knowledge possessed by a person having ordinary skill in the art. All of these issues may be considered to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent.

15. I also am informed that in conducting an obviousness analysis, a precise teaching directed to the specific subject matter of the challenged claim need not be sought out because it is appropriate to take account of the inferences and creative steps that a person of ordinary skill in the art would employ. The prior art considered can be directed to any need or problem known in the field of endeavor at the time of invention and can provide a reason for combining the elements of the prior art in the manner claimed. In other words, the prior art need not be directed towards solving the same specific problem as the problem addressed by the patent. Further, the individual prior art references themselves need not all be directed towards solving the same problem. I am informed that, under the *KSR* obviousness standard, common sense is important and should be considered. Common sense teaches that familiar items may have obvious uses beyond their primary purposes.

16. I also am informed that the fact that a particular combination of prior art elements was “obvious to try” may indicate that the combination was obvious even if no one attempted the combination. If the combination was obvious to try (regardless of whether it was actually tried) or leads to anticipated success, then it is likely the result of ordinary skill and common sense rather than innovation. I am further informed that in many fields it may be that there is little discussion of obvious techniques or combinations, and it often may be the case that market demand, rather than scientific literature or knowledge, will drive the design of an invention. I am informed that an invention that is a combination of prior art must do more than yield predictable results to be non-obvious.

17. I am informed that for a patent claim to be obvious, the claim must be obvious to a person of ordinary skill in the art at the time of the invention. I am informed that the factors to consider in determining the level of ordinary skill in the art include (1) the educational level and experience of people working in the field at the time the invention was made, (2) the types of problems faced in the art and the solutions found to those problems, and (3) the sophistication of the technology in the field.

18. I am informed that it is improper to combine references where the references teach away from their combination. I am informed that a reference may be said to teach away when a person of ordinary skill in the relevant art, upon reading

the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the patent applicant. In general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the patentee. I am informed that a reference teaches away, for example, if (1) the combination would produce a seemingly inoperative device, or (2) the references leave the impression that the product would not have the property sought by the patentee. I also am informed, however, that a reference does not teach away if it merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into the invention claimed.

19. I am informed that even if a *prima facie* case of obviousness is established, the final determination of obviousness must also consider "secondary considerations" if presented. In most instances, the patentee raises these secondary considerations of non-obviousness. In that context, the patentee argues an invention would not have been obvious in view of these considerations, which include: (a) commercial success of a product due to the merits of the claimed invention; (b) a long-felt, but unsatisfied need for the invention; (c) failure of others to find the solution provided by the claimed invention; (d) deliberate copying of the invention by others; (e) unexpected results achieved by the invention; (f) praise of the

invention by others skilled in the art; (g) lack of independent simultaneous invention within a comparatively short space of time; (h) teaching away from the invention in the prior art.

20. I am further informed that secondary considerations evidence is only relevant if the offering party establishes a connection, or nexus, between the evidence and the claimed invention. The nexus cannot be based on prior art features. The establishment of a nexus is a question of fact. While I understand that the Patent Owner here has not offered any secondary considerations at this time, I will supplement my opinions in the event that the Patent Owner raises secondary considerations during the course of this proceeding.

III. CLAIM CONSTRUCTION

21. I have been informed by counsel that the first step in an unpatentability analysis involves construing the claims, as necessary, to determine their scope. Second, the construed claim language is then compared to the disclosures of the prior art. I am informed that claims are generally given their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of the invention in light of the patent specification and prosecution history, i.e., the intrinsic record. I understand the Petition does not propose any express constructions, so I have applied this ordinary and customary meaning of all claim language in my analyses below.

IV. A PERSON HAVING ORDINARY SKILL IN THE ART

22. I was asked to provide my opinion as to the level of skill of a person having ordinary skill in the art (“POSITA”) of the ’107 Patent at the time of the claimed invention, which I have been instructed to assume is May 1, 2019.¹ In determining the characteristics of a hypothetical person of ordinary skill in the art of the ’107 Patent at the time of the claimed invention, I was told to consider several factors, including the type of problems encountered in the art, the solutions to those problems, the rapidity with which innovations are made in the field, the sophistication of the technology, and the education level of active workers in the field. I also placed myself back in the time frame of the claimed invention and considered the colleagues with whom I had worked at that time.

23. In my opinion, a person having ordinary skill in the art of the ’107 Patent at the time of its filing would have at least a bachelor’s degree in computer science, electrical engineering, computer engineering or equivalent from an accredited academic program with at least two years of work experience with

¹ My opinions provided in this Declaration are made as of the priority date of the ’107 Patent unless expressly stated otherwise. To the extent that any verb tense used in this Declaration or any deposition or testimony provided in this matter is a present tense, e.g., “would understand,” such verb tense should be understood to be my opinion as of the ’107 Patent’s priority date.

electronic communications. A POSITA also would have had an understanding of the privacy concerns relevant to electronic communications. Additional education may substitute for lesser work experience and vice-versa. Such a person of ordinary skill in the art would have been capable of understanding the '107 Patent and the prior art references discussed herein.

24. Based on my education, training, and professional experience in the field of the claimed invention, I am familiar with the level and abilities of a person of ordinary skill in the art at the time of the claimed invention. Additionally, I met at least these minimum qualifications to be a person having ordinary skill in the art at least as of May 1, 2019. Further, although my qualifications may exceed those of the hypothetical person having ordinary skill in the art defined above, my analysis and opinions regarding the '107 Patent have been rendered from the perspective of a person having ordinary skill in the art at the time of the invention.

V. OVERVIEW OF THE TECHNOLOGY

25. The features described and claimed in the '107 Patent were routine as of May 1, 2019. In the following paragraphs, I briefly summarize the technology background for a few key features relevant to the opinions set forth herein.

26. Email aliasing systems (remailers) have been used for decades and have incorporated many features, including email filtering:

Gburzynski and Maitan proposed the remailer approach for limiting spam in 2004 []. The main idea of this approach is to set a program called remailer between senders and recipients to forward each other's e-mail. A user is allowed to set up an unlimited number of aliases of his or her permanent e-mail address to be protected. The aliases are handed out to other users willing to communicate with the owner of the aliases. A user is able to set up the validity of his or her alias based on a specific time period, number of received messages, population of senders, or in other ways.

Ex. 1009, 38-39. It was understood that “[s]ince the use of aliases is compatible with the existing e-mail infrastructure, it can be easily integrated with other anti-spam techniques.” *Id.*, 38. “For example, filtering can be used with aliases. Each alias can have a different filtering setting based on its specific purpose.”

27. Filtering can use a whitelist, where “e-mails from those senders defined in the whitelists are considered to be legitimate messages.” *Id.*, 37. Whitelists can be used to restrict each alias to specific senders. “By restricting each alias to specific senders (people who want to communicate with the owner of the alias), the chance of these aliases being used for spamming is greatly reduced.” *Id.*, 38.

A. Separate Aliases for Incoming and Outgoing Emails

28. Aliasing systems using separate aliased incoming and outgoing emails to protect user anonymity were well known prior to the priority date of the '107 Patent. U.S. Patent Publication No. 2018/0288987 to Paulramachandran et al. (Ex.

1011) discloses an email aliasing system designed to accommodate merchant and consumer emails:

Senders 10 and recipients 14 (e.g., consumers and/or providers) may subscribe to or otherwise identify themselves to a host 12 through registration, or other information gathering process. In some embodiments, the host 12 may be operated by a promotion and marketing service or other third party intermediary.

Ex. 1011, [0039]. Information related to the sender and recipient “may be stored at the host 14 in the form of a user profile.” *Id.*

29. Upon a request, “[t]he host 12 may generate and assign a first transaction address to the sender and a second transaction address to a recipient 14.” *Id.*, [0045]. For example, “first transaction address: 4868985506@hostcompany.com [and] second transaction address: 212700048@hostcompany.com.” *Id.*, [0046]. “Each transaction address includes a domain (hostcompany.com) associated with the company (e.g., promotion and marketing service) that operates host 12.” *Id.*, [0047].

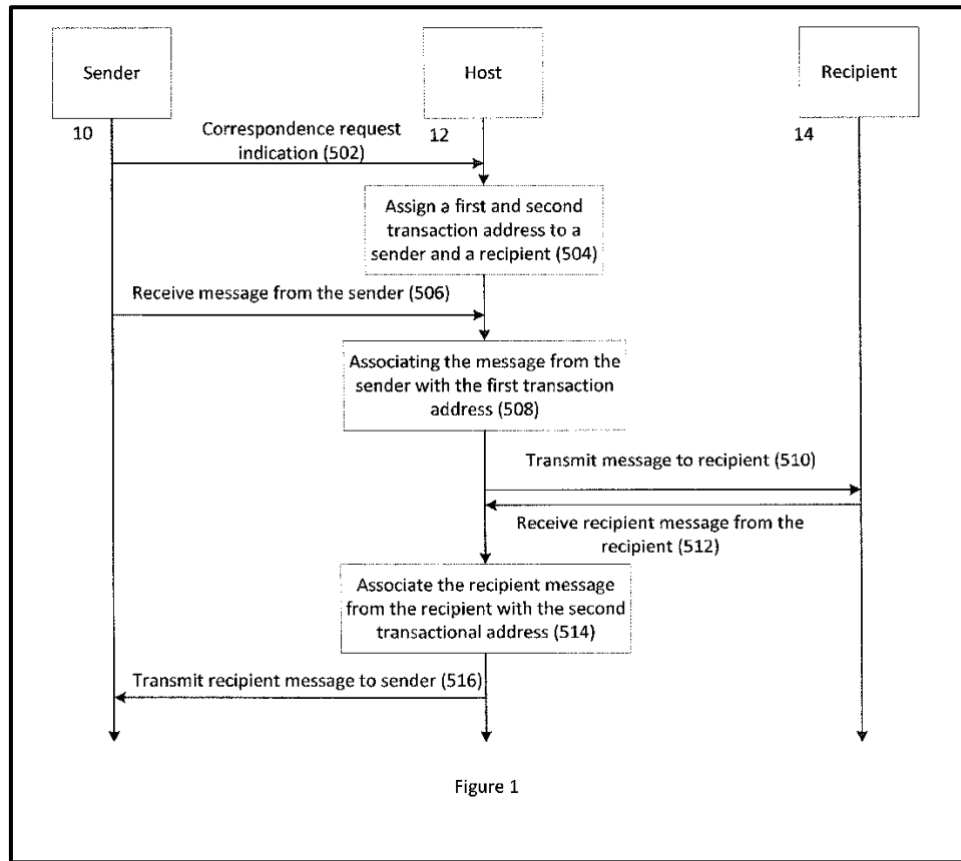
30. When a sender emails a recipient, aliases for both the sender and recipient may be used to protect private addresses:

The host 12 may identify the sender’s email address (e.g. consumer1234@groupon.com) and associated transactional address (e.g. 315141921135226917@hostcompany.com) and ***substitute the sender’s email address with the sender’s transactional address.*** The

host 12 may identify the transactional address and associated recipient's email address and ***substitute the recipient transactional address (e.g. 116181522945230250@hostcompany.com) with the recipient's email address (e.g. provider4567@groupon.com).*** Therefore, allowing the recipient to receive the message at their respective email application and ***maintain the anonymity of the sender and sender email address, respective to the recipient and the anonymity of the recipient and recipient email address, respective to the sender.***²

Id., [0059]. FIG. 1 visualizes transactions between a sender 10 and recipient 14 using host 12 as an intermediary.

² All emphases added unless noted otherwise.



Id., FIG. 1.

B. Associating a URL to an Email Aliasing Profile

31. Associating a website to an alias email address was known prior to the priority date of the '107 Patent. U.S. Patent No. 7,558,829 to Perlman et al. (Ex. 1012) discloses an aliasing system where a user establishes an account on a DEA server 100, allowing the “end user [to] specif[y] a base email name/address, and associate[] the base email name/address with his/her home email address.” Ex. 1012, 2:29-31. The user can create different disposable email address in “following format: myaccount-extension@deamail.com, where ‘myaccount’ represents the users ‘base’

email name and ‘extension’ represents an extension to the base email name[.]” *Id.*, 2:24-27. A user can create a new disposable email for different websites: “For example, when the user purchases an item from an e-commerce Website 140 such as Amazon.com®, the user may provide a DEA server email address with an extension that uniquely identifies the e-commerce Website (e.g., myaccount-amazon@deamail.com).” *Id.*, 2:46-51. In one embodiment, the URL associated with a website is stored and used to implement the email functionalities:

DEA plugin 124 maintains an up-to-date list of the current base-extension combinations selected by the end user (e.g., ‘myaccount-amazon,’ ‘myaccount-bestbuy,’ ... etc). After a particular extension is recorded, *the DEA plugin 124 may detect when user returns to a particular Website (e.g., based on the secondary domain name such as ‘amazon’ within the amazon.com Web address)*, and automatically provide the user with the correct base-extension for that site.

Id., 3:46-53.

C. Identifying and Masking Personal Information in Electronic Messages

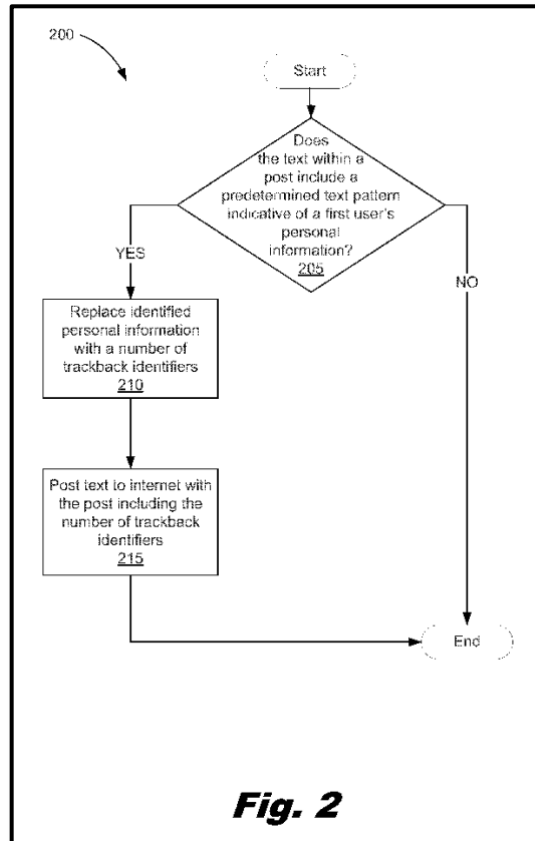
32. It was known at the time of the priority date of the ’107 Patent that a user’s personal information could be aliased to protect the user’s anonymity. For example, U.S. Patent No. 9,401,886 to Bastide et al. (Ex. 1013) discloses a “system for replacing personal information in an internet post with a number of trackback

identifiers[.]” Ex. 1013, 1:43-45. Specifically, a method is disclosed for preventing personal information from being disclosed:

The method may begin with determining (205) whether the text within a post includes a predetermined text pattern. As briefly discussed above the predetermined pattern in the text may include a series of letters and numbers that define a telephone number, a physical address, internet address, a social security number, or even a uniform resource locator.

If the system (100) determines (205) that the text does not include a predetermined text pattern (No decision, 205) the process ends and the text is posted to the intended website on the Internet. ***When the system (100) determines that the text within a post includes a predetermined text pattern (Yes determination, 205), then the traceback generation module (125) replaces (210) the identified text with traceback identifier.*** After the identified text has been replaced (210) with the traceback identifier, the system (100) may post (215) the text to the website with the text now including the traceback identifier.

Id., 4:65-5:15.



Id., FIG. 2.

33. Additionally, it was understood that text strings could be replaced in the body of emails. For example, U.S. Patent Publication No. 2007/0180039 to Sutidze et al. (Ex. 1014) discloses “employing anonymous disposable email addresses of the email user associated with one or more third party email users to minimize email spam.” Ex. 1014, Abstract. A channel management server (CMS) “determines an anonymous disposable email address, associates the anonymous disposable email address with the intended recipient’s email address, and stores the user’s option to either send the email message anonymously or disclose the user’s

base email address, on the CMS 104.” *Id.*, [0032]. When a user desires to send an anonymous email, information in the body of the email is removed to prevent the user’s email address from being revealed:

[T]he user’s base email address, ***in the header and body of the email message, is removed and replaced with the anonymous disposable email address stored by the CMS*** and associated with the communication channel associated with the intended recipient’s email address. The email message is then routed to the intended recipient 108 only utilizing with the disposable email address, thereby maintaining the confidentiality of the user’s base email address.

Id. Removing the user’s base email in the body of the email prevents a third party from seeing the email in the headers generally included in the body of an email chain.

VI. THE ’107 PATENT AND ITS PROSECUTION

A. The ’107 Patent’s Alleged Invention

34. The ’107 Patent is generally directed to an email system capable of protecting an end user’s (e.g., a consumer’s) personal information from being revealed to a relying party (e.g., a merchant).³ Ex. 1001, Abstract. The described

³ The ’107 Patent refers to the user who seeks to protect his or her personal information as an “end user” and the entity that emails the end user as a “relying party.” Because the patent often uses the example of a potential customer receiving marketing emails from a merchant, consistent with the Petition, I will use

system comprises an ID cloaking system that “serves as an intermediary between the end user’s email system and the relying-party’s email system.” *Id.*, 4:5-8. The ID cloaking system provides consumers with a cloaked address they can provide to a merchant. *Id.*, 6:7-14. When the ID cloaking system receives an email sent to this cloaked consumer address, it processes the email and sends it to the consumer’s personal email address, hiding the consumer’s actual (i.e., non-cloaked) email address from the merchant. *Id.*, 12:1-12. In addition to hiding the consumer’s actual email address from the merchant, the ID cloaking system creates a cloaked merchant address and inserts this cloaked address in the “from” field when the message is passed along to the consumer. *Id.* As a result, if the consumer responds to the email, the ID cloaking server will receive the reply and will replace the consumer’s actual email address with a cloaked address before sending the reply to the merchant. *Id.*, 12:17-64.

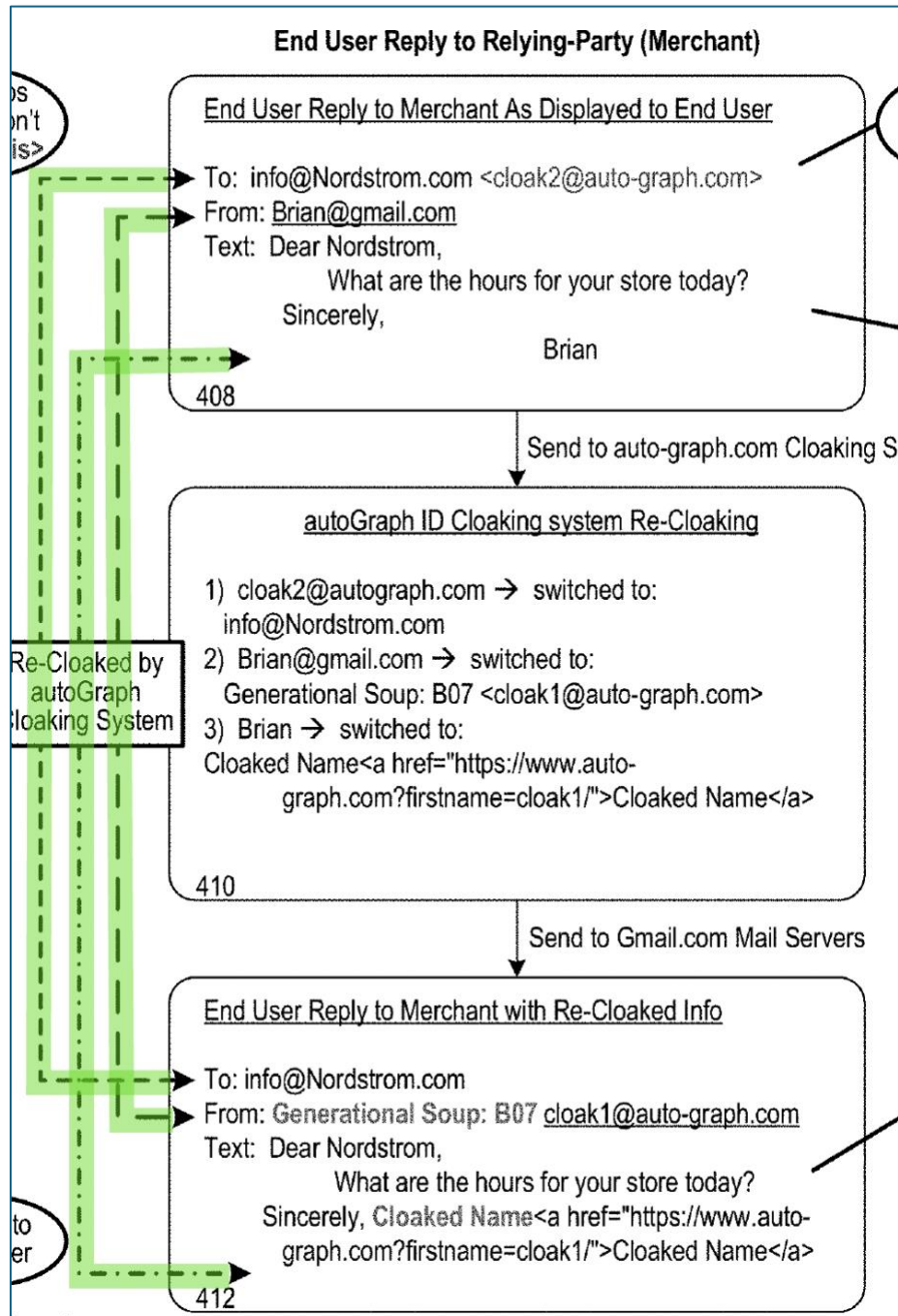
35. The ’107 Patent teaches that a consumer creates a profile with the ID cloaking system that allows the consumer to “specify what information she wants to keep confidential from others[.]” *Id.*, 7:60-64. This information is stored on the profile along with the consumer’s actual email address, cloaked values, and the

“consumer” interchangeably with “end user” and “merchant” interchangeably with “relying party.”

associations between the cloaked values and the consumer's actual information. *Id.*, 11:4-17.

36. The ID cloaking system is capable of “cloaking” and “decloaking” information found in emails to and from the consumer. *Id.*, 6:42-49. As an example of cloaking, when the ID cloaking system receives emails from the consumer's email system to the merchant's email system, it *cloaks* the private information of the consumer by swapping this information with cloaked values before routing the email to the merchant. *Id.*, 4:16:21. And, as an example of de-cloaking, when an email is sent from the merchant to the consumer, the private information is *de-cloaked* by the ID cloaking system (returned to the actual values) before being delivered to the consumer's actual email address. *Id.*, 4:32-39.

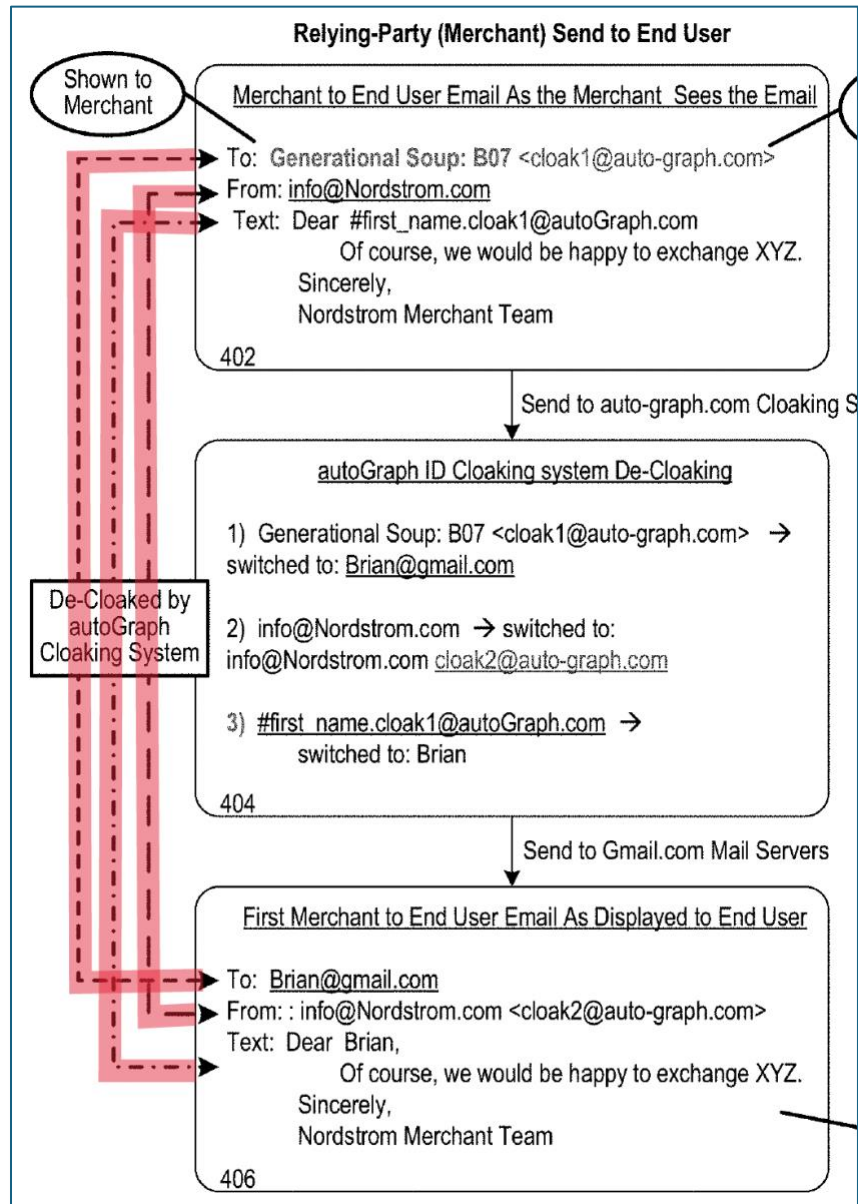
37. FIG. 4 illustrates the ID cloaking system cloaking (or re-cloaking) emails sent from a consumer to a merchant. In this example, the consumer's email address, brian@gmail.com, is replaced with a cloaked consumer address, cloak1@auto-graph.com. *Id.*, 12:54-64. The cloaked merchant email address, cloak2@auto-graph.com is replaced with the merchant's email address info@nordstrom.com. *Id.*, 12:64-66. Finally, the consumer's first name, Brian, is also cloaked when the system replaces it with the cloaked placeholder, “Cloaked Name.” *Id.*, 12:54-64. The **green arrows** illustrate which data fields are modified by the ID cloaking system:



Id., FIG. 4 (annotated).

38. When the system receives an email from a merchant, the ID cloaking system decloaks the information in the manner shown below. The cloaked consumer

email, cloak1@auto-graph.com is replaced with the consumer's personal email, Brian@gmail.com. *Id.*, 11:32-35. The merchant email address info@nordstrom.com is replaced with the cloaked merchant address cloak2@auto-graph.com. *Id.*, 11:56-57. Finally, the cloaked name placeholder is replaced with the consumer's name, Brian. *Id.*, 11:46-51. As with the example above, the red arrows illustrate which data fields are modified by the ID cloaking system:



Id. at FIG. 4 (annotated).

39. In certain embodiments, the consumer may use the email cloaking system to contact a merchant via a webform, initiating contact without revealing the consumer's actual/private email address. *Id.*, 7:42-57. In this scenario, the ID cloaking system generates an association between the URL of the webform and the

cloaked consumer email address. *Id.*, 8:58-65. When an email is received from a merchant email address, the ID cloaking system identifies a consumer profile associated with the cloaked consumer email address and any merchant URLs associated with that profile. *Id.* In one example, storing merchant URLs in a consumer profile allows the consumer to identify unauthorized/unwanted merchants using a cloaked email the consumer created for a more limited use. *Id.*, 18:53-59 (“[I]f the end user notices that a cloaked email address she created with one merchant (related to the merchant email/URL when created etc.) is being misused, she can cancel, disable or delete the cloaked email address.”).

B. The ’107 Patent’s Prosecution

40. I have been informed that the ’107 Patent issued from U.S. Application Serial No. 16/865,053 (the “’053 Application”), filed on May 1, 2020, which claims priority to two provisional applications, Provisional Application No. 62/841,726 filed on May 1, 2019 and Provisional Application No. 62/850,459 filed on May 20, 2019. ’107 Patent (Ex. 1001). I have been asked to assume that May 1, 2019 is the priority date for the Challenged Claims.

41. I note that the ’107 Patent was allowed without an office action. In the Notice of Allowance, the Examiner cited a single prior art reference, U.S. Patent Application No. 2017/0032344 to Attolini et al. (“Attolini”), noting Attolini failed to teach the claimed subject matter. Ex. 1002, 43.

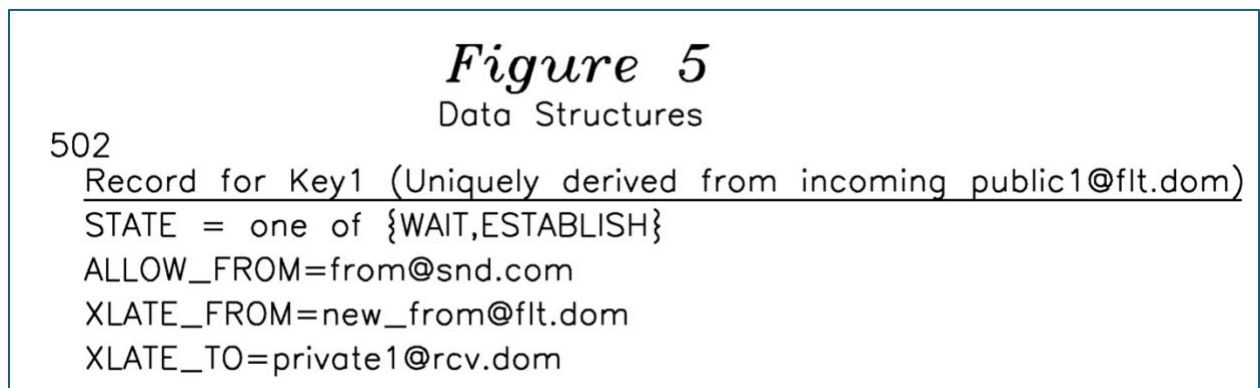
VII. OVERVIEW OF THE PRIOR ART

A. Overview of *Lee*

42. Lee describes an email proxy server that protects a user's private email address from receiving unwanted messages by generating and managing proxy emails. *Lee*, Abstract, 1:61-2:14. In a first step, the user requests a proxy email from the server that the user can provide to a third party. *Id.*, 2:36-45. Once a proxy is generated and provided by the user to a third party, the email proxy server receives and forwards emails sent to the proxy email according to a filter/translate algorithm. *Id.*, 4:46-51, 6:48-52.

43. Lee teaches that a user profile is generated when the user creates an email alias. Namely, first data structure 502 is “generated upon registration of a user private email address ... addressable using a first key[.]” *Lee*, 6:10-12. The first key

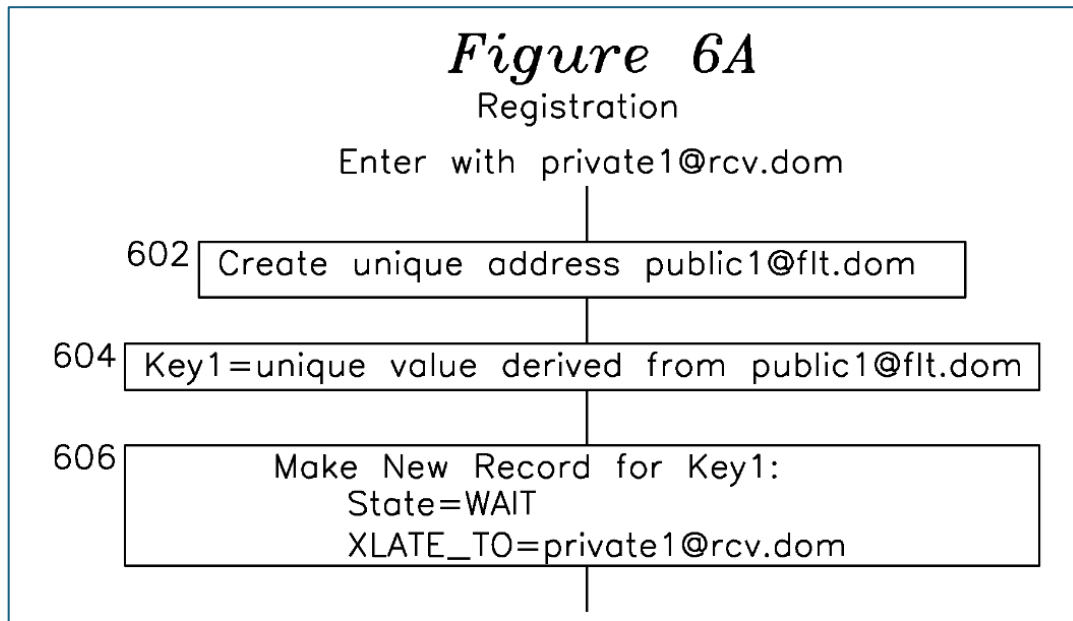
is associated with a public email address and contains a record⁴. *Id.*, 6:9-14, FIG. 5. The key 1 record is stored “using either a database with database records, or they may be stored in a lookup memory such as any random access memory (RAM), a disk file, or in any manner known for maintaining records.” *Id.*, 7:44-47. The key 1 record contains various fields, including those illustrated in FIG. 5:



Lee, FIG. 5 (cropped to show the key 1 record).

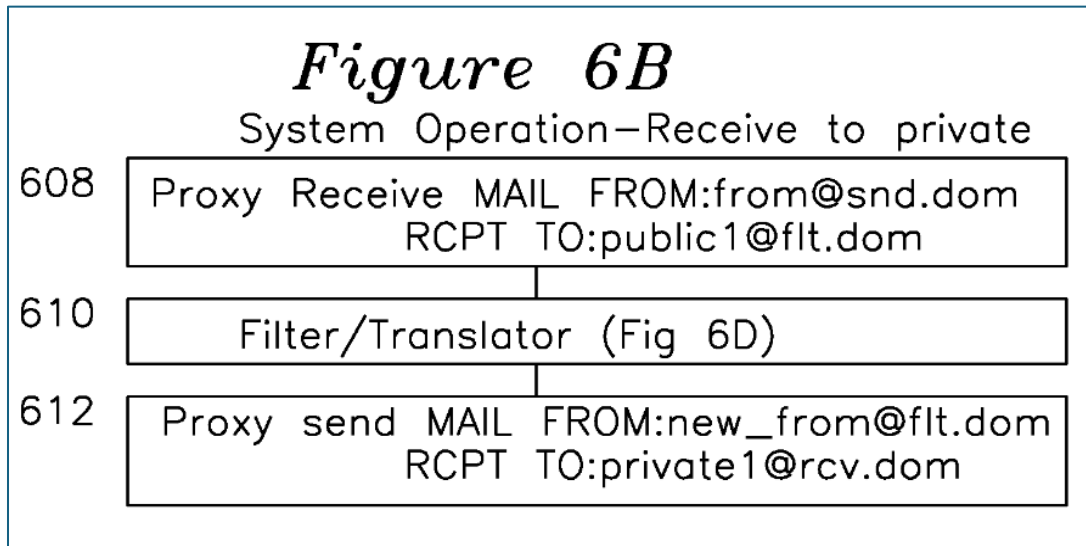
⁴ The first key is a unique value derived from the public email address generated in step 604 of FIG. 6A. The first key has a record that contains fields and associated values. For simplicity, when my opinion refers to the “key 1 record” it is referring to the information contained within and associated with the first key, including the public address used to generate the unique key and the entire record of the key. This key 1 record includes at least the public address (i.e., the user’s alias email address), the private email of the user stored in an XLATE_TO field, and a STATE field with a value. Other fields, including ALLOW_FROM and XLATE_FROM, are eventually populated and stored within the key 1 record, but they do not contain a value at initialization.

44. When the key 1 record is initially created, it includes two important data fields initialized as follows: the STATE field is set to “WAIT” and the XLATE_TO field is the user’s private email address.



Id., FIG. 6A, 6:33-37 (describing the same).

45. As illustrated in Fig. 6B, when an email is received to the public email address associated with the key 1 record (e.g., the generated alias email address, public1@flt.dom), a filter/translator process is run by the email proxy server prior to the proxy sending the email to the user’s private address (e.g., private1@rcv.dom):



Id., FIG. 6B, 6:47-52 (describing the same).

46. In the filter/translate step, the server first checks the STATE value in the key 1 record to determine if the alias email has been contacted before. If the value is WAIT, it indicates that no prior emails have been received to the associated alias email:

If a record for the associated public email address exists and ***the STATE value is WAIT*** 654, ***this indicates that the user has registered this public email address, but it has not been used yet***, so the record contains only STATE=WAIT and XLATE_TO=private1@rcv.dom, which were initialized at the time of registration of the public email address, as described in FIG. 6A.

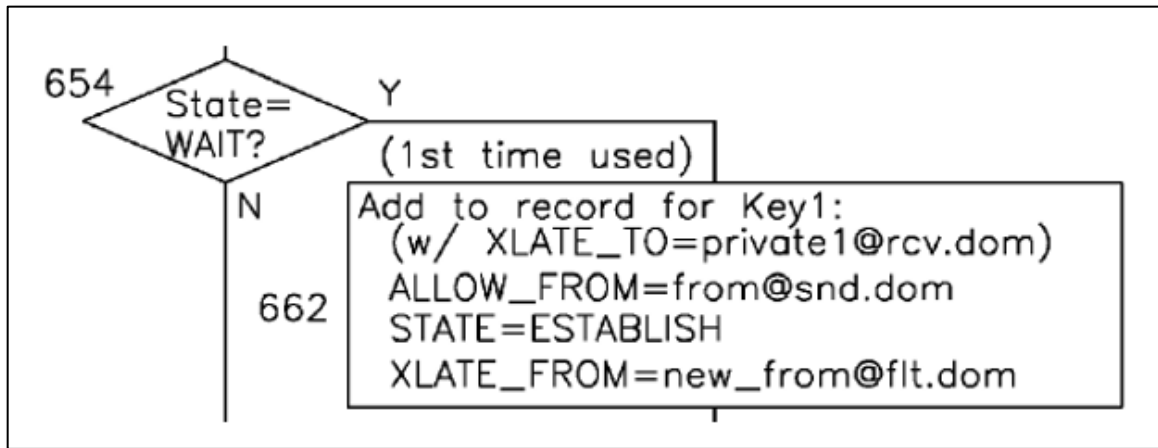
Id., 7:1-7. Upon detecting that the alias has never before been used, an alias email address is generated for the sending party (e.g., new_from@flt.dom), the sending party's email is optionally stored in the key 1 record and the state is updated to

ESTABLISH, which indicates to the system moving forward that the user's email alias has been previously used and that a sender alias has been previously generated:

In step 662, the XLATE_FROM value is updated with a unique value, shown as "new_from@[flt].dom",⁵ and an optional field ALLOW_FROM is initialized with the sender's email address, shown as "from@snd.dom". The STATE value is updated to ESTABLISH, which indicates that the public address is ready to process the first and any subsequent emails directed to it.

Id., 7:7-13. This process of updating the user profile in response to receiving a first email is depicted in the Fig. 6D excerpt below:

⁵ The specification incorrectly states that the newly generated sender alias is new_from@snd.dom. As illustrated in Fig. 6D, and consistent with the remainder of the disclosure, a POSITA would understand that the alias should instead be new_from@flt.dom, using the "flt.dom" domain Lee associates with all aliases generated by its system. For Lee to operate as described, the sender alias must correspond to the email alias server. This is mandatory because only the email alias server in Lee is capable of converting between public email alias addresses and actual private email addresses. Accordingly, the sender alias in Lee's system must have an "flt.dom" email address.



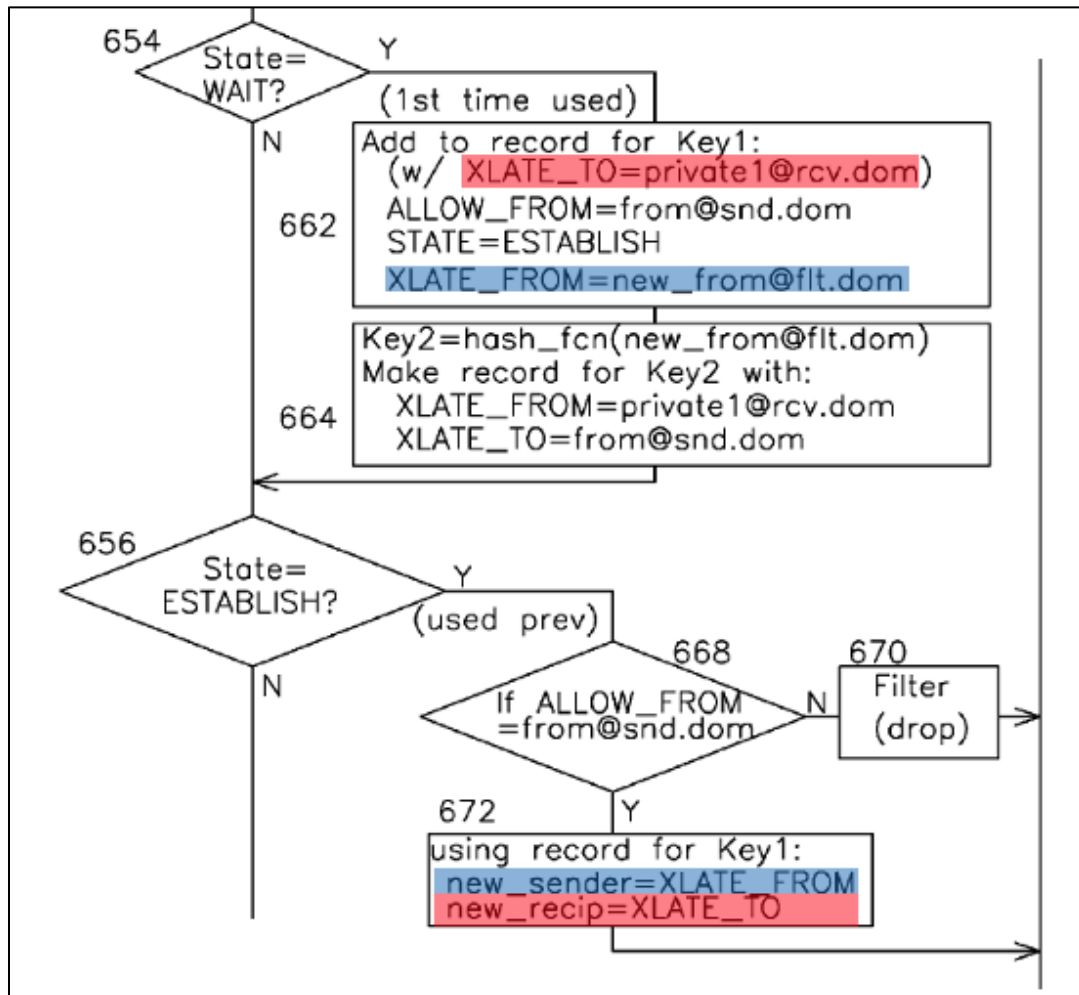
Id., Fig. 6D (excerpt).

47. With a sender alias generated and stored in Key1, the system then passes the email to the intended recipient by (1) checking to ensure the sender is allowed, (2) replacing the recipient's alias with her private email address in the "to" field, and (3) replacing the sender's private email address with the newly generated sender alias in the "from" field:

If the record for the key associated with the public email address as [sic] STATE=ESTABLISH 656, the associated ALLOW_FROM field is compared 668 with the sender address, and if there is no match, the message is filtered 670, otherwise ***the translation fields XLATE_FROM and XLATE_TO associated with the received public address*** (first key) are extracted from the associated record, and these fields ***are used for the new_sender and new_recipient address translations***, respectively.

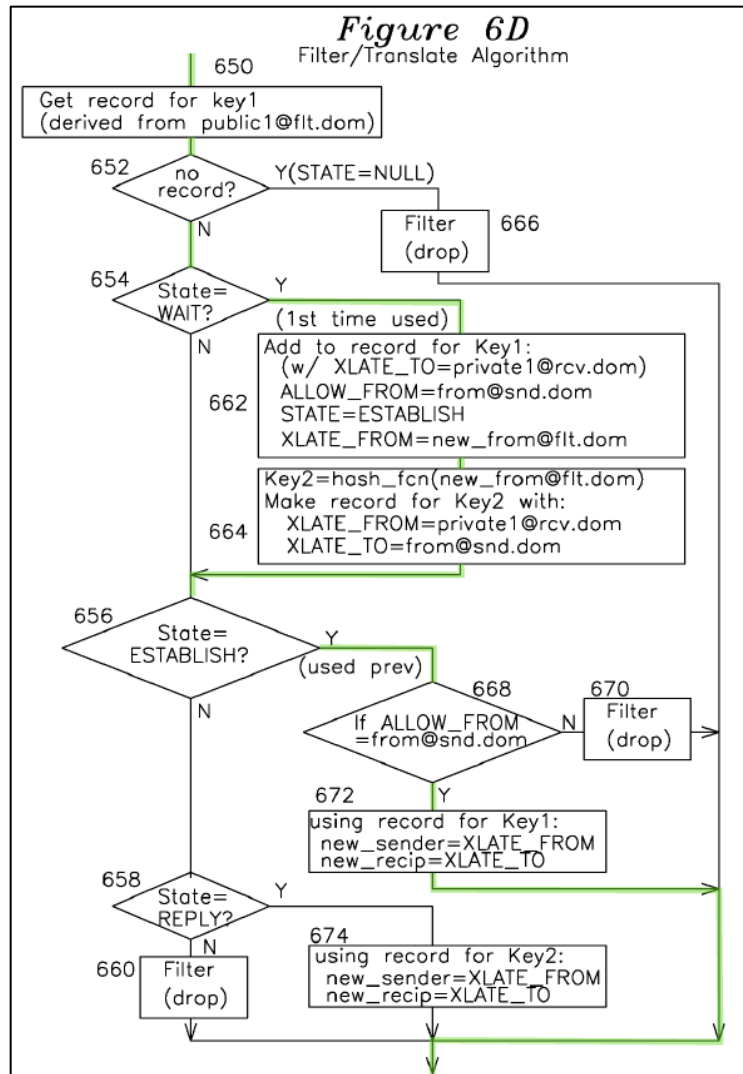
Id., 7:27-35. The annotated FIG. 6D excerpt below illustrates the process of translating both the sender and recipient emails prior to forwarding the message to

the recipient, ensuring the sender/from field is populated with the newly generated sender's alias and the recipient/to field is populated with the user's private address:



Id., Fig. 6D (excerpt and annotated).

48. The full Fig. 6D below, illustrates the complete filter/translate algorithm that is performed when the first email to a user's alias is generated:



Id., FIG. 6D (annotated).

49. Because Lee, like the '107 Patent, discloses an email alias system, Lee is in the same field of endeavor as the '107 Patent. *Compare* '107 Patent, 4:5-15, 4:44-54 (describing an ID cloaking system that acts as an intermediary by substituting email addresses as emails are sent between the consumer and merchant), *with* Lee, 3:33-4:11 (describing an email proxy server that translates sender and recipient addresses as emails are sent between the user and a third party).

50. Further, the '107 Patent and Lee are both directed to the problem of protecting user privacy in email communications. *Compare* '107 Patent, Abstract (the disclosure protects privacy for the end user by allowing email communications without providing the other party with information such as an email address or name) *with Lee*, 6:53-64 (the end user's privacy is preserved by replacing email fields with alternate values). Accordingly, Lee is analogous art to the '107 Patent.

B. Overview of *Hardt*

51. *Hardt* is directed to a method and system of automated pseudonymous email address (also called an alias) generation and creation to prevent unsolicited email messages from reaching a user. *Hardt*, Abstract. Relevant to the Proposed Grounds, *Hardt* creates aliases “for web pages, mailing lists, untrusted recipients and online forms” and “creat[es] rules that determine the routing associated with the alias.” *Id.*, 8:32-36.

52. Users can complete a webform to initiate the email alias process. *Id.*, 19:67-20:4. When an alias is generated pursuant to the webform embodiment, the “form filler provides the URL of the form in which the information will be entered, so that the alias generator 100 can store the information to later determine if privacy policies have been breached.” *Id.*, 20:4-9. This privacy policy enforcement mechanism allows the system to ensure emails originating from senders unaffiliated with the stored URL can be rejected. *Id.*, 15:2-6 (“[A]lias generator 100 obtains,

either directly from the plug-in, or from the website privacy policy, a set of email addresses that mail will be received from, so that any message received from another address can be discarded.”).

53. Because Hardt, like the '107 Patent, discloses an email alias system, Hardt is in the same field of endeavor as the '107 Patent. *Compare* '107 Patent, 4:5-15, 4:44-54 (describing an ID cloaking system that acts as intermediary by substituting email addresses as emails are sent between the consumer and merchant), *with Hardt*, 5:21-42 (describing a pseudonymous email address creator that creates a pseudonymous email address and replaces the users address with the pseudonymous email when emails are sent to a third party).

54. Further, the '107 Patent and Hardt are both directed to the problem of protecting user privacy in email communications. *Compare* '107 Patent, Abstract (the disclosure protects privacy for the end user by allowing email communications without providing the other party with information such as an email address or name) *with Hardt*, Abstract (the disclosure teaches the use of pseudonymous email addresses to prevent unsolicited emails from reaching the user). Accordingly, Hardt is analogous art to the '107 Patent.

C. Overview of *Le Jouan*

55. Le Jouan published on November 3, 2016 and is prior art to the '107 Patent under 35 U.S.C. § 102(a)(1). Le Jouan was not cited or considered during the '107 Patent's prosecution.

56. Le Jouan is directed to protecting personal information by generating entity-specific aliases for use in communications with third parties. *Le Jouan*, Abstract. In one embodiment relevant to my opinion, Le Jouan discloses an alias-aware email server system. *Id.*, [0136], FIG. 5. The email server system contains an email personalization engine 514 and an email server 504. *Id.*, [0144]. When a user sends an email to a third party, the email personalization engine 514 “can remove sensitive information [and] replace the sensitive information with dummy values or aliases, or the like.” *Id.*, [0144]. Le Jouan specifies sensitive information “is intended to mean personal information that is useful for contacting or identifying the user outside of the system [], such as an email address, a physical address, a phone number, or the like.” *Id.*, [0077]. This email personalization engine also performs standard email alias functionalities, including replacing “the user’s email alias . . . with the user’s actual email address” when a third party sends an email to the user. *Id.*, [0145].

57. Because Le Jouan, like the '107 Patent discloses an email alias system, Le Jouan is in the same field of endeavor as the '107 Patent. *Compare* '107 Patent,

4:5-15, 4:44-54 (describing an ID cloaking system that acts as an intermediary by substituting email addresses as emails are sent between the consumer and merchant), *with Le Jouan*, [0144]-[0145] (describing an email personalization engine that swaps a user email address with an email alias when emails are sent to or from the user).

58. Further, the '107 Patent and *Le Jouan* are both directed to the problem of protecting user privacy in email communications. *Compare* '107 Patent, Abstract (the disclosure protects privacy for the end user by allowing email communications without providing the other party with information such as an email address or name) *with Le Jouan*, Abstract (“Protecting personal information by generating entity-specific aliases for use in communication with third parties is disclosed”). Accordingly, *Le Jouan* is analogous art to the '107 Patent.

VIII. GROUND 1: OPINIONS REGARDING LEE

A. Claim 13⁶

[13(P)] A non-transitory computer readable medium for a ID cloaking system having instructions stored thereon that are executable by processor electronics to:

59. To the extent the preamble is limiting, Lee discloses this feature or at least renders it obvious. Lee discloses an email proxy server (“ID cloaking system”)

⁶ The independent Challenged Claims are largely similar in scope, but independent Claim 13 lacks the URL limitations recited in Claims 1 and 7. Ground 1 maps the prior art to broader independent Claim 13, and the subsequent grounds capture the URL concepts of the narrower independent claims and their dependents.

that allows a user to create a public/alias email address. *Lee*, 6:33-46. A key 1 record is generated upon creating the alias that includes the user's private email address, the newly generated alias, and additional information that is populated as the public email alias is used. *Id.*, 3:33-45. A filter/translate algorithm ("instructions") on the email proxy server processes and modifies emails sent to the public email address, allowing the user to receive communications from third parties without revealing the user's private email address. *Id.*, 6:9-26.

60. Lee acknowledges standard server electronics for the system, including that the key values generated by the system are stored in a "database with database records, or they may be stored in a lookup memory such as any random access memory (RAM), a disk file, or in any manner known for maintaining records." *Id.*, 7:43-47. Lee does not expressly describe that these processor electronics are used for executing its filter/translate algorithm or the specific memory on which the filter/translate algorithm is stored. However, a POSITA would have understood that this RAM or disc file constitutes a non-transitory computer readable medium and would further have understood or at least found it obvious that Lee's filter/translate algorithm is stored on this same or similar memory within the email proxy server. Indeed, email servers such as that described by Lee are widely understood to be general purpose server platforms on which software-based algorithms are used to route and process electronic communications. A POSITA would have understood or

at least found obvious from Lee's teachings that its filter/translate algorithm is merely software running on a general server and that data generated by Lee's server (e.g., key 1 records for generated aliases) would also be stored in memory on the same server.

[13(a)] receive an email addressed to a cloaked end user address, wherein the email is sent from a relying party email address, and wherein the domain of the cloaked end user address and the domain associated to the cloaked ID system are the same domain;

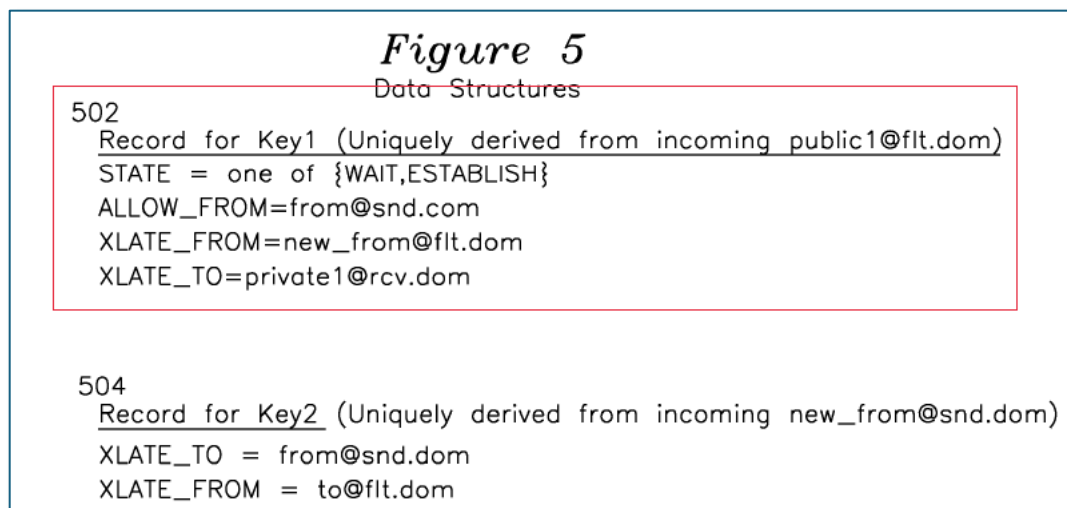
61. Lee discloses this limitation, teaching an ID cloaking system that shares its domain with the cloaked consumer email addresses it generates.

62. Lee discloses a user providing their private email address during registration to create a public email address ("cloaked end user address"), which has the domain of the email proxy server, for communication with a third party. *Lee*, 6:9-26, 2:36-45. A key 1 record is created that contains the public email address, private email address, and other information. *Id.*, 6:33-46. When a third party sends an email from its email address ("relying party email address") to the public email address, the email proxy server receives the email, runs a filter/translate algorithm to modify the key 1 record, and sends the email to the user. *Id.*, 6:47-52.

63. In the relevant embodiment, a first data structure 502 (key 1 record) "is generated upon registration of a user private email address, and is addressable using a first key, which may be generated from the public email address associated with

the record[.]” *Id.*, 6:10-13, FIG. 5. This public email address is “a cloaked end user address” since the public address is not the end user’s private email and is provided to a sender in order to contact the end user. *Id.*, 4:47-51.

64. The key 1 record contains fields that include STATE, ALLOW_FROM, XLATE_FROM, and XLATE_TO, each of which can have values set and updated by the email proxy server. *Id.*, 6:40-46, 7:7-13. FIG. 5 illustrates the information stored in the record of the first key, outlined in red.



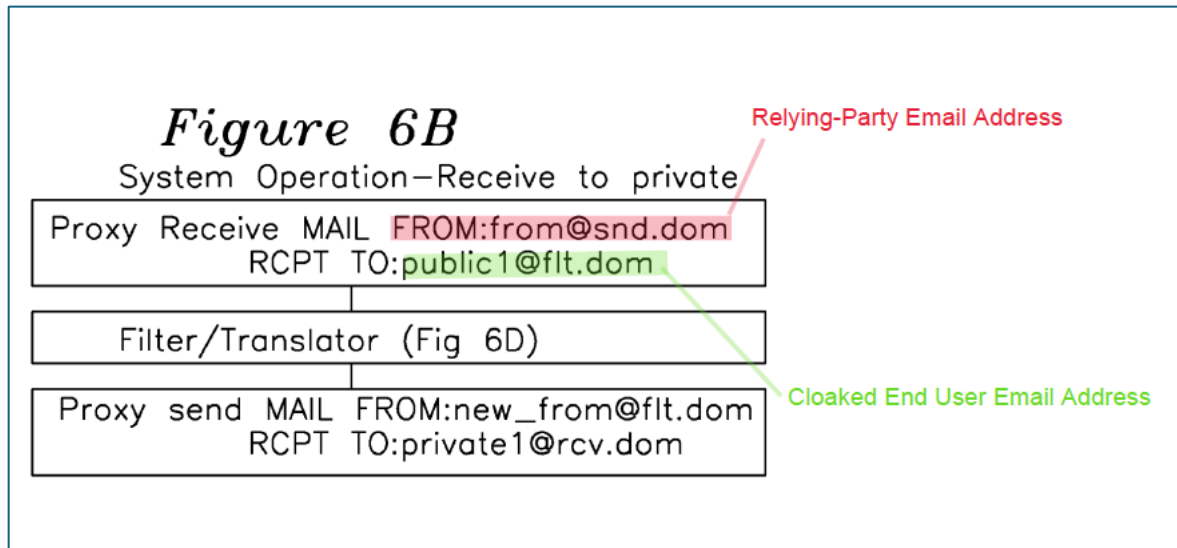
Id., FIG. 5 (annotated).

65. When “an email message to a public address is received” the sender private email address and recipient public email address are sent to the filter/translator step 610 “which either rejects the email, or sends the email in step 612 using the translated values.” *Id.*, 6:47-52, FIG. 6B. In this embodiment, the email received by the email proxy server is sent from a sender email address, namely

“from@snd.dom”, to a public email address (which may be associated with a recipient, i.e., a user who registered with Lee’s email proxy system), namely “public1@flt.dom.” *Id.*, FIG. 6B.

66. The public email address and the mail proxy system (cloaked ID system) have the same domain—flt.dom. Lee expressly teaches that the “domain flt.dom resolves to the IP address of the mail proxy system[.]” *Id.*, 6:37-38. When a user requests a public email address, they are assigned an “flt.dom” address, e.g., “public1@flt.dom”. *Id.*, 6:33-38, FIG. 6B. Therefore, the “cloaked end user address and the domain associated to the cloaked ID system are the same domain[.]”

67. FIG. 6B, illustrated below, shows an operation of the email proxy server where the server receives an email from a sender email address, **from@snd.dom**, sent to a public email address, **public1@flt.dom**. The mail proxy system goes through the filter/translator steps of FIG. 6D (*See infra* Section VIII.A.13(b), VIII.A.13(c)) and sends the email to the end user, private1@rcv.dom.



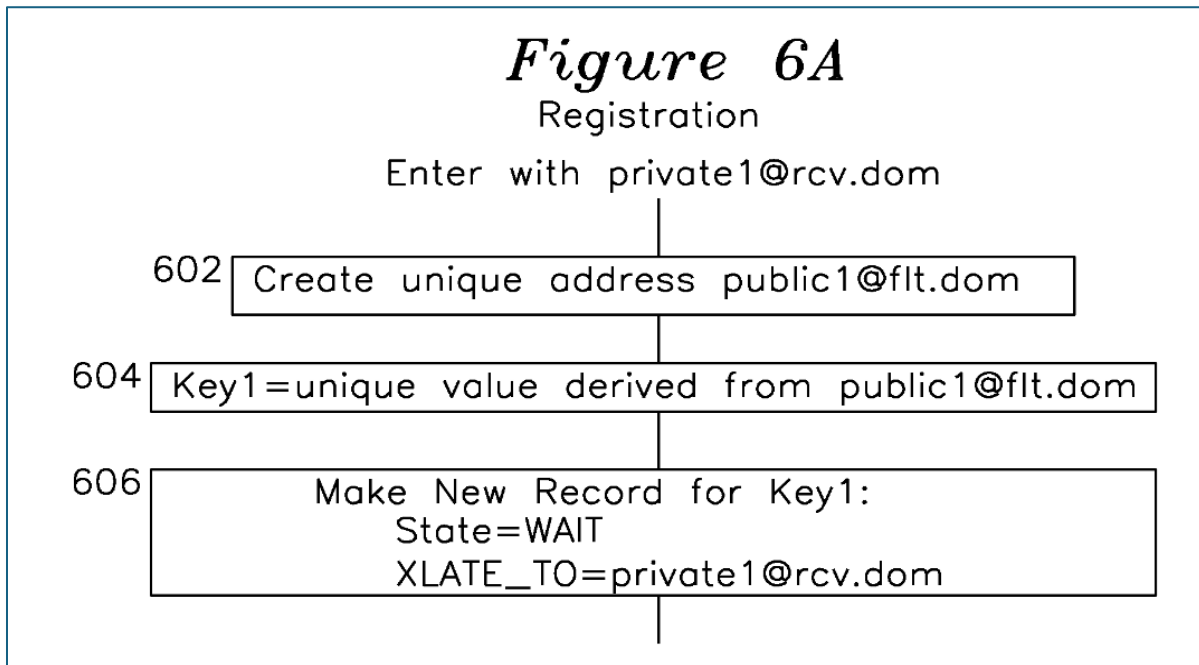
Lee, FIG. 6B (annotated).

[13(b)] identify an end user specified address associated to the cloaked end user address by an end user profile;

68. Lee discloses a key 1 record (“end user profile”) that associates a private email address of the user (“end user specified address”) with a public alias email address (“cloaked end user address”). When the server receives an email to the user’s alias address, it checks to see if a key 1 record exists. Accessing this key 1 record identifies the private email and the public email linked to the user, as claimed.

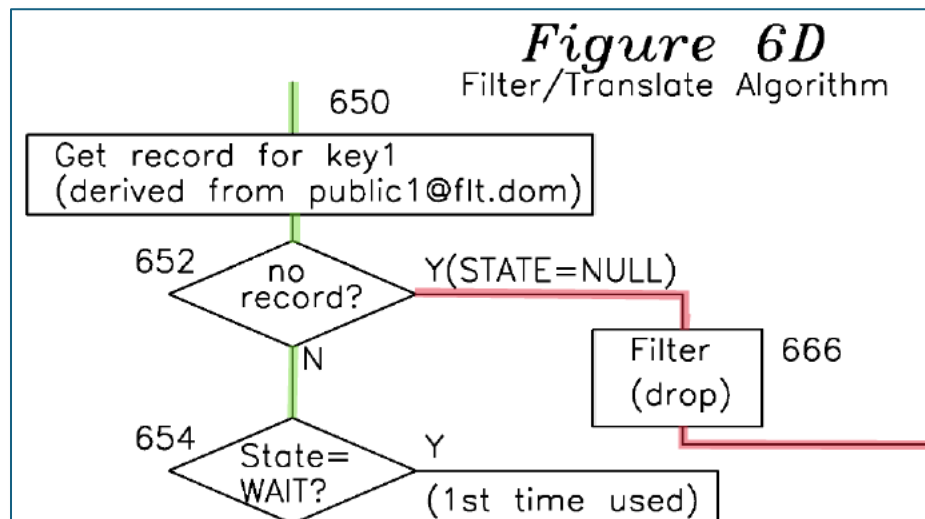
69. Lee discloses the creation of a key 1 record (“end user profile”) during a registration upon request by the user. FIG. 6A, below, illustrates the registration step of a new public email address including the creation of a key 1 record. *Lee*, 6:33-46. The key 1 record has a key value related to the created public email address,

e.g., “public1@flt.dom” (“cloaked end user address”) and an XLATE_TO field with a value of the user’s private address, e.g., “private1@rcv.dom” (“end user specified address”).



Lee, FIG. 6A. A POSITA would understand that the key 1 record is an “end user profile” at least because it contains information relating to the user’s cloaked and private address. The term user profile is often used to describe a collection of information or data related to a particular user. Here, when initialized, *Lee*’s key 1 record contains an individual’s private address and the cloaked address related to the user’s private address. *See Lee*, FIG. 6A. As the user’s alias is used, other data fields related to the user are populated. *Id.*, 7:7-11. Accordingly, a POSITA would have understood that *Lee*’s key 1 record is a user profile.

70. Lee teaches that when an email is sent to a user's public email address, the sender email address and public email address "are furnished to the filter/translator step[.]" *Lee*, 6:47-52, FIG. 6B. In the initial step of the filter/translator algorithm, the system checks to see if there is a record associated to the key 1 record. *Id.*, 6:65-67, FIG. 6D (shown below). If there is not a record, it means the public email address does not exist (e.g. was not created by a user), and the server filters out the email. FIG. 6D (shown in red). If a record for the key is found, the public email associated with the key was previously generated and the filter/translate algorithm continues to perform additional steps. FIG. 6D (shown in green).



Lee, FIG. 6D (annotated). The key 1 record contains an XLATE_TO field with the value of the user's private email address, private1@rcv.dom, initialized at the time of registration of the public/alias email address. *Id.*, 7:1-7, FIG. 6A, FIG. 5.

71. Because the key 1 record associates the user's private email ("end user specified address") and alias email ("cloaked end user address"), a POSITA would have recognized that determining that the key 1 record exists satisfies the claimed step of "identify[ing] an end user specified address associated to the cloaked end user address by an end user profile[.]" Indeed, searching for the key 1 record inherently identifies the user's private address, which is associated with the public address based at least on the fact that both addresses are stored as part of the key 1 record.

[13(c)] determine whether the end user profile contains a previous association between the relying party address and a cloaked relying party email address, wherein the relying party address has a different domain than the cloaked relying party email address;

72. Lee discloses this limitation or at least renders it obvious. When an initial email is received to a user's alias, Lee's system checks to see if an alias has been previously generated for the sender by checking the value of the STATE field in the key 1 record ("end user profile"). *See Lee*, 7:1-7, 7:27-35. As explained below, the value WAIT means the system has *not* previously associated the sender with the user's alias email address.

73. When the STATE value is WAIT, it indicates to the system that there has not been a previous communication to the user's alias address:

If a record for the associated public email address exists and the STATE value is WAIT 654, this indicates that the user has registered

this public email address, but it has not been used yet, so the record contains only STATE=WAIT and XLATE_TO=private1@rcv.dom, which were initialized at the time of registration of the public email address, as described in FIG. 6A.

*Lee, 7:1-7, FIG. 6D. In other words, when STATE=WAIT, there is no information about any sender's email address, and therefore when the STATE=WAIT is encountered, it indicates that it is "determine[d]" that the end user profile **did not contain** a "previous association between the relying party address and the cloaked relying party email address".*

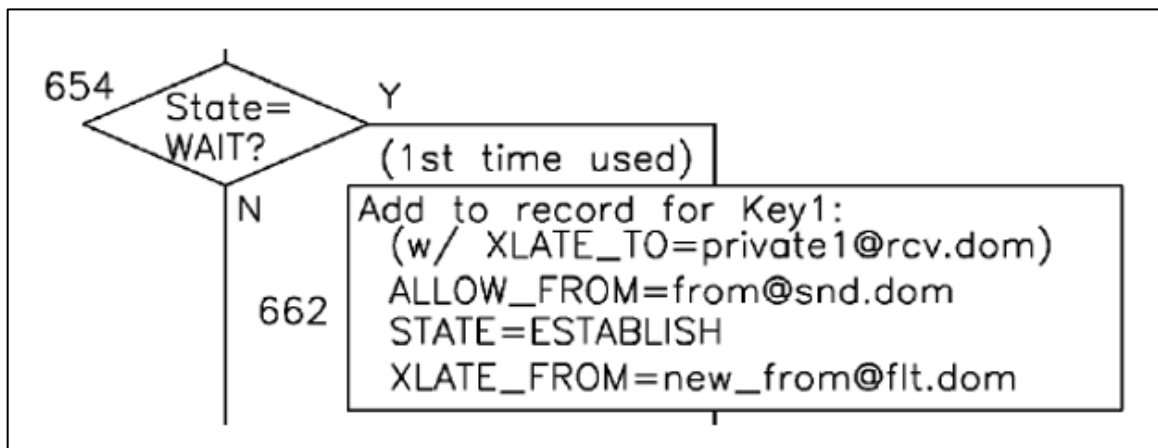
74. Upon detecting that the alias has never before been used, an alias email address is generated for the sending party (e.g., new_from@flt.dom) ("a cloaked relying party email address"), that cloaked relying party email address is stored in the XLATE_FROM field, and the state is updated to ESTABLISH, which indicates to the system moving forward that the user's email alias has been previously used and that an alias email address has been previously generated for this sender:

In step 662, *the XLATE_FROM value is updated with a unique value, shown as "new_from@[flt].dom",⁷* and an optional field ALLOW_FROM is initialized with the sender's email address, shown as "from@snd.dom". The STATE value is updated to ESTABLISH,

⁷ See fn3.

which indicates that the public address is ready to process the first and any subsequent emails directed to it.

Id., 7:7-13. At this point, Lee’s key 1 record (“end user profile”) is updated to contain an association between a sender’s (“relying party”) email address and a cloaked version of that address (“a cloaked relying party email address”). This process of updating the user profile in response to receiving a first email is depicted in the Fig. 6D excerpt below:



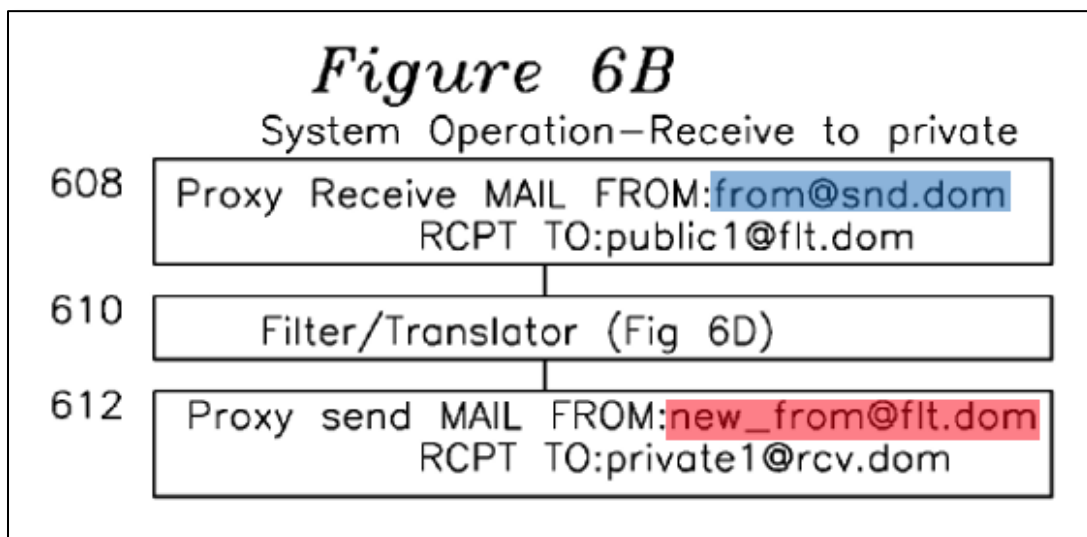
Id., Fig. 6D (excerpt).

75. A STATE value of WAIT means no prior email has been received to the user’s alias address and therefore no sender alias has been generated; a STATE value of ESTABLISH means that a prior email has been received to the user’s alias address, and an alias has been created for the sender’s email address. Therefore, checking the value of the STATE variable “determine[s] whether the end user profile

contains a previous association between the relying party address and a cloaked relying party email address,” as claimed.

Lee’s sender alias has a different domain than the sender’s native email address

76. As discussed above, Lee teaches that its mail proxy system uses the domain flt.dom and that all alias addresses also use this domain. *Lee*, 5:30-36 (describing a user’s alias address “public1@flt.dom, and a sender’s alias addresses, “new_from@flt.dom”), 6:37-38 (teaching the “domain flt.dom resolves to the IP address of the mail proxy system”). Lee also teaches that the sender address has a different domain, e.g., “snd.dom.” *Id.* Fig. 6B below has been annotated to highlight the different domains of the **sender’s native email address** and the **sender’s generated alias**:



Id., Fig. 6B (annotated). Accordingly, “the relying party address has a different domain than the cloaked relying party email address.” As I discussed above, Lee’s

email server has its own domain (flt.dom), which allows the email proxy server to send, receive, and process emails while allowing a user with an email address hosted at any other domain (e.g., rcv.dom) to use the email proxy server.

[13(d)] where the end user profile does not contain a previous association between the relying party address and the cloaked relying party email address, then generate a new cloaked relying party email address and associate the new cloaked relying party email address to the end user profile, the cloaked end user address, wherein the new cloaked relying party email address is generated with a domain different than the relying party address; and

77. As I explained for limitation 13(c), Lee discloses this limitation, teaching that, upon receiving a first email from the sender, the system (1) confirms that no sender alias exists (STATE=WAIT), (2) generates an alias email for the sender, and (3) stores this new sender alias in the end user's profile along with the user's alias (and sets STATE to ESTABLISHED). *Lee*, 7:1-13; *see supra* VIII.A.13(c). Further, as set forth with reference to the preceding limitation, the sender's native email address and the sender's generated alias use different domains.

78. When the STATE value is WAIT, it indicates to the system that there has not been a previous communication from the sender address ("relying party address"), which means the XLATE_FROM field ("a cloaked relying party email address") has not yet been populated:

If a record for the associated public email address exists and ***the STATE value is WAIT*** 654, ***this indicates that the user has registered this public email address, but it has not been used yet, so the record***

contains only STATE=WAIT and XLATE_TO=private1@rcv.dom,
which were initialized at the time of registration of the public email
address, as described in FIG. 6A.

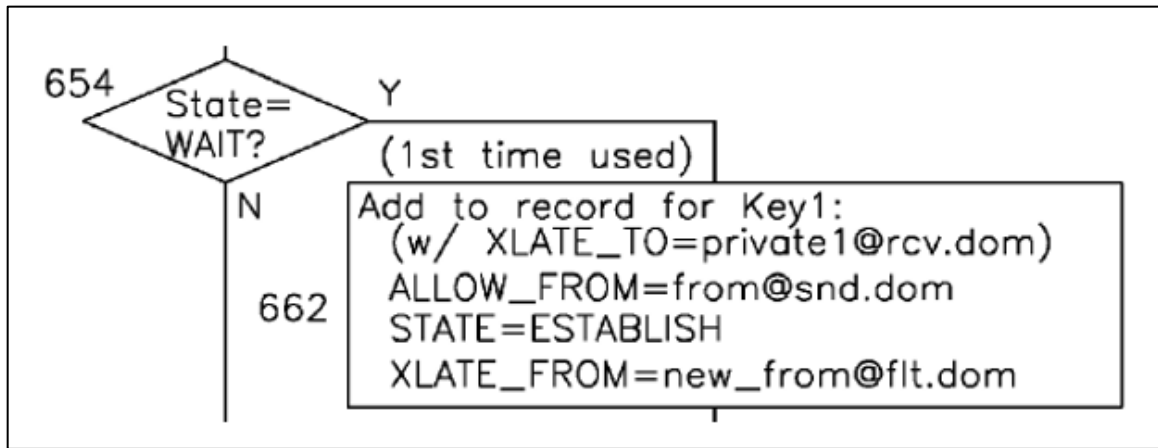
Lee, 7:1-7, FIG. 6D.

79. Upon detecting that the alias has never before been used, an alias email address is generated for the sending party (e.g., new_from@flt.dom) (“a cloaked relying party email address”), that cloaked relying party email address is stored in the XLATE_FROM field in key 1 (“the end user profile”), and the state is updated to ESTABLISH, which indicates to the system moving forward that the user’s email alias has been previously used and that a sender alias has been previously generated:

In step 662, ***the XLATE_FROM value is updated with a unique value, shown as “new_from@[flt].dom”,⁸*** and an optional field ALLOW_FROM is initialized with the sender’s email address, shown as “from@snd.dom”. The STATE value is updated to ESTABLISH, which indicates that the public address is ready to process the first and any subsequent emails directed to it.

Id., 7:7-13. This process of updating the user profile in response to receiving a first email is depicted in the Fig. 6D excerpt below:

⁸ See fn3.



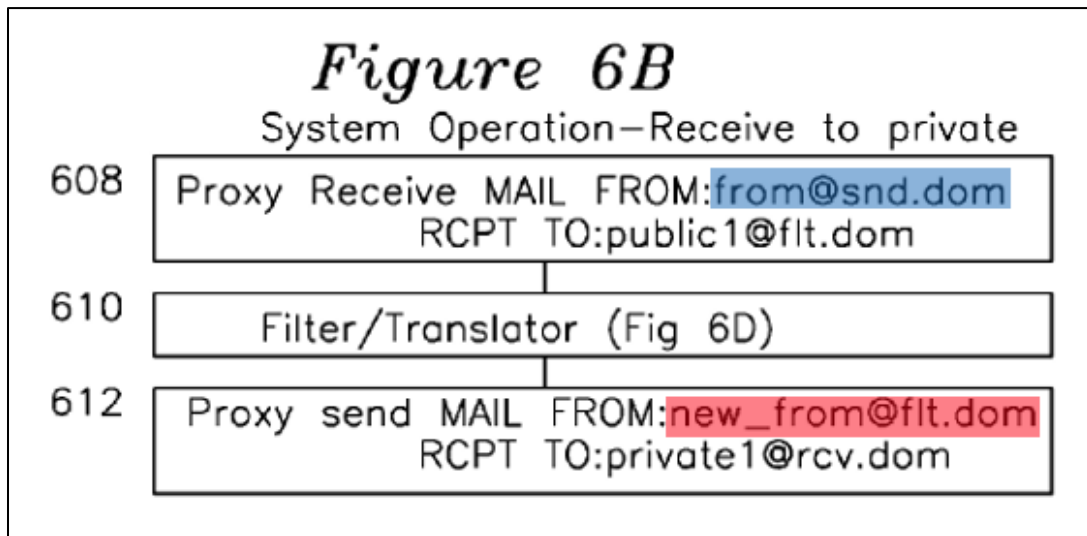
Id., Fig. 6D (excerpt).

80. A POSITA would understand that storing the sender’s new alias (“new cloaked relying party email address”) in the key 1 record (“the end user profile”), which already contains the user’s alias (“the cloaked end user address”), “associates” the newly generated sender alias with the user alias. As I discussed above, a POSITA would understand that the purpose of a user profile is to collect and associate information with a particular user. In Lee, when new data is stored in the key 1 record, a POSITA would understand that this storage associates the new data with the existing data in the profile.

Lee’s sender alias has a different domain than the sender’s native email address

81. As discussed above, Lee teaches that its mail proxy system uses domain flt.dom and that all alias addresses also use this domain. *Id.*, 5:30-36 (describing a user’s alias address “public1@flt.dom, and a sender’s alias addresses, “new_from@flt.dom”), 6:37-38 (teaching the “domain flt.dom resolves to the IP

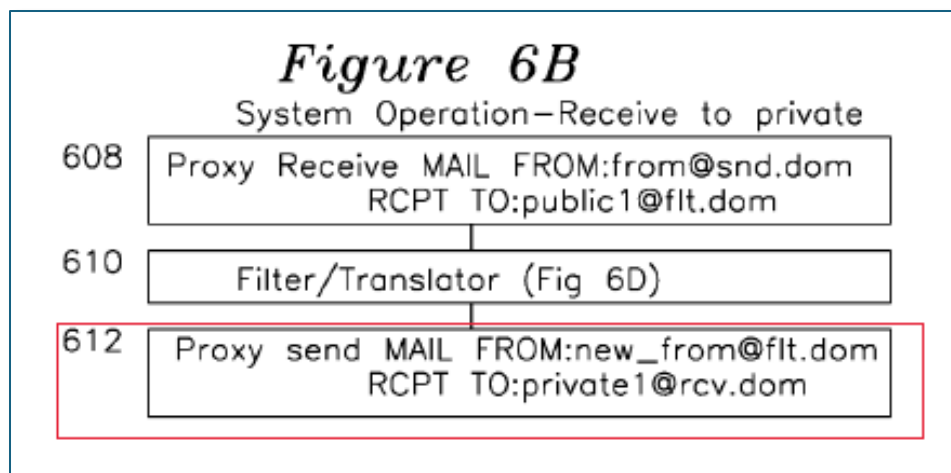
address of the mail proxy system”). Lee also teaches that the sender address has a different domain, e.g., “snd.dom.” *Id.* Fig. 6B below has been annotated to highlight the different domains of the **sender’s native email address** and the **sender’s generated alias**:



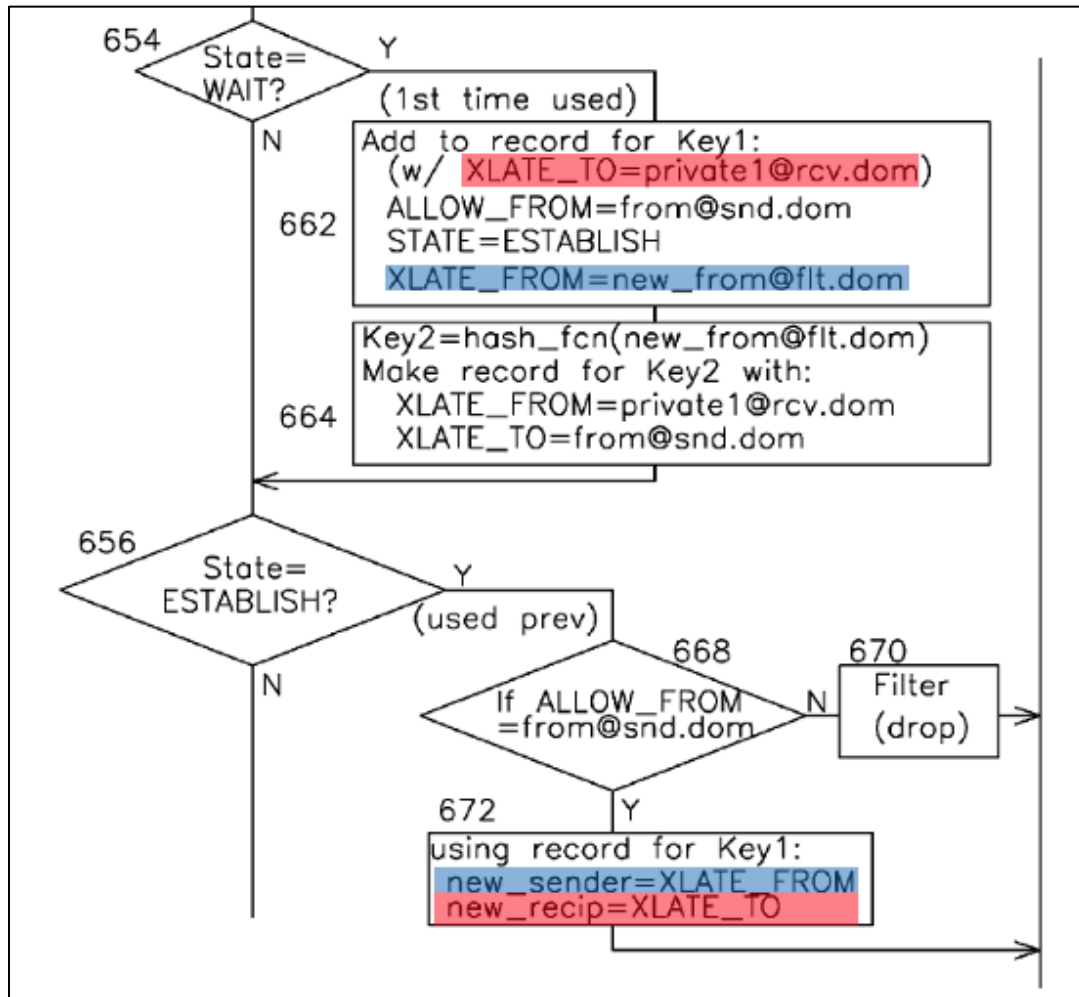
Id., Fig. 6B (annotated). Accordingly, “the relying party address has a different domain than the cloaked relying party email address.” Functionally, the cloaked relying party email address must use the domain **of** the email proxy so that messages from the user to the cloaked relying party email are received and processed **by** the email proxy server.

[13(e)] send the email to the identified end user specified address, wherein the email is configured with a reply-to email address comprising the new cloaked relying party email address.

82. After the filter/translator algorithm has processed as described with reference to the preceding limitations, Lee teaches sending the “email in step 612 using the **translated values**.” *Lee*, 6:51-52, FIG. 6B.



Lee, FIG. 6B (annotated to show the MAIL FROM and RCPT TO addresses). The annotated FIG. 6D excerpt below illustrates this process of translating both the sender and recipient emails prior to forwarding the message to the recipient, ensuring the sender/from field is populated with the newly generated **sender's alias** and the recipient/to field is populated with the **user's private address**:



Id., Fig. 6D (excerpt and annotated), 7:31-35 (“[T]ranslation fields XLATE_FROM and XLATE_TO associated with the received public address (first key) are extracted from the associated record, and these fields are used for the new_sender and new_recipient address translations, respectively.”) Accordingly, the sender’s alias, new_from@flt.dom, populates the “From” address of the email sent by the email proxy server to the end user.

Lee's system configures the forwarded email with a reply-to email address comprising the sender's alias

83. As described in the '107 Patent, an email can contain distinct “from” and “reply-to” fields. '107 Patent, 17:21-24 (“The email is then sent to the end user's real email address by end user email system 104, with the “**from**”/**reply-to** address of info@nordstroms.com <cloak2@autograph.me>[.]”). A POSITA would have understood that these two fields serve distinct roles. Namely, the “from” field indicates an address of the sender and the “reply-to” field is an optional field that defines which address will populate the “to” field in a responsive communication when the recipient replies to the email that is only used in case the sender wishes a reply to be sent to a different address than that found in the “from” field. A POSITA would also understand that, while the “from” and “reply-to” fields are different, either field can be used to control the destination of a responsive email. As I discussed above in the state of the technology section, it was understood that the address in the “from” field would populate the “to” field if the user chose to respond to the email unless a reply-to field was specified. Therefore, while technically distinct, the “reply-to” field and “from” field would have been understood to be functionally identical unless the “reply-to” field is given a different value than the “from” field.

“When the ‘Reply-To:’ field is present, it indicates the mailbox(es) to which the author of the message suggests that replies be sent. ***In the***

absence of the ‘Reply-To:’ field, replies SHOULD by default be sent to the mailbox(es) specified in the ‘From:’ field unless otherwise specified by the person composing the reply.”

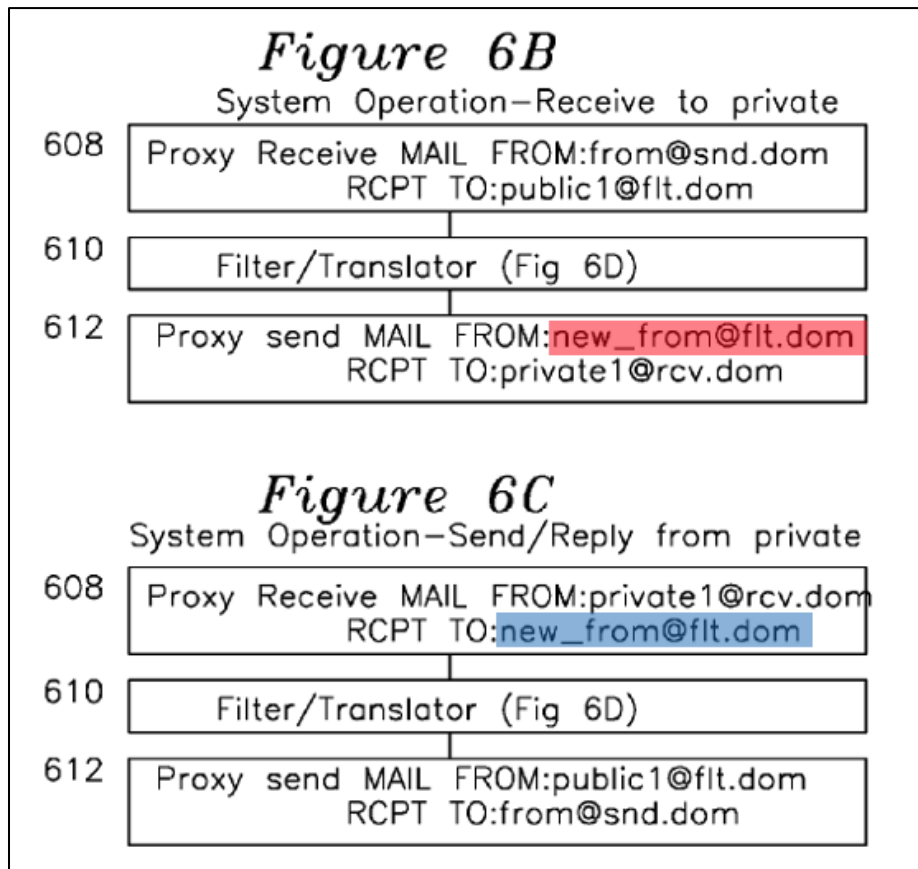
Ex. 1015, 21.

“When a message is a reply to another message, the mailboxes of the authors of the original message (the mailboxes in the ‘From:’ field) or mailboxes specified in the ‘Reply-To:’ field (if it exists) MAY appear in the ‘To:’ field of the reply since these would normally be the primary recipients of the reply.”

Id., 22. A POSITA would have understood that while the ’107 Patent contemplates the “from” and “reply-to” addresses to be the same, it merely desires “that any replies from the end user to the sender get routed back through the ICS.” ’107 Patent, 17:65-67. A POSITA familiar with RFC-822 (cited by the ’107 Patent, and Ex. 1015 of this Declaration) would understand that it is redundant to provide a “reply-to” field with the same address as the “from” field as discussed in the ’107 Patent. *See* ’107 Patent, 17:62-67, 16:57-64, 17:21-24, FIG. 4.

84. Lee does not expressly discuss distinct “from” and “reply-to” fields, but it does expressly teach that, when an end user responds to an email received pursuant to the embodiment described above, the responsive email will be addressed to the sender’s alias address. For example, Figs. 6B and 6C below, show that the sender’s alias address (i.e., new_from@flt.dom) populates the “from” field in an email to the user’s private address and also is the “to” address in responsive communications.

Namely, Fig. 6B shows that the sender's alias (**new_from@flt.dom**) populates the "from" field in a translated email sent to the user's private email address (private1@rcv.dom). And Fig. 6C shows that the user's responsive email is addressed to the same sender's alias (**new_from@flt.dom**).



Lee, Figs. 6B-6C (annotated).

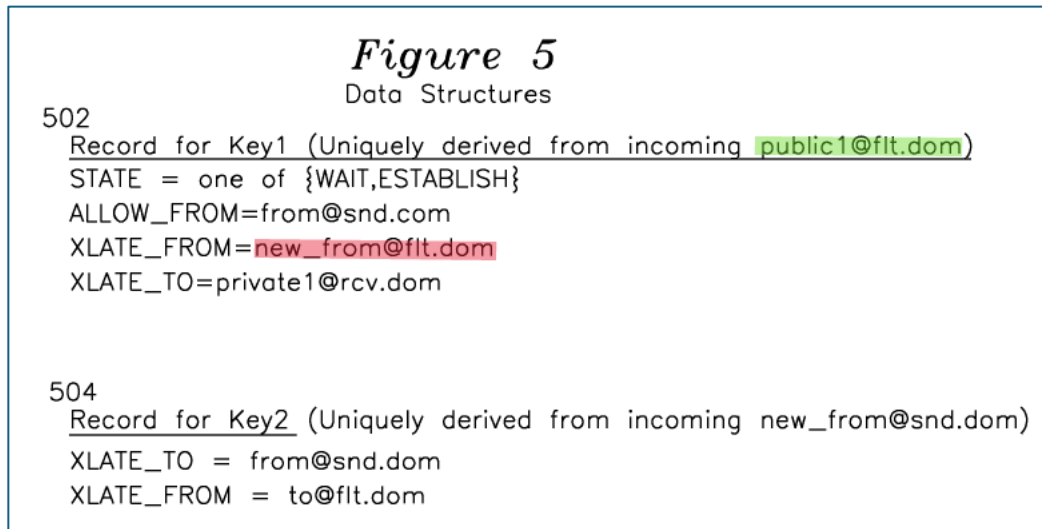
85. Accordingly, a POSITA would have understood that it would have been obvious to populate a "reply-to" field with the sender's alias. By populating the "from" field with the XLATE_FROM value, a POSITA would have recognized that any user reply is sent to the email listed in the XLATE_FROM field, allowing the

email proxy server to receive the reply. Therefore, while Lee does not discuss a “reply-to” field, a POSITA would have understood that a user’s reply would be sent to the address in the “from” field where the email alias server does not input a “reply-to” address. It would have been obvious to a POSITA that alternatively, to accomplish the same function, the “reply-to” field could be given the address stored in the XLATE_FROM field.

B. Claim 14

The non-transitory computer readable medium 13, wherein the new cloaked relying party email address has a domain that is the same as the cloaked end user address.

86. Lee discloses the XLATE_FROM value (cloaked relying party email address) as having a flt.dom domain, for example **new_from@flt.dom**. *Lee*, FIG. 5, 6D. Lee also discloses the user’s public email address as having a flt.dom domain, for example **public1@flt.dom**. *Id.* Therefore, Lee discloses the cloaked relying party email address has the same domain as the cloaked end user address.



Lee, FIG. 5 (annotated to highlight public email address and XLATE_FROM values with same domain).

IX. GROUND 2: OPINIONS REGARDING THE COMBINATION OF *LEE* AND *HARDT*

87. As set forth in Ground 1 above, *Lee* teaches or renders obvious all limitations of independent Claim 13. Independent Claims 1 and 7 are similar in scope to Claim 1, but further recite storing, in the end user profile, one or more URLs associated with the relying party. As set forth below, a POSITA would have been motivated to supplement *Lee*'s email alias system with *Hardt*'s functionality that (1) allows a user to create an email alias using a web form, (2) stores the URL of the web form in the user's profile, and (3) uses the stored URL to enforce privacy policies that ensure emails are received to the alias address only from user-intended senders.

A. Claim 1

[1(P)] A processor-based ID cloaking system, comprising:

88. To the extent the preamble is limiting, Lee discloses this feature. Lee discloses an email proxy server (ID cloaking system) that allows a sender to send email to a user's primary email address via a public address which is provided to the sender. *Lee*, 2:36-45. A POSITA would understand that an email proxy server would consist of at least one processor in order to perform the functions of an email proxy server. *See supra* Section VIII.A.13(P). Indeed, as I discussed above, a POSITA would have understood (or at least found obvious) that Lee's email server is a general purpose server on which software runs that defines and implements Lee's email functionality. A POSITA would further have understood (or at least found obvious) that one or more processors would be used to execute this software, implementing Lee's filter/translate algorithm.

[1(a)] memory configured to store contents that are executable by processor electronics;

89. Lee discloses storage of values associated with keys using "either a database with database records, or they may be stored in a lookup memory such as any random access memory (RAM), a disk file, or in any manner known for maintaining records." *Lee*, 7:43-47. A POSITA would understand that the contents of the memory disclosed by Lee would be executable by the processor electronics of

the email proxy server. *See supra* Section VIII.A.13(P). As noted above, a POSITA would have understood (or at least found obvious) that Lee's email server is a general purpose server on which software runs that defines and implements Lee's email functionality. A POSITA would further have understood (or at least found obvious) that one or more processors would be used to execute this software, implementing Lee's filter/translate algorithm. Further, a POSITA would have understood that, to run the filter/translate algorithm, processor electronics would need to read and write to a computer memory accessible by the electronics. Therefore, a RAM, disc file, or similar memory would be understood to store the key 1 record and the filter/translate algorithm.

[1(c)] processor electronics configured to execute the contents in order to:

90. Lee discloses this element for at least the same reasons as presented above for limitation 13(P). *See supra* Section VIII.A.13(P).

[1(c)(i)] receive an email addressed to a cloaked end user address, wherein the email is sent from a relying party email address, and wherein the domain of the cloaked end user address and the domain associated to the processor-based cloaked ID system are the same domain;

91. Lee discloses this limitation for at least the same reasons as presented above for 13(a). *See supra* Section VIII.A.13(a).

[1(c)(ii)] identify an end user specified address as well as any URLs associated to the cloaked end user address based on an end user profile;

92. Lee in view of Hardt renders this limitation obvious. This limitation narrows the concept recited in Claim 13 (mapped in Ground 1) by further requiring the ID cloaking system identify any URLs stored in the user profile. Referred to as “associated relying-party URLs” in claim 1(c)(iv), consistent with the ’107 Patent specification, the URLs recited in claim 1 correspond to the relying-party (e.g., they identify the merchant’s URL) and are associated with the end user’s alias and stored in the end user’s profile. Indeed, the ’107 Patent described an embodiment in which a consumer fills out a webform using a cloaked consumer address. *Id.*, 9:13-26. The ID cloaking system may then associate “the URL [of] the webform” with the consumer’s profile. *Id.*, 9:34-40. In one example, storing merchant URLs in a consumer profile allows the consumer to identify unauthorized/unwanted merchants using a cloaked email the consumer created for a more limited use. *Id.*, 18:53-59 (“[I]f the end user notices that a cloaked email address she created with one merchant (related to the merchant email/URL when created etc.) is being misused, she can cancel, disable or delete the cloaked email address.”).

93. Hardt teaches a similar process through which webform URLs are used to ensure only intended senders/merchants are able to reach the end user via that user’s email alias. Namely, Hardt teaches that users can complete a webform to

initiate its email alias process. *Hardt*, 19:67-20:4. When an alias is generated pursuant to the webform embodiment, the “form filler provides the URL of the form in which the information will be entered, so that the alias generator 100 can store the information to later determine if privacy policies have been breached.” *Id.*, 20:4-9. This privacy policy enforcement mechanism allows the system to ensure emails originating from senders unaffiliated with the stored URL can be rejected. *Id.*, 15:2-6 (“[A]lias generator 100 obtains, either directly from the plug-in, or from the website privacy policy, a set of email addresses that mail will be received from, so that any message received from another address can be discarded.”).

94. Lee discloses an end user specified address associated to cloaked end user address based on an end user profile. *See supra* Section VIII.A.13(b). But Lee does not describe identifying “URLs associated to the cloaked end user[.]” As set forth below, however, a POSITA would have been motivated to supplement Lee’s teachings with such URL functionality pursuant to *Hardt*.

a. *Lee’s* Teachings

95. As discussed above, Lee’s email proxy server generates a key 1 record for a public email generated upon a user request. *Lee*, 6:9-14. When initially generated, the key 1 record contains the user’s private email address, a uniquely generated public email address, and a STATE field. *Lee*, 6:33-46. Upon receiving a first ever email from a third-party sender to the public address (as indicated by

STATE=WAIT), an optional ALLOW_FROM field is initialized with the sender's address and the STATE is then updated to ESTABLISH. *Id.*, 7:1-13. Once the STATE is updated to ESTABLISH, the ALLOW_FROM field is used to filter out future emails from different senders. *Id.*, 7:27-35, FIG. 6D. A POSITA would have understood that this mechanism prevents the abusive email behavior Lee identifies as problematic in which an alias email address is sold and used by any number of undesired senders. *Lee*, 1:65-2:6 (describing a scenario in which a merchant "resells customer lists to other promoters, or uses the list for their own unrequested promotions[,] " which causes "[t]he user [to] receive[] increasing amounts of email wholly unrelated to the original transaction"). By limiting the use of a public email alias to a single sender, any entity that obtains the email alias after its initial use will be unable to contact the end user via the email alias.

96. Importantly, Lee does not identify any security mechanism that prevents the ALLOW_FROM field from being populated with an email address from an undesired sender. The only security measure outside of limiting senders described in Lee is the ALLOW_FROM field. Per Lee's express teachings, the ALLOW_FROM field does not limit who the first sender can be. It merely ensures the first sender is the only sender able to contact the user through the public address. Therefore, the Lee system simply assumes that the first party to send a message to the public address is a desired sender and populates the ALLOW_FROM field with

that party's email address. *Id.* A POSITA would have recognized that Lee's process creates a security flaw, allowing potentially undesired senders to communicate with a user simply by being the first party to communicate with a newly generated user alias email. If an unauthorized sender obtains the public email address and is the first to contact the address, not only will the user receive unwanted email(s), but the ALLOW_FROM field will prevent the intended user of the email from reaching the user. Therefore, there is significant benefit in ensuring the first party able to use the public address is a desired sender.

97. Additionally, Lee recognizes that a user may wish to authorize more than one sending party, i.e., to populate multiple addresses in the ALLOW_FROM field. *See Lee*, 7:53-56 ("In another embodiment of the invention, a new state ESTABLISH_ADD could be used to indicate that additional qualified ALLOW_FROM and XLATE_FROM senders should be added to the record 502.'). But Lee does not describe how a user may configure the system to permit multiple desired senders while filtering out all others.

98. As set forth below, a POSITA would have been motivated to implement Hardt's URL teachings in Lee's system, allowing a user to define authorized senders by storing URLs for those senders in the user profile upon its generation. This modification improves Lee's system in multiple ways. First, it solves the security flaw in Lee's native system, allowing the user to define a desired sender with

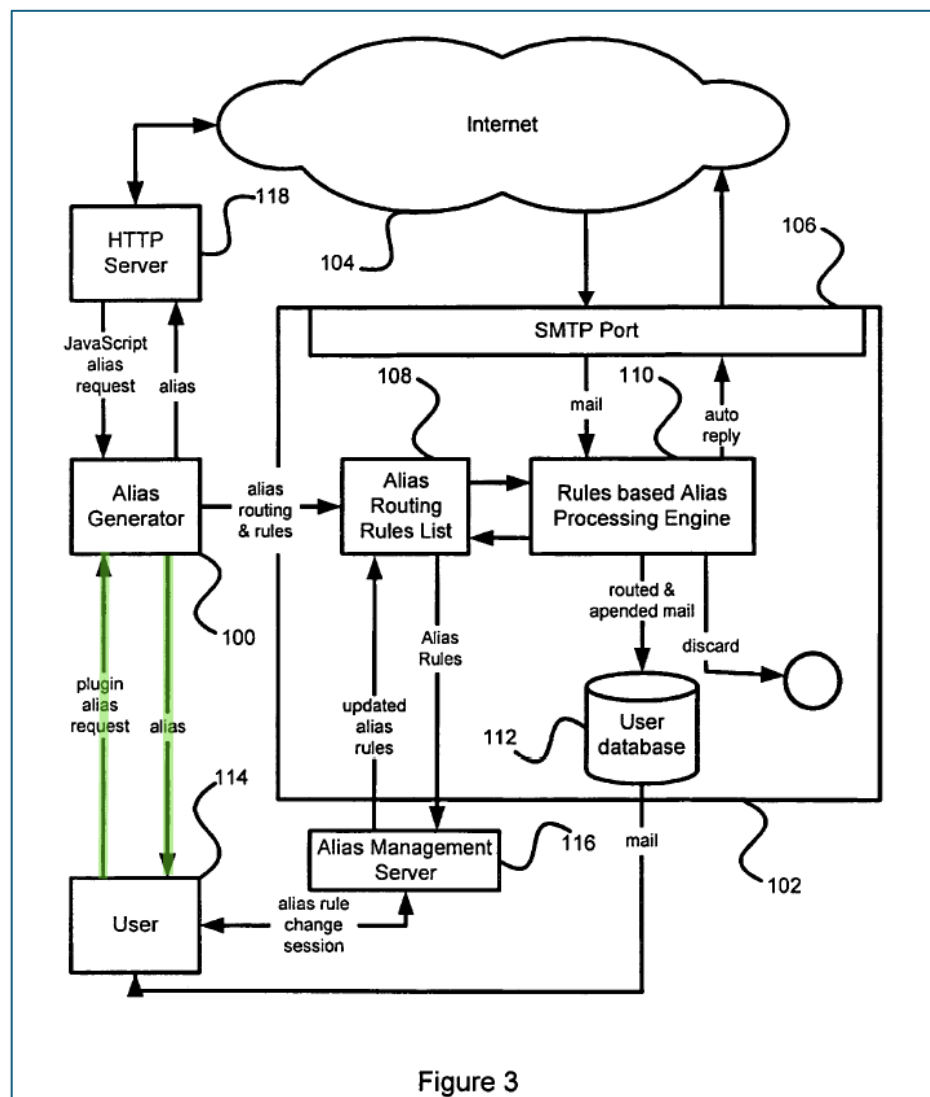
specificity, rather than simply assuming the first sender is a desired sender. Second, it provides implementation details for the multiple allowed senders feature that Lee expressly contemplates, defining how a user may configure the system to permit multiple desired senders while filtering out all others.

b. *Hardt's* Teachings

99. Hardt teaches an identity management system that includes a form filling application that can request an alias from an alias generator 100 and provide it to the web-based form. *Hardt*, 19:61-65, FIG. 3. The form filler may provide the URL of the form to the alias generator 100 to be stored to help determine if privacy policies are later breached. *Id.*, 20:4-9. The alias generator 100 (and as a result, the URL) is associated with a user profile. *Id.*, 20:13-15. The alias generator 100 may obtain from the website privacy policy associated with the URL “a set of email addresses that mail will be received from, so that any message received from another address can be discarded.” *Id.*, 15:2-6. Hardt does not mandate *when* the URL is used by the alias generator to pull email addresses from the website’s privacy policy, but a POSITA would have understood that the addresses could either be pulled at the creation of the alias, when the webform is completed, or subsequently when an email is received by the alias. A POSITA would have recognized that there are benefits realized by waiting until an email is received to the generated alias. Namely, storing the URL and pulling emails associated with the privacy policy at the time the email

is received ensures that the most recent privacy policy is checked (e.g., the system receives the most recent list of allowed emails per the associated security policy).

100. The annotated FIG. 3 below shows the architecture of the identity management system of Hardt. The green pathways show the request from the user to generate an alias through the webform plugin and the alias generator 100 providing the alias back to the user.



Hardt, Fig. 3 (annotated).

101. Although Hardt does not specify what exact data is stored as the “URL,” a POSITA would have understood that Hardt teaches (or at least renders obvious) storing the full URL associated with the webform. A URL (unique resource locator) is a unique identifier that “represents the ‘location’ of a specific resource on the internet.” Ex. 1010, 1. It is “effectively a unique web address”. *Id.* Three main parts of a URL are the scheme, domain (or hostname), and path. The scheme (or protocol) “determines how data is transferred between the host and a web browser (or client).” *Id.*, 4. The domain “define[s] a specific area of control and autonomy (aka a website location).” *Id.*, 2-3. It consists of three elements, the “Domain Name, Top Level Domain (TDL), and Subdomain. *Id.*, 2. The elements constituting the domain “are the foundation of every URL” (*Id.*) and “are the most commonly understood and recognized.” *Id.*, 3. The path “refers to the exact location of a page, post, file, or other asset.” *Id.*, 4. Using <https://www.nordstrom.com/browse/customer-service> as an example, the scheme is “https”, the domain is “nordstrom.com”, and the path is “browse/customer-service”. A POSITA would have understood that a full URL—including a scheme, domain, and likely a path—is associated with the webforms described by Hardt. And, while Hardt does not specify whether the entire URL or a partial URL is stored, a POSITA would have understood the most straightforward manner with which to store the webform URL pursuant to Hardt’s teachings is to store the full URL. Indeed, while

it is certainly possible to filter components of the URL, retaining only the information necessary to implement an associated privacy policy, a POSITA would have understood that Hardt does not teach or suggest such filtering. Hardt's silence regarding any such filtering would have led a POSITA to conclude that Hardt teaches (or renders obvious) storing the full URL.

c. The *Lee-Hardt* Combination

102. In the proposed Lee-Hardt combination, the email proxy server of Lee is supplemented with the webform filler and URL association of Hardt as a means of providing a public email address to a third-party sender. A user requests a public email (i.e., an alias) in the process of filling a webform. When requesting a public email using a webform, Lee's key 1 record will be supplemented with a URL field that is automatically populated with the URL of the webform, and the URL is then used to enforce privacy functions disclosed in Hardt. *Hardt*, 15:2-6 (describing a privacy policy associated with the URL that defines "a set of email addresses that mail will be received from, so that any message received from another address can be discarded"). The proposed combination relies on Lee's existing ALLOW_FROM field to enforce such privacy policies. Per Lee's native functionality, the ALLOW_FROM field is used to reject emails from undesired senders, and Lee expressly acknowledges that the ALLOW_FROM field can support multiple desired senders. *See Lee*, 7:53-56. Accordingly, Hardt's URL-based privacy policy

teachings seamlessly merge with Lee's system, populating Lee's ALLOW_FROM field with email addresses associated with the privacy policy of the stored URL.

103. For example, a user filling out a webform at ford.com could request the email proxy server provide a public email to be used in the messages between Ford and the user to protect the user's private email address. The URL https://www.ford.com would be stored in the key 1 record URL field. When an email is received by Lee's email proxy server to the user's alias associated with key 1, the server examines the URL field to enforce Hardt's privacy policy. For example, the privacy policy at ford.com may show emails at Ford may come from email1@ford.com or email2@ford.com. The email proxy server could subsequently add these emails to ALLOW_FROM fields contained in the key 1 record. This would allow the email proxy server to filter out emails to the public address that are not from these emails and ensure only ford.com may contact the user through the public address.

104. In sum, the Lee-Hardt combination utilizes a web form filler that "provides the URL of the form in which the information will be entered" to the email proxy server to "store the information" as part of the creation of a public email address and associated key 1 record. The email proxy server then uses the URL to find email addresses in the privacy policy and to forward emails from senders only if they have an address that matches one of those in the privacy policy.

d. Motivation to Combine *Lee* and *Hardt*

105. For a number of reasons, a POSITA would have been motivated and found it obvious to supplement Lee’s email proxy server with Hardt’s form filler plugin. A POSITA would have recognized that the form filler disclosed by Hardt would benefit the email proxy server of Lee in the same way it benefits Hardt, allowing the user the ability to create a public email address via a webform and using the URL of the webform to ensure emails are received only from intended senders. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious[.]”). This addresses an apparent problem of Lee—that the user cannot limit which sender(s) uses a public address when registering the public address because Lee’s system simply assumes that the first received email is desired regardless of sender. A POSITA would have recognized that limiting intended senders to email addresses associated with one or more user-approved URLs solves the security problem of Lee, benefitting Lee’s system in the same way the URL feature benefits Hardt’s system. Indeed, in Lee’s modified system, no longer can an undesired sender reach the end user simply by being the first sender to use a newly generated alias email.

106. Supporting the conclusion that it would have been obvious to supplement Lee's system with Hardt's form filler, Lee and Hardt describe "similar devices." For example, each reference discloses a system that can generate an aliased email to hide the end user's actual email address (the email proxy server of Lee and the alias generator of Hardt). *Compare Lee*, Abstract, with *Hardt*, Abstract. Each system has the capability to route an email sent to an aliased email to the end user, and to replace the "from" address with a generated email that shares a domain of the system. *Compare Lee*, Abstract, with *Hardt*, 10:41-44. Finally, each teaches a profile that is associated with the end user that stores information including the user's personal email address and one or more cloaked addresses. *Compare Lee*, 6:9-32 (discussing the key 1 record), with *Hardt*, 10:1-3.

107. These similarities in function and architecture would also have led a POSITA to expect success in making the proposed combination. The proposed modifications to Lee's filter translate algorithm and key 1 record are also straightforward and would have been well within the capabilities of a POSITA at the time, further supporting a reasonable expectation of success in making the proposed modification. Indeed, adding a field for a URL is technically similar to adding an additional ALLOW_FROM field. Because Lee already filters undesired emails using the ALLOW_FROM field's value, a POSITA would understand the proposed modification seamlessly merges with Lee's existing functionality. The changes to

the key 1 record and filter/translate algorithm required would merely duplicate fields and functions already taught by Lee. Additionally, integrating other anti-spam techniques, like that shown in Hardt, was already a common modification for email proxy systems. *See* Ex. 1009, 5 (“Since the use of aliases is compatible with the existing e-mail infrastructure, it can be easily integrated with other anti-spam techniques.”). Further, integrating filtering mechanisms into email alias systems was known in the art. *Id.* (“[F]iltering can be used with aliases. Each alias can have a different filtering setting based on its specific purpose.”).

108. Additionally, a POSITA would have recognized that Hardt was a known and predictable solution for implementing Lee’s expressly contemplated feature of populating ALLOW_FROM with multiple permitted senders. As noted above, Lee recognizes that a user may wish to authorize more than one sending party (i.e., to populate multiple addresses in the ALLOW_FROM field), but does not describe how a user may configure the system to accomplish this functionality. *Lee*, 7:53-56. A POSITA would have been motivated to look to known methods for accomplishing such functionality and would have recognized Hardt as an obvious solution that aligns with Lee’s native teachings and that was well within a POSITA’s technical grasp. *KSR Int’l Co.*, 550 U.S. 398 at 421 (“When there is a design need . . . and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If

this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.”); *see also In re Translogic Technology, Inc.*, 504 F.3d 1249, 1262 (Fed. Cir 2007) (“[I]n looking for a multiplexer circuit for the individual 2:1 multiplexers disclosed in Gorai, a person of ordinary skill in the art would have solved this design need by ‘pursu[ing] known options within his or her technical grasp.’”).

[1(c)(iii)] determine whether the end user profile contains a previous association between the relying party email address and a cloaked relying party email address, wherein the relying party email address has a different domain than the cloaked relying party email address;

109. Lee discloses this limitation for at least the same reasons as presented for limitation 13(c). *See supra* Section VIII.A.13(c).

[1(c)(iv)] in response to determining the end user profile does not contain a previous association between the relying party address and the cloaked relying party email address, generate a new cloaked relying party email address and associate the new cloaked relying party email address to the end user profile, the cloaked end user address and any of the said associated relying-party URLs, wherein the new cloaked relying party email address is generated with a domain different than the relying party address; and

110. Lee in combination with Hardt discloses this limitation. Lee discloses this limitation with the exception of “and any of the said associated relying-party URLs[.]” *See supra* Section VIII.A.13(d). The Lee-Hardt combination teaches adding a URL to the key 1 record. *See supra* Section IX.A.1(c)(ii).a. Since the URL is contained in the key 1 record which also has an XLATE_FROM value (cloaked

relying party email address) (*See supra* Section VIII.A.13(d)) this element is satisfied by the Lee-Hardt combination.

[1(c)(v)] send the email to the identified end user specified address, wherein the email is configured with a reply-to email address comprising the new cloaked relying party email address.

111. Lee discloses this limitation for at least the same reasons presented above for 13(e). *See supra* Section VIII.A.13(e).

B. Claim 2

[7(P)] A non-transitory computer readable medium for a ID cloaking system having instructions stored thereon that are executable by processor electronics to:

112. Lee discloses this limitation for at least the same reasons presented above for claim 14. *See supra* Section VIII.B.14.

C. Claim 7

[7(P)] A non-transitory computer readable medium for a ID cloaking system having instructions stored thereon that are executable by processor electronics to:

113. To the extent the preamble is limiting, Lee discloses this limitation for at least the same reasons presented above for 13(Preamble). *See supra* Section VIII.A.13(P).

[7(a)] receive an email addressed to a cloaked end user address, wherein the email is sent from a relying party email address, and wherein the domain of the cloaked

end user address and the domain associated to the cloaked ID system are the same domain;

114. Lee discloses this limitation for at least the same reasons presented above for limitation 13(a). *See supra* Section VIII.A.13(a).

[7(b)] identify an end user specified address as well as any URLs associated to the cloaked end user address by an end user profile;

115. Lee in combination with Hardt teaches this limitation for at least the same reasons presented above for limitation 1(c)(ii). *See supra* Section IX.A.1(c)(ii).

[7(c)] determine whether the end user profile contains a previous association between the relying party address and a cloaked relying party email address, wherein the relying party address has a different domain than the cloaked relying party email address;

116. Lee discloses this limitation for at least the same reasons presented above for limitation 13(c). *See supra* Section VIII.A.13(c).

[7(d)] where the end user profile does not contain a previous association between the relying party address and the cloaked relying party email address, then generate a new cloaked relying party email address and associate the new cloaked relying party email address to the end user profile, the cloaked end user address and any of the said associated relying-party URLs, wherein the new cloaked relying party email address is generated with a domain different than the relying party address; and

117. The combination of Lee and Hardt teaches this limitation for at least the same reasons presented above for limitation 1(c)(iv). *See supra* Section XI.A.1(c)(iv).

[7(e)] send the email to the identified end user specified address, wherein the email is configured with a reply-to email address comprising the new cloaked relying party email address.

118. Lee discloses this limitation for at least the same reasons presented above for limitation 13(e). *See supra* Section VIII.A.13(e).

D. Claim 8

The non-transitory computer readable medium of claim 7, wherein the new cloaked relying party email address has a domain that is the same as the cloaked end user address.

119. Lee discloses this limitation for at least the same reasons presented above for claim 14. *See supra* Section VIII.B.14.

E. Claim 19

The non-transitory computer readable medium of claim 13, wherein the user profile is further comprised of at least one URL associated to the cloaked end user address.

120. The combination of Lee and Hardt teaches this limitation. Where a user registers a key 1 record using the Lee-Hardt combination by filling in a webform, the “form filler provides the URL of the form” to the key 1 record as a value to a URL field. *Hardt*, 20:4-9; *See supra* Section IX.B.1(c)(ii).c. Because the key 1 record contains both the URL of the webform and the user’s private address, the Lee-Hardt combination discloses this limitation.

**X. GROUND 3 & 4: OPINIONS REGARDING THE COMBINATION OF
LEE AND LE JOUAN AND THE COMBINATION OF *LEE, HARDT,*
*AND LE JOUAN***

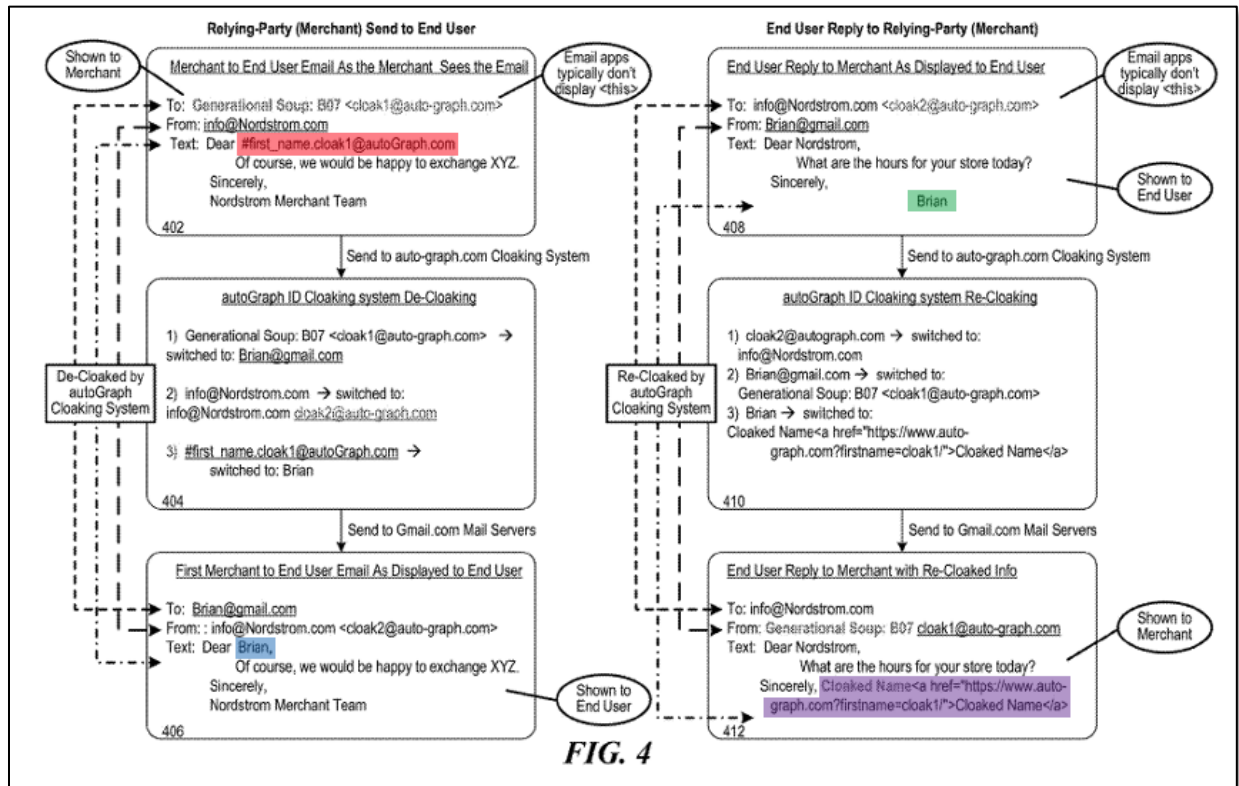
121. The remaining claims recite limitations directed to identifying and processing “cloaked placeholders” within emails. For example, Claim 6 recites an additional step in which the user profile is configured to remove the user’s name from an email, replacing it with cloaked/alias information and protecting the privacy of the user. As set forth in Grounds 1 and 2, Lee alone and the combination of Lee and Hardt disclose all the limitations of the independent claims underlying the additional claims addressed here in Grounds 3 and 4, including limitations directed to cloaking both the end user’s email address and the sender’s email address. As set forth in detail below, a POSITA would have been motivated to modify Lee (alone or in combination with Hardt) to additionally cloak the user’s personal information pursuant to Le Jouan. Le Jouan discloses a controlled data management system with an email personalization engine 514 that is capable of creating dummy values for personal user information and to cloak and de-cloak that information, protecting the user’s privacy. *Le Jouan*, [0144-45] (“When a user sends an email to a third party entity, the email personalization engine 514 can remove sensitive information, replace the sensitive information with dummy values or aliases, or the like.”). Further, Le Jouan discloses that user’s personal information can include a name, among other identifying information. *Id.*, [0030].

A. Ground 3: Claims 15-18 are obvious over Lee in view of Le Jouan

a. Claim 15

The non-transitory computer readable medium of claim 13, further comprising instructions that are executable by the processor electronics to cause the processor electronics to determine if the email comprises a cloaked placeholder.

122. The combination of Lee and Le Jouan render obvious this limitation. The '107 Patent teaches that “cloaked placeholders” may be used to cloak personal information contained in an email. '107 Patent, 11:39-51. Fig. 4 illustrates this process in both the merchant->consumer direction and the consumer->merchant direction. As illustrated on the left, a merchant may send an email to the consumer, using a **placeholder for the consumer's name**, which the cloaking system will replace with the **user's actual name** when the email is delivered. In the opposite direction, as illustrated on the right, a consumer may draft an email including their **actual name**, which the system can identify and replace with a **cloaked placeholder** before delivering the message to the merchant.



Id., Fig. 4 (annotated).

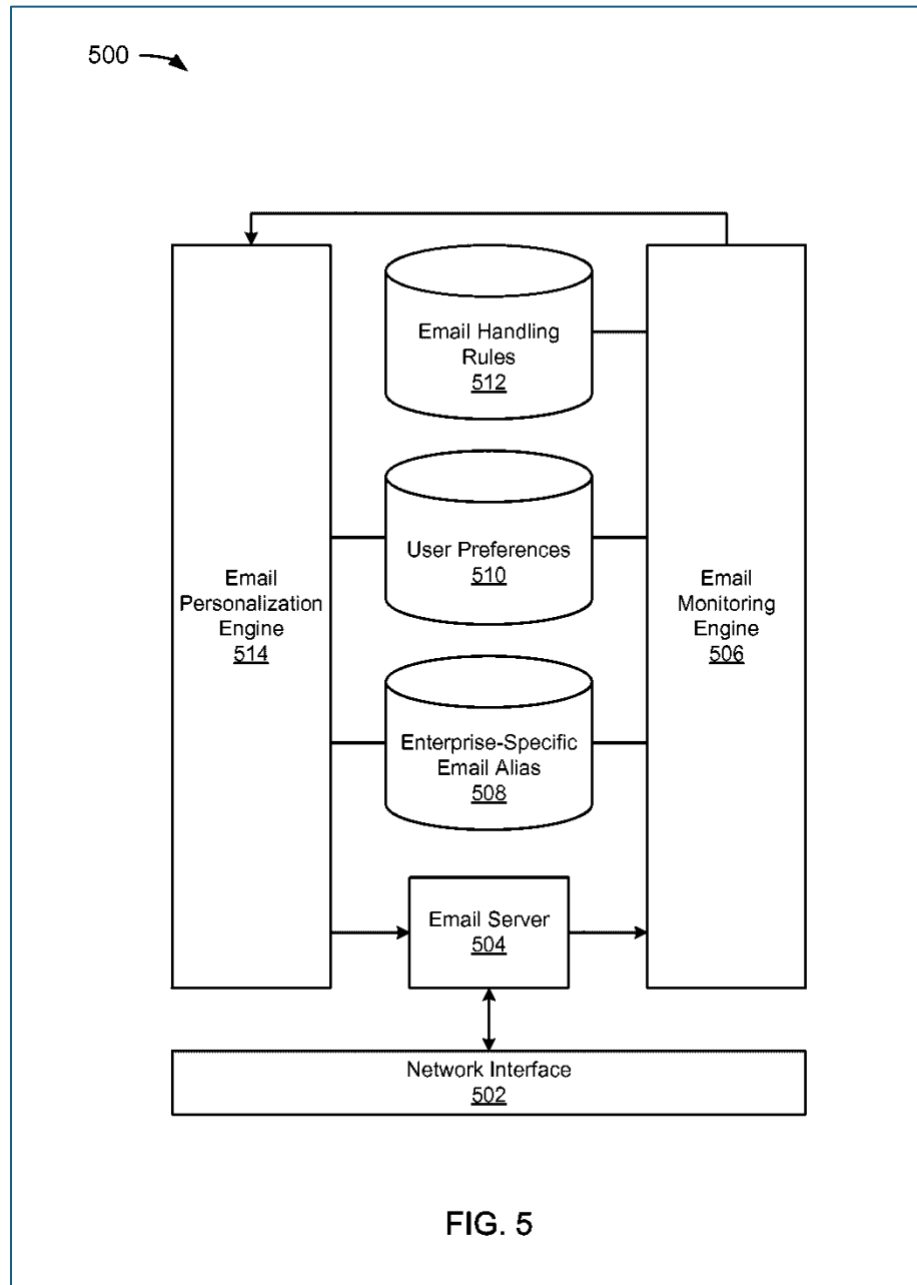
1. *Le Jouan's* Teachings

123. Like the '107 Patent, *Le Jouan* describes a system that “[protects] personal information by generating entity-specific aliases for use in communication with third parties[.]” *Le Jouan*, Abstract. “[P]ersonal information can include name, important anniversaries, home address, business address, home phone, home fax, cell phone, business phone, business fax, personal email” among other information that is associated with a user. *Le Jouan*, [0033]. *Le Jouan* teaches that, not only can a user's email address be cloaked with an email alias, but a user's personal information can also be cloaked, maintaining more comprehensive anonymity:

In a specific implementation, ***the aliased information includes an email alias***. In alternative implementations, the aliased information could include ***an aliased phone number, an aliased name*** (e.g., a doing-business-as “DBA” name), ***an aliased address*** (e.g., a post office box), or the like.

Id., [0066].

124. Relevant to this declaration, Le Jouan discloses an embodiment of an alias-aware email server system 500. *Id.*, [0136], FIG. 5. The architecture of the email server system is shown in FIG. 5 below.



Le Jouan, FIG. 5. The alias aware email server system 500 includes an email personalization engine 514 that can replace sensitive personal information with aliases or dummy values in an outgoing email from a user to a third party:

When a user sends an email to a third party entity, ***the email personalization engine 514 can remove sensitive information, replace***

the sensitive information with dummy values or aliases, or the like.

While the email personalization engine 514 can be configured to automatically identify certain character strings that are likely to include sensitive information, *such as email addresses, URLs, phone numbers, credit card numbers*, or other character strings that have distinctive formats[.]

Id., [0144]. The email personalization engine also works for incoming emails, replacing dummy values or aliases in an email from a third party with actual values:

When a user receives email from a third party entity, *the email personalization engine 514 can update the email with useful information*. For example, the user's email alias can be replaced with the user's actual email address so that the message can be sent to the user . . . [and] *aliases or dummy values could be replaced or the actual values could be added parenthetically next to the aliases or dummy values*[.]

Id., [0145].

125. Although Le Jouan does not expressly mention a user's name as sensitive information that may be anonymized within this Fig. 5 embodiment, a POSITA would have understood that a user's name falls within the category of sensitive information to which this embodiment is directed (or at least would have been motivated to anonymize a user's name consistent with this embodiment). *See* Ex. 1013, 4:7-12 (identifying "a telephone number, a home address, an internet address, a URL, a social security number, an email address, *a name*, a date of birth,

a location of birth, a maiden name, and a number uniquely associated with a service such as a[n] insurance number, among other[s]” as personal information to be protected). Indeed, Le Jouan defines “‘sensitive information’ [as] *personal information that is useful for contacting or identifying the user outside of the system* 300, such as an email address, a physical address, a phone number, or the like.” *Le Jouan*, [0077]. Le Jouan contrasts such user-identifying “sensitive information” with data fields like a user ID from which the user’s identity cannot be ascertained. *Id.* (“Perhaps most information that a user would store in an address book could be considered sensitive information, but *a userid that identifies the user only within a controlled data management system would not be considered sensitive information*, since *that information would not enable a third party to identify the user* without more.”). A POSITA would have understood that a user’s name (e.g., first name, last name, or full name) falls within the category of user-identifying sensitive information of the type Le Jouan’s email personalization engine is intended to cloak. Indeed, Le Jouan at [0066] expressly describes cloaking a name, phone number, and address—all personal information a user may desire to protect from merchants.

2. The Lee-Le Jouan Combination

126. The Lee-Le Jouan combination modifies the email proxy server of Lee with personal information aliasing taught by Le Jouan. Per this proposed

modification, Lee's key 1 record would contain fields for personal information (e.g. a NAME field) and associated aliases (e.g. a NAME_XLATE_TO field). When the user requests a public email address (i.e., Lee's initial alias generation process), the user would be prompted to provide sensitive information (i.e., information to be cloaked) directly to the email proxy server. Per Le Jouan's teachings, dummy values would be created for each item of personal information in the same manner the public email address is created. *See Le Jouan*, [0135] (teaching providing an alias to a user so that the user can provide the alias to a third party entity). For example, when a user requests a public email, the user would provide their name by filling in a NAME field, the proxy server would generate a dummy value for this name (e.g., "Name1") and store it in a key 1 data field (e.g., NAME_XLATE_TO). When an email is received, the email proxy server would run a modified filter/translate algorithm that searches for character string matching a dummy value (e.g., Name1) and replaces the dummy value with the correct personal information (e.g., the user's name) in the manner disclosed by Le Jouan. *See Le Jouan*, [0145].

127. Relevant to claim 15, in the proposed combination, when an email is received by the email proxy server, the email personalization engine 514 identifies any dummy values in the email ("cloaked placeholder") and "update[s] the email with useful information" such as the user's actual name, rather than the public/alias name. *Le Jouan*, [0145].

3. Motivation to Combine *Lee* with *Le Jouan*

128. A POSITA would have been motivated and found it obvious to combine the email proxy server of *Lee* with the functions of the email personalization engine 514 taught by *Le Jouan*. First, a POSITA would have recognized that replacing sensitive information with dummy values when sending emails to a third party and replacing those dummy values with the actual values when receiving emails from a third party as taught by *Le Jouan* would benefit the email proxy server of *Lee* in the same way it benefits *Le Jouan*. Namely, as *Le Jouan* expressly teaches, this protects personal information included in the body of emails. *KSR Int’l Co.*, 550 U.S. 398 at 417 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious[.]”); see *Le Jouan*, [0144] (system automatically identifies character strings in emails that include sensitive information and replaces the strings with dummy values). A POSITA would have recognized that such functionality desirably provides users with the ability to protect personal information included in emails received and processed by the email proxy server of *Lee*. It was widely acknowledged that personal information provided to third parties poses a threat to consumers if that information is sold, stolen, and/or otherwise obtained by bad actors. See Ex. 1013, 1:6-10 (explaining criminals can use personal information “to cause harm to others’ reputation, financial status, and general well being.”).

129. Supporting the conclusion that it would have been obvious to benefit Lee's system with the protection of other information as taught by Le Jouan, Lee and Le Jouan describe "similar devices." For example, each reference discloses a system to hide the end user's actual email address from third parties (the email proxy server of Lee and the email server system 500 of Le Jouan). *Compare Lee*, Abstract, with *Le Jouan*, [0136]. Each system also teaches storing personal information and aliases associated to the user including the user's personal email address and one or more public/aliased addresses. *Compare Lee*, 6:9-32 (discussing the key 1 record), with *Le Jouan*, [0132].

130. Based on these similarities and the straightforward nature of the proposed combination, a POSITA would also have had a reasonable expectation of success in making the proposed combination. Improving Lee to store additional values for personal information, associated dummy values, and to recognize and replace the dummy values with actual information would be well within the skill of a POSITA. Indeed, Lee's existing functionality that replaces private emails with public alias emails (and vice versa) is very similar to the private placeholder functionality in the proposed combination—both simply supplant data in pre-determined data fields based on settings in a user profile. Adding additional fields to the key 1 record and replacing dummy values with actual values are both simple

changes implemented via software, the nature of which would have been well within the capabilities of a POSITA.

b. Claim 16

The non-transitory computer readable medium of claim 15, further comprising instructions that are executable by the processor electronics to cause the processor electronics to replace the cloaked placeholder with end user specified information from the end user profile.

131. Le Jouan discloses replacing aliases or dummy values with actual values. *See supra* Section X.A.a.2. In the Lee-Le Jouan combination, the key 1 record includes fields for personal information and fields for dummy values relating to said personal information (end user specified information). *See supra* Section X.A.a.2. When an email is received the email proxy server identifies any dummy values included in the email and replaces each dummy value with the associated value from the key 1 record (“end user profile”). *See Le Jouan*, [0145]. A POSITA would understand that this function is implemented via the processor electronics of Lee. Processor electronics are required to store the information on the key 1 record, as taught in Lee, and to perform (via software) an algorithm to replace values with dummy values.

c. Claim 17

The non-transitory computer readable medium of claim 13, wherein the user profile is further comprised of an end user first name.

132. The combination of Lee and Le Jouan teaches this element. The Lee-Le Jouan combination teaches storing a variety of personal information of a user's choice in the key 1 record. *See supra* Section X.A.a.2. Le Jouan discloses that "personal information can include name," and a POSITA would understand that the name can be any part of a user's full name, including a first name. *Le Jouan*, [0033]. Therefore, the Lee-Le Jouan combination can include a field for first name in the key 1 record.

d. Claim 18

The non-transitory computer readable medium of claim 17, wherein the user profile was configured by the end user to associate the end user first name with a cloaked end user first name placeholder.

133. The Lee-Le Jouan combination teaches the user providing personal information to the email proxy system, which includes the functionality of the email personalization engine 514 of Le Jouan. *Le Jouan* [0144]. The user can choose what information to provide to key 1 record. *See Le Jouan*, [0144]; *See supra* Section X.A.a.2. The information provided by the user may include first name. *See supra* Section X.A.b. A POSITA would understand that the user's first name would be associated with a dummy value ("cloaked end user first name placeholder") in the key 1 record so that the dummy value can be replaced with the actual value. *See*

supra Section X.A.a.2. Further, the user may configure the key 1 record to store a first name and cloaked first name placeholder in the Lee-Le Jouan combination. *See supra* Section X.A.a.2.

B. Ground 4: Claims 3-6 and 9-12 are obvious over Lee in view of Hardt and in further view of Le Jouan

134. As set forth in Ground 3 above, a POSITA would have been motivated to modify Lee pursuant to Le Jouan, satisfying the personal information cloaking limitations of Claims 15-18. Claims 3-6 and 9-12 are materially identical to Claims 15-18, but for their respective underlying independent claims. As noted above, independent claims 1 and 7 are substantively identical to independent claim 13, but for their addition of URL limitations. Ground 2 established that independent claims 1 and 7 are obvious over Lee in view of Hardt, pointing to Hardt's URL teachings, but otherwise relying on the same Lee teachings as set forth in Ground 1 for independent claims 13.

135. Relevant to dependent Claims 3-6 and 9-12, a POSITA would have been motivated and found it obvious to modify the Lee-Hardt combination set forth in Ground 2 pursuant to Le Jouan's personal information cloaking teachings for the same reasons set forth in Ground 3 above. *See Intell. Ventures II LLC v. Ericsson Inc.*, 685 F. App'x 913, 917 (Fed. Cir. 2017) (nonprecedential) (noting "[t]here is no per se rule that requires each subset of prior art references to be independently combined" where each secondary reference can be combined through the primary

reference). Indeed, a POSITA would recognize the addition of Hardt's URL functionalities in Lee's system would have no impact on the motivation to also add Le Jouan's personal information cloaking teachings. The form filler of Hardt allows for a user to generate a public address for use on a specific website and limits the user of the public address to email addresses associated with the URL of said website. Le Jouan allows a user to replace personal information with dummy values. Both functionalities require the use of additional fields in the key 1 record and modifications to the filter/translate algorithm to be implemented. However, these functionalities operate independently from one another, and the inclusion of one would have no bearing on the inclusion of the other. Neither the additional fields or algorithm modifications would prevent a POSITA from being able to implement either or both modifications. A POSITA would have had little difficulty modifying the structure of the key 1 record and the filter/translate algorithm of Lee to contain the desired functionality of both Hardt and Le Jouan. Accordingly, Ground 4 renders obvious Claims 3-6 and 9-12 over Lee in view of Hardt and Le Jouan for the same reasons as set forth in Ground 3 above, discussing Lee in view of Le Jouan.

XI. Conclusion

I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like

Declaration of Loren Terveen
U.S. Patent No. 11,361,107

so made are punishable by fine or imprisonment, or both, under Section 1001 of Title
18 of the United States Code.

Date: September 16, 2024

By: 
Loren Terveen

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Address	Department of Computer Science and Engineering University of Minnesota Minneapolis, MN 55455		
Education	Ph.D. in Computer Sciences	University of Texas	1991
	M.S. in Computer Sciences	University of Texas	1988
	B.A. in Computer Science, Mathematics, History	University of South Dakota	1984
Affiliations	Member of ACM, ACM/SIGCHI		
Research Interests	Human-Computer Interaction, Social Computing, Artificial Intelligence		
Professional Experience	Professor	University of Minnesota	2002 --
	Distinguished McKnight University Professor		2017 --
	Principal Member of Technical Staff	AT&T Labs - Research	1996-2002
	Member of Technical Staff	AT&T Bell Labs	1991-1996
	Graduate Research Intern	Microelectronics and Computer Corporation	1986-19991
	Teaching Assistant	University of Texas at Austin	1985

AWARDS AND MAJOR ROLES

ACM Distinguished Scientist (awarded 2009)

ACM SIGCHI Academy (2019)

ACM SIGCHI Lifetime Service Award (2023)

ACM SIGCHI President (2015-2018)

ACM Council, SIG Governing Board Representative (2016 – 2018)

RESEARCH

External Funding

NSF:EAGER: Revolutionizing Wikipedia's Relationship with New and Emerging Knowledge (**Co-PI**, with Stevie Chancellor PI), **\$300,000** for 09/01/2023 to 08/31/2025.

Cisco: Detecting and Reducing Bias in Collaborative Virtual Meetings: Field Deployment (**Co-PI**, with Stevie Chancellor PI). **\$141,714** for 8/1/2023 to 7/31/2024.

Northwestern University: Safe and Compassionate ML Recommendations For People With Mental Illnesses (**Co-PI**, with Stevie Chancellor PI). **\$275,000** for 02/2023 to 01/2025

NSF:CISE: Community-Engaged Design and Implementation of a Framework for Ethical Online Communities Research (**Co-PI**, with Svetlana Yarosh PI, Stevie Chancellor Co-PI, Joseph Konstan Co-PI, Kangjie Lu Co-PI), \$400,000 for 01/01/2023 to 12/31/2025.

Cisco: Detecting and Reducing Bias in Collaborative Virtual Meetings (**Co-PI**, with Stevie Chancellor PI). **\$177,915** for 9/1/2021 to 12/31/2022.

NSF:CHS:Small: Incorporating and Balancing Stakeholder Values in Algorithm Design (UMN **PI**), Award Total \$500,000, UMN Share \$243,941 for 8/1/2019 to 7/31/2022.

NSF: EAGER: AI-DCL: Capture, Explain and Negotiate the Inherent Trade-offs in Machine Learning Algorithms (UMN **co-PI**), Award Total \$295,713, UMN Share \$103,267 for 10/1/2019 to 9/30/2022.

NSF:CHS: Small: Collaborative Research: Structured Data Peer Production: Addressing Challenges and Leveraging Opportunities (**PI**), \$249,738 for 9/1/2018 - 8/31/2021.

National Cancer Institute (NCI): Restore: Improving sexual outcomes of gay and bisexual prostate cancer survivors (R. Simon Rosser **PI**; my role: **Co-PI**); \$2,039,220 (directs) \$3,039,541 (total), 2017-2022.

NSF: "PFI:BIC: Smart Human-Centered Collision Warning System: sensors, intelligent algorithms and human-computer interfaces for safe and minimally intrusive car-bicycle interactions" (Co-PI, with Rajesh Rajamani (PI), Max Donath, and Nichole Morris), \$999,773 for September 1, 2016 to August 31, 2019.

NSF: "Computer-Supported Cooperative Work Doctoral Colloquium" (**PI**), \$25,000 for 03/01/2016 to 02/28/2017.

National Institute on Drug Abuse: "A Technology-Delivered Peer-to-Peer Support ARB Adherence Intervention for HIV+ Adults", (Co-PI, with Keith Horvath (PI) and Darin Erickson), \$3,302,62 for 07/01-2015 to 05/31/2020.

NSF: “HCC: Tools and Mechanisms to Support Social Participation Efforts”, **(PI)**, \$499,399 for 10/01/2012 to 09/30/2015.

NSF: “SoCS: Collaborative Research: Novel Algorithms and Interaction Mechanisms to Enhance Social Production”, **(PI)**, \$527,140, for 7/01/2012 to 06/30/2015.

NSF: “Collaborative Research: Supporting Newcomer Socialization in Online Production Communities”, **(PI)**, \$301,135.00 for 08/2011 to 08/31/2015.

Minnesota Department of Transportation: “Statewide Cycloplan: A Bicycle Planning Tool with Participatory GIS”, **(PI)**, \$130,000, for 10/01/2011 to 06/30/2013.

Metropolitan Council: “Cycloplan II”, **(PI)**, \$71,350, for 08/15/2011 to 05/31/2012.

NSF: “Wikisym Doctoral Consortium”, **(PI)**, \$13,163, for 05/01/2011 to 04/30/2012.

IBM: “Mobile Crowdsensing”, **(PI)**, \$100,000 awarded 04/01/2011

NSF: “Social-Computational Systems (SoCS) Community Meeting” **(PI)**, \$48,801 for 09/01/2010 to 08/31/2011

NSF: “SoCS: Collaborative Research: Information Framing: Intelligent Interfaces for an Online Production Community”, **(PI)**, \$375,000 for 09/15/2010 to 08/31/2015.

NSF: “Collaborative Research: Guiding Folksonomy Development to Enable Novel Tagging Applications” **(PI)**, with J. Riedl and S. Sen (Macalester College)). \$949, 788 for 04/1/2010 to 03/31/2014 (UMN Share).

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Metropolitan Council: “Cycloplan” **(PI)**, \$185,000, October 2009 – March 2011.

NSF “Collaborative Research: Understanding Online Volunteer Communities: Toward Theory-Based Design” **(co-PI)**, with J. Riedl, J. Konstan, M. Snyder, & Y. Ren; R. Kraut (CMU) \$2,400,000 for 08/01/2008 to 07/31/2013.

NSF: “Recommender Systems Doctoral Consortium” **(PI)** \$15,415, 2007-2008.

NSF: “Mining Spatiotemporal Data: From Personal Use to Community Knowledge” **(PI)**

\$449,570 for 12/1/2005 to 11/30/2009.

NSF: “Collaborative Research: Mark This! - Operationalizing the notion of "place" for interactive community systems” (PI, with Q. Jones (NJIT) and S. Whittaker (Univ. of Sheffield)). \$173,411 for 6/1/2003 to 5/31/2007 (UMN share).

NSF: “Being There: Mobile Devices for Community and Commerce” (PI, with J. Konstan, J. Riedl, and S. Shekhar). \$120,000 for 9/1/2002 to 8/31/2005.

NSF: “ITR: Collaborative Research: Designing On-Line Communities to Enhance Participation” (co-PI, with J. Konstan & J. Riedl, R. Kraut & S. Kiesler (CMU), P. Resnick and Y. Chen (Univ. of Michigan)). \$1,246,017 for 9/1/2003 to 8/31/2009 (UMN share).

AT&T: “VURI: Collaborative Filtering and Intelligent Interface Design for Enhanced TV Applications” (PI). \$35,000 for November 1, 2008 to October 31, 2009.

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Minnesota/China Collaborative Research Grant: "Expertise Oriented Mining for Web Community". \$10,000 for July 1, 2007 to June 30, 2008 (PI, with Jie Tang, Tsinghua University, Beijing China).

University of Minnesota TEL grant: “The Next Generation Online Learning Environment: Designing for Community and Collaboration”. \$10,000 for September 2006 to May 2007. (co-PI, with Joan Hughes, David Ernst, and Ann Ooms, College of Education and Human Development).

University of Minnesota Digital Technology Center: “Indoor Navigation Aids for Visually Impaired People”. \$25,67 for June 2005 to December 2006. (co-PI, with S. Shekhar and G. Legge).

University of Minnesota Digital Technology Center: “Eye-Tracking Research on Community Websites: Photo Directories and Building Social Networks”. \$19,300 for June 2004 to June 2005. (co-PI, with J. Konstan).

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2. Mo Houtti, Moyan Zhou, Loren Terveen, and Stevie Chancellor. “All of the White People Went First”: How Video Conferencing Consolidates Control and Exacerbates Workplace Bias. *PACM Human-Computer Interaction* (2023).

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Book Chapters

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132. Amento, B., Terveen, L.G and Hill, W. From PHOAKS to TopicShop: Experiments in Social Data Mining, in Lueg, C. and Fisher, D. (ed.), *From Usenet to CoWebs: Interacting with Social Information Spaces* (2002), Springer.
133. Whittaker, S., Terveen, L.G, Hill, W.C., and Cherny, L. The Dynamics of Mass Interaction, in Lueg, C. and Fisher, D. (ed.), *From Usenet to CoWebs: Interacting with Social Information Spaces* (2002), (this chapter is a reprint of Whittaker et al 1998), Springer.
134. Terveen, L.G and Hill, W. Beyond Recommender Systems: Helping People Help Each Other, in Carroll, J. (ed.), *HCI in the New Millennium* (2001), Addison Wesley.
135. Terveen, L.G. Computer-Mediated Collaboration, in *More than Screen Deep: Toward Every-Citizen Interfaces to the Nation's Information Infrastructure* (1997), National Academy Press.

Other Publications

136. Konstan, J.A., and Terveen, L.G. Human-centered recommender systems: Origins, advances, challenges, and opportunities. *AI Magazine*, 2021.
137. Terveen, L. "Autonomous" agents? What should we worry about? What should we do? *Human-Computer Interaction*.
138. Kaur, A., Smith, C. E., and Terveen, L. Sway Together, Stay Together: Visualizing Spiritual Support Networks Through the SoulGarden Prototype. In *Extended Abstracts of CSCW 2021*.
139. Kaur, H., Johnson, I., Miller, H., Terveen, L., Lampe, C., Hecht, b., and Lasecki, W. Oh The Places You'll Share: An Affordances-Based Model of Social Media Posting Behaviors. In *Extended Abstracts of CHI 2017* (ACM Conference on Human Factors in Computing Systems). 40% acceptance rate.
140. Masli, M. and Terveen, L. Geographical Social Production: Lessons from Cyclopath, in CHI 2013 GeoHCI Workshop.
141. Masli, M., Bouman, L., Owen, A., and Terveen, L. Geowiki + route analysis = improved transportation planning, CSCW 2013 Interactive Poster.
142. Brady, S. S., Sieving, R. E., Terveen, L. G., Rosser, B. R. S., Kodet, A. J., & Rothberg, V. D. (2012, October). *TeensTalkHealth: An interactive website to promote healthy relationships and prevent STIs*. Paper presented at the annual meeting of the American Public Health Association, San Francisco, CA.
143. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "The role of community orientation in promoting online participation" (with J. S. Kim, P. C. Dwyer, J. Filson Moses, P. T. Fuglestad, C. A. Mannino, R Davies, & M. Snyder)
144. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Applying a functional approach to participation in online groups" (with P. T. Fuglestad, P. C. Dwyer, J. Filson Moses, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
145. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Past volunteerism predicts amount of content contributed in an online community" (with P. C. Dwyer, J. Filson Moses, P. T. Fuglestad, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
146. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Social motives and personality as predictors of online participation" (with J. Filson Moses, P. C. Dwyer, P. T. Fuglestad, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
147. Kapoor, N., Frankowski, D., Konstan, J., and Terveen, L. Lessons Learned in Implementing the CHIplace Online Community, in *Proceedings of Human-Computer Interaction International 2005*.
148. Zhou, C., Ludford, P., Frankowski, D., and Terveen, L. An Experiment in Exploring How People Describe Places, Short Paper in *Proceedings of Pervasive 2005*.
149. Zhou, C., Ludford, P., Frankowski, D., and Terveen, L. An Experiment in Discovering Personally Meaningful Places from Location Data, Short Paper in *Proceedings of CHI 2005*.
150. Kapoor, N., Konstan, J., and Terveen, L. How Peer Photos Influence Member Participation in Online Communities, Short Paper in *Proceedings of CHI 2005*.
151. Amento, B., Hill, W., and Terveen, L. The Sound of One Hand: A Wrist-mounted Bio-acoustic Fingertip Gesture Interface, Short Paper in *Proceedings of CHI 2002*, 724-725. 33% acceptance rate.
152. Terveen, L., Hill, W., and Amento, B. Collaborative Filtering to Locate, Comprehend, and Organize Collections of Websites, in SIGART Bulletin, 9, 3&4 (1998), 10-17.

153. Terveen, L., Hill, W., Amento, B., McDonald, D., and Creter, J. 1997. PHOAKS: a system for sharing recommendations. *Commun. ACM* 40, 3 (Mar. 1997), 59-62.
154. Terveen, L.G., Stolze, M., and Hill, W. From 'Model World' to 'Magic World', in *SIGCHI Bulletin*, 27, 4 (1995), 31-34.
155. Terveen, L.G., Papavero, E., and Tuomenoksa, M. DynaDesigner: A Tool for Rapid Design and Deployment of Device-Independent Interactive Services, Refereed Formal Demonstration in *Adjunct Proceedings of CHI'95*, 29-30.
156. Terveen, L.G. Person-Computer Cooperation through Collaborative Manipulation. Ph.D. Thesis, University of Texas Department of Computer Sciences, 1991.

Invited Presentations

Carnegie Mellon University

Northwestern University

The University of California Irvine

Carleton College

Twin Cities MetroGIS Policy Board

Hennepin County Bicycle Advisory Committee

University of Minnesota Digital Humanities Collaborative

University of Minnesota Advanced Transportation Technologies Seminar Series

Georgia Tech

University of Minnesota Urban Ecosystems Symposium

University of Minnesota New Media

IBM T.J. Watson Research

University of Illinois

University of Maryland

University of Washington

Carnegie-Mellon University

Swedish Institute of Computer Science / Royal Institute of Technology

Uppsala University, Sweden

New Jersey Institute of Technology

Microsoft Research

Vassar University

Rensselaer Polytechnic Institute

University of Colorado

Virginia Tech

University of Nebraska

Conference Presentations

- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2014.

- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2012.
- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2002.
- ACM Conference on Computer-Supported Cooperative Work (CSCW), 1998.
- ACM Conference on Human Factors in Computing Systems (CHI), 1998.
- ACM Conference on Design of Interactive Systems, 1997.
- ACM Conference on Human Factors in Computing Systems (CHI), 1997.
- ACM Conference on Human Factors in Computing Systems (CHI), 1996.
- IFIP TC13 International Conference on Human-Computer Interaction (INTERACT), 1995.
- IEEE Conference on Knowledge-Based Software Engineering, 1994.
- ACM Conference on Human Factors in Computing Systems (CHI), 1993.
- Conference on Information and Knowledge Management, 1993.
- Conference on Information and Knowledge Management, 1992.
- National Conference on Artificial Intelligence (AAAI), 1991.
- International Joint Conference on Artificial Intelligence (IJCAI), 1991.
- National Conference on Artificial Intelligence (AAAI), 1990.

Workshop Presentations

- CHI 2013 GeoHCI Workshop
 - “Geographical Social Production: Lessons from Cyclopath”
- CSCW 2002 Workshop on “The Role of Place in Shaping Virtual Communities”:
 - “Place-Based Community Information Systems”.
- CHI 99 Workshop on “Interacting with Recommender Systems”:
 - “Visualization Interfaces for Recommender Systems”.
- 1999 Human-Computer Interaction Consortium Workshop:
 - “A Reference Task Agenda for Human-Computer Interaction”.
- 1998 AAI Workshop on “Recommender Systems”:
 - “The PHOAKS Recommender System”.
- 1997 Human-Computer Interaction Consortium Workshop:
 - “The PHOAKS Recommender System”.
- 1995 Lifelike Computer Characters Workshop:
 - “Hidden Hands, not Talking Heads: The Magic World Interaction Paradigm”.
- 1995 Lifelike Computer Characters Workshop:
 - “Moving Agent-User Voice Dialogue towards Natural Conversation”.
- CHI 95 Workshop on “‘Model World’ to ‘Magic World’: Making Visual Objects the Medium for Intelligent Design Assistance”:
 - “The ‘Magic World’ Approach to Human-Computer Collaboration”.

- 1993 AAAI Fall Symposium: “Human-Computer Collaboration: Reconciling Theory, Synthesizing Practice”:
 - “A Framework for Human-Computer Collaboration”
- 1993 AI-ED Workshop on “Collaborative Problem Solving: Theoretical Frameworks and Innovative Systems”:
 - “Collaborative Problem Solving in Interactive Systems”.
- 1992 CAIA Workshop on “Applying AI To Software Problems: Assessing Promises and Pitfalls”:
 - “Representing and Disseminating Software Design Knowledge”.
- 1992 AAAI Spring Symposium on “Cognitive Aspects of Knowledge Acquisition”:
 - “In The Footprints of The Masters: Embedding Knowledge Acquisition in Organizational Activity”.
- AAAI 90 Workshop on “Complex Systems, Ethnomethodology, and Interaction Analysis”:
 - “Resources for Person-Computer Collaboration”.
- 1990 AAAI Spring Symposium on “Knowledge-Based Human-Computer Communication”:
 - “Tools for Human-Computer Collaboration”.

Patents

U.S. Patent # 5,388,188. Apparatus and methods for providing design advice. (with P. Selfridge). Issued February 7, 1995.

U.S. Patent #5,659,724. Interactive data analysis apparatus employing a knowledge base. (with A. Borgida, R.J. Brachman, T. Kirk, and P. Selfridge). Issued August 19, 1997.

U.S. Patent #5,680,530. Graphical environment for interactively specifying a target system (with P. Selfridge). Issued October 21, 1997.

U.S. Patent #5,806,060. Interactive data analysis employing a knowledge base. (with A. Borgida, R.J. Brachman, T. Kirk, and P. Selfridge). Issued September 8, 1998.

U.S. Patent # 5,809,492. Apparatus and method for defining rules for personal agents. (with L. Murray). Issued September 15, 1998.

U.S. Patent # 5,953,393. Personal Telephone Agent. (With P. Culbreth, P. Danielsen, R.J. Hall, E. Papavero, and M. Tuomenoksa). Issued September 14, 1999.

U.S. Patent #6,029,192. System and method for locating resources on a network using resource evaluations derived from electronic messages. (with W.C. Hill). Issued February 22, 2000.

U.S. Patent #6,244,873. Wireless myoelectric control apparatus and methods. (with W.C. Hill, F.C. Pereira, and Y. Singer). Issued June 12, 2001.

U.S. Patent #6,256,648. System and method for selecting and displaying hyperlinked information resources. (with W.C. Hill). Issued July 3, 2001.

U.S. Patent #9,430,043. Bioacoustic Control System, Method, and Apparatus. (with B. Amento and W.C. Hill). Issued August 30, 2016.

CONSULTING

This is my consulting record for the years 2019-2023. I have received compensation for the patent litigation cases listed below in these years. I provide details for the cases where my role unless the client requested I do not do so; in the latter case I provide general descriptions.

- (2023) Retained by on behalf of a software, hardware, and consumer electronics company. General technology area: graphical user interfaces.
- (2023) Retained by on behalf of an ecommerce company. General technology area: graphical user interfaces.
- (2023) Retained by Unified Patents. General technology area: online advertising. Writing declaration in support reexamination petition.
- (2023) Retained on behalf a consumer and information technology company. General technology area: graphical and touch-based user interfaces. Writing declaration in support of inter partes review petitions.
- (2023) Retained on behalf of a computer software, hardware, and consumer electronics company. General technology areas: graphical user interfaces for web information access Writing declaration in support of inter partes review petitions.
- (2022) Retained on behalf of a computer software company. General technology areas: map-based user interfaces, mobile computing, messaging. Writing declarations in inter partes review proceedings involving patents owned by the company.
- (2022) Retained as expert witness on behalf of a computer software and hardware company. General technology area: group collaboration systems. Writing declaration in support of inter partes review petitions.
- (2022) Retained as expert witness on behalf of a consumer electronics company. General technology area: graphical user interfaces. Analyzed possible infringements of the company's patents.
- (2022) Retained as expert witness on behalf of a computer software company. General technology areas: Web-based and mobile user interfaces.
- (2022) Retained as expert witness on behalf of a computer software company. General technology areas: Web-based and mobile user interfaces.
- (2021) Retained to write declaration in support of inter partes review petitions. General technology area: information discovery.

- (2021) Retained on behalf of a computer software and hardware company. General technology area: graphical user interfaces. Writing declaration in support of inter partes review petitions.
 - **Deposed: September 2022**
- (2021) Retained on behalf of a computer software and hardware company. General technology areas: web information access, voice interaction, home automation. Writing declaration in support of inter partes review petitions.
- (2021) Retained on behalf of a computer software company. General technology area: multimedia messaging. Analyzing potential infringement of company's patents.
- (2021) Retained on behalf of a computer software company. General technology areas: map-based user interfaces, mobile computing, messaging. Writing declarations in support of patent holder's position in *ex parte* reexaminations.
- (2020) Retained on behalf of a computer software and hardware company. General technology area: information processing, hypertext, inference. Writing expert reports.
- (2020) Retained on behalf of a computer software and hardware company. General technology area: graphical user interfaces. Analyzed potential invalidity of patents.
- (2020) Retained by on behalf of a consumer electronics company. General technology area: graphical user interfaces. Analyzed possible infringements of the company's patents.
- (2020) Retained by Erise IP on behalf of Apple
 - Worked on *Inter Partes* review declaration
 - **Deposed: December 2020**
- (2019) Retained on behalf of Comcast. General technology area: interactive program guide systems. Writing expert reports.
 - **Deposed July 2021**
 - **Testified July 2022**
 - **Testified at jury trial April 2022:** Judge William Jung of the U.S. District Court for the Middle District of Florida granted judgment as a matter of law of no infringement for Comcast.
- (2019) Retained on behalf of a computer and internet software company. General technology area: information search. Did not write expert reports.
- Retained by O'Melveny & Myers on behalf of Google (2019)

SERVICE

University of Minnesota Committees

- College of Science & Engineering Consultative Committee: 2015-2018
- College of Science & Engineering Honors & Awards Committee, 2017-2020

External Professional Activities

ACM Special Interest Group on Computer Human Interaction

- President: 2015-2018
- Executive Committee: Adjunct Chair for Awards, 2012 – 2015.
- Executive Committee: Vice President for Membership and Communication, 2009 – 2012.

Conference Chair

- CHI 2002: ACM Conference on Human Factors in Computing Systems
- IUI 1998: ACM Conference on Intelligent User Interfaces.

Program Committee Chair

- CSCW 2004: ACM Conference on Computer-Supported Cooperative Work.
- CSCW 2013: ACM Conference on Computer-Supported Cooperative Work.

Computer Supported Cooperative Work (CSCW) Steering Committee

- Chair, 2012-2014 (First elected Chair of the committee that oversees the CSCW Conference and the general CSCW and Social Computing research community.)

Awards Committee Chair

- CSCW 2008: ACM Conference on Computer-Supported Cooperative Work.

Journals Edited

- Special Issue of *Knowledge-Based Systems* on Human-Computer Collaboration, Vol. 8, No. 2-3, 1995.

Proceedings Edited

- Proceedings of the 2002 ACM Conference on Human Factors in Computing Systems (CHI 2002).
- Proceedings of the 1998 ACM Conference on Intelligent User Interfaces (IUI 1998).

Editorial Boards

- Communications of the ACM, 2009-present.
- ACM Transactions on CHI, 2000-2006.

- Knowledge-Based Systems, 1993-2009.
- *ACM intelligence*, 1998-2001.

Program Committees

- ACM Conference on Human Factors in Computing Systems (CHI): 1999-2004, 2006, 2016.
- ACM Conference on Computer-Supported Cooperative Work (CSCW): 2000, 2006, 2008, 2010, 2011, 2012, 2015.
- ACM Conference on Intelligent User Interfaces (IUI): 1997-2000, 2004.
- ACM Recommender Systems Conference: 2007, 2008, 2009, 2010, 2013.
- ACM GROUP Conference: 2007, 2009, 2010.
- ACM SIGIR Conference: 2008.
- AAAI Conference on the Web and Social Media: 2011, 2012, 2016.
- User Modeling, Adaptation, and Personalization: 2011, 2016.
- NordiCHI 2008, 2010.
- Communities and Technology: 2009.
- Computer-Supported Cooperative Learning 2002.
- User Modeling: 2001.
- International Conference on Knowledge Capture 2001.
- Knowledge-Based Software Engineering (KBSE): 1994-1999.
- Intelligent Data Analysis: 1997.
- National Conference on Artificial Intelligence (AAAI): 1996-1997.
- IEEE Conference on Artificial Intelligence for Applications (CAIA): 1994.
- International Workshop on Privacy-Aware Location-based Mobile Services: 2007.
- SIGIR Workshop on Future Challenges in Expertise Retrieval: 2008.

Other conference leadership positions

- ACM Conference on Computer-Supported Cooperative Work Doctoral Consortium Co-Chair, 2016 and 2011.
- The 2nd AAAI Conference on Human Computation and Crowdsourcing (HCOMP 2014) Doctoral Consortium Co-Chair.
- International Symposium on Wikis and Open Collaboration Doctoral Symposium Chair, 2011.
- ACM Conference on Recommender Systems Doctoral Consortium, Co-Chair, 2007.
- International Joint Conference for Artificial Intelligence Doctoral Consortium, Co-Chair, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, Co-Chair, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, Co-Chair, 1996.

Reviewer

Journals

- ACM Computing Surveys.
- IEEE Transactions on Data and Knowledge Engineering.
- IEEE Expert.
- Information Systems.
- International Journal of Human-Computer Studies.
- Journal of Computer-Supported Cooperative Work.

Conferences

- Ninth IFIP International Conference on Human-Computer Interaction (INTERACT): 2003.
- ACM Conference on Human Factors in Computing Systems (CHI): 1995-1998.
- ACM Conference on Computer-Supported Cooperative Work (CSCW): 1998.
- ACM Symposium on User Interface Software and Technology (UIST): 1996.
- ISSM Conference on Information and Knowledge Management: 1993.

National Science Foundations Panels

Served on panels in 1996, 1998, 2001, 2003, 2005, 2010, 2012, 2013.

Workshops Organized

- ACM Wikis and Open Collaboration Doctoral Symposium, 2011.
- Social Computational Systems Community Workshop, 2011.
- ACM Computer Supported Cooperative Work Doctoral Consortium, 2011.
- International Conference on Ubiquitous Computing (UbiComp): “Multi-device Interfaces for Ubiquitous Peripheral Interaction”, 2003.
- ACM Conference on Human Factors in Computer Systems (CHI): “Interacting with Recommender Systems”, 1999.
- International Joint Conference for Artificial Intelligence Doctoral Consortium, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, 1996.
- ACM Conference on Human Factors in Computer Systems (CHI): “‘Model World’ to ‘Magic World’: Making Visual Objects the Medium for Intelligent Design Assistance”, 1995.
- ACM Conference on Human Factors in Computer Systems (CHI): “New Uses and Abuses of Interaction History”, 1994.
- AAAI Fall Symposium: “Human-Computer Collaboration: Reconciling Theory, Synthesizing Practice”, 1993.
- World Conference on Artificial Intelligence and Education: “Collaborative Problem Solving:

Theoretical Frameworks and Innovative Systems”, 1993.

- Conference on AI for Applications: “Applying AI To Software Problems: Assessing Promises and Pitfalls”, 1992.

Other Professional Service

- Member of SIGCHI Publications Board and Conference Management Committee, 2002-2004.
- ACM Special Interest Group on Artificial Intelligence Conference Chair (1995-1999); originated and co-organized Doctoral Consortia held in conjunction with AAAI and IJCAI.

Internal Service

- Associate Department Head, 2019-
- Chair, Department Head Search Committee, 2015.
- Chair, Strategic Planning Committee, 2013-2014.
- Chair, Social Computing Faculty Search Committee, 2013-2014.
- Curriculum Committee, 2012-2013.
- Chair, Strategic Planning Committee / Faculty Recruiting Committee, 2011-2012.
- Director of Graduate Studies: 2007-2010.
- Communications Committee: 2007
- Newsletter/Brochure Committee (chair): 2006-2007
- Research Opportunities Committee: 2005-2007
- Curriculum Committee: 2003-2005.
- Hosted Robert Kraut, Cray Colloquium speaker: October 2003.
- Participated in recruiting and admission activities.
- Information, Technology, and Everyday Life Initiative: Committee Member.

TEACHING AND ADVISING

Ph.D. Students Advised

- Dan Cosley (co-advised with John Riedl): completed PhD July 2006, currently an Associate Professor at Cornell University; on leave as Program Director at NSF.
- Pamela Ludford: completed PhD September 2007, currently an independent consultant.
- Reid Priedhorksy: completed PhD August 2010, currently employed at Los Alamos National Laboratories.
- Colin Delong: completed PhD October 2013 (co-advised with Jaideep Srivastava)
- Mikhil Masli: completed PhD July 2013, currently employed at IBM.
- Aaron Halfaker (co-advised with John Riedl): completed PhD September 2013, currently employed at Microsoft.

- Katie Panciera: completed PhD August 2014; currently Assistant Professor at Milwaukee School of Engineering.
- Fernando Torre: completed PhD September 2014; founder of a startup.
- Shuo (Steven) Chang: completed PhD August 2016; currently employed at Facebook.
- Tien Nguyen (co-advised with Joe Konstan): completed PhD August 2016; currently employed at Facebook.
- Morten Warncke-Wang (co-advised with Brent Hecht): completed PhD December 2016, currently employed at the Wikimedia Foundation.
- Andrew Sheppard: completed PhD December 2017, currently employed at Houston Engineering.
- Jacob Thebault-Spieker (co-advised with Brent Hecht): completed PhD December 2017; currently Assistant Professor at The University of Wisconsin.
- Hannah Miller (co-advised with Brent Hecht): completed PhD August 2018; currently Assistant Professor at University of Wisconsin Oshkosh.
- Vikas Kumar (co-advised with Joe Konstan), completed PhD August 2018, currently employed at KenSci.
- Andrew Hall: completed PhD August 2019; currently employed at 3M.
- Bowen Yu (co-advised with Haiyi Zhu), completed PhD December 2018, currently employed at Facebook.
- C. Estelle Smith: completed PhD December 2020; currently Assistant Professor at the Colorado School of Mines.
- Zach Levonian (co-advised with Lana Yarosh): completed PhD July 2022.
- Charles Chuankai Zhang (entered program Fall 2019).
- Mohammed (Mo) Houtti (entered program Fall 2019)
- Moyan Zhou (entered program Fall 2021)
- Ava Bartolome (entered program Fall 2022; co-advised with Stevie Chancellor)

M.S. Students Advised

- Tyler Danielsen – received degree in 2016
- Jie Kang – received degree in 2016
- Zahra Eslami – received degree in 2015
- Yanjie Liu – received degree in 2013
- Renji Yu – received degree in 2012
- Carol Drysdale – received degree in 2011
- Jingwen Zhang – received degree in 2011
- Jisu Oh – received degree in 2010
- Sara Drenner – received degree in 2008

- Anna Rouben – received degree in 2006
- Arjun Sundararajan – received degree in 2006
- Pamela Ludford – received degree in 2005
- Rahul Akolkar – graduated May 2004

Undergraduate Honors / Senior Thesis Students Advised

- Moyan Zhou 2021
- Avleen Kaur 2020
- Harmanpreet Kaur, 2016
- Arlo Siemsen, 2014
- Johnathan Frenz, 2013
- David Pitchford - 2012
- Michael Ludwig - 2010
- Jordan Focht – 2010
- Kurt Wilms - 2005
- John Murphy – 2004

Other Committees

- Hanlin Li, PhD: Member of final examination committee (Northwestern University).
- Matheus Araújo, PhD: Member of preliminary and final examination committees
- Hao-Fei Cheng, PhD: Member of preliminary and final examination committees
- Catherine Grevet, PhD: member of preliminary and final examination committees (Georgia Tech).
- Loxley Wang, PhD: member of preliminary and final examination committees.
- Abigail Bakke, PhD: member of preliminary and final examination committees
- Tahir Sousa, MS: member of final examination committee
- Tony Lam, PhD: member of preliminary examination committee.
- Michael Janseen, PhD: member of preliminary examination committee.
- Haleh Hagh Shenass, PhD: member of preliminary & final examination committees.
- Julie Beilfuss, MS: member of final examination committee.
- Liv Knatterud, MS: member of final examination committee.
- Sean McNee, MS: member of final examination committee.
- Shankar Subrahmanian, MS: member of final examination committee.
- Vamsee Venuturumilli, MS: member of final examination committee.
- Eric Gilbert, Ph.D. Preliminary and Final Examination Committees (UIUC, 2009/2010):

member of thesis committee.

- Yi (Jenny) Zhang, Ph.D. (New Jersey Institute of Technology, 2004): member of thesis committee.
- Brian Amento, Ph.D. (Virginia Tech, 2001): member of thesis committee.
- David McDonald, Ph.D. (UC Irvine, 2000): member of thesis committee.

Courses taught

A list of all the classes I have taught, in most cases multiple times.

- CSCI 8115: Human-Computer Interaction and UI Technology
- CSCI 5125: Collaborative and Social Computing
- CSCI 5116: GUI Toolkits and Their Implementation
- CSCI 5115: User Interface Design, Implementation, and Evaluation
- HSEM 2519H: Honors Seminar on Crowdsourcing
- CSCI 1902: Structure of Computer Programming II
- CSCI 1901H: Introduction to Computer Science (Honors)

Tutorials

“Intelligent User Interfaces: Issues, Approaches, Evaluation”, offered at 1993 Conference on Artificial Intelligence for Applications.