IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Title: TELECOMMUNICATION AND MULTIVOICE VOICE_MEDIA MANAGEMENT METHOD AND APPARATUS	Confirmation No.: 1037

DECLARATION OF THOMAS G. HALLIN UNDER 37 C.F.R. § 1.132

Commissioner for Patents
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I. BACKGROUND & QUALIFICATIONS

1. My name is Thomas G. Hallin. I am currently a consultant in the field of telecommunications. I have been working in this field for more than 40 years.

2. My educational background is as follows: BS Mathematics, Oregon State University 1967; BS Electrical Engineering, Oregon State University 1968; MS Electrical Engineering, Northwestern University 1970 (Thesis: Pipelining of Arithmetic Units); PhD Electrical Engineering, Northwestern University 1976 (Dissertation: Automatic Test Generation for Large Digital Circuits)

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EXPERIENCE

3. 1968 – 1977: Member of Technical Staff, Bell Laboratories. Developed fault diagnostic and fault recovery software for early electronic telephone switching systems (1A ESS and 4ESS). Developed first large-scale digital simulation model to debug complete central processor logic prior to initial manufacture.

4. 1978 – 2000: Technical Manager, Bell Laboratories (later Lucent Technologies): Managed software development projects for International versions of the 1A ESS analog and 5 ESS digital switching systems. Participated in CCITT standards development of the Specification and Description Language tools as editor/author of the base specification, Z.101, in the time between 1981-1984. Managed the element manager development teams for early Hybrid Fiber Coax and VoIP products. Led the software customer support team for the initial Lucent softswitch deployments.

5. 2001 – 2007 Member Technical Staff, Motorola: Developed talker arbitration protocol for VoIP iDEN push-to-talk project (US Patent 7688764). This imbedded talker arbitration signaling into RTP packet headers. Part of team developing interface specifications for a SIP based gateway between circuit based and IP based iDEN push-to-talk systems. Member of OMA (Open Mobile Alliance) team developing PoC (Push-to-talk over Cellular) standards with responsibility for the creation of the talker arbitration protocols. Co-authored RFC4964 that added a SIP header to allow early voice to speed up PoC call setup. Member of 3GPP architecture team developing real-time handover of voice calls between circuit-switched GSM cellular and IMS IP based cellular networks. Member of CableLabs industry team developing PacketCable 2.0 specifications (VoIP over cable) with responsibilities for architecture (specifically integrating 3GPP IMS into PacketCable 2.0) and handover of voice calls between circuit-switched cellular and PacketCable 2.0 via WiFi connected to cable. Member of industry team developing WiMAX standards.

6. 2008 – 2010 Technical Consultant to CableLabs and CSC: For CableLabs, conducted studies on PacketCable 2.0 deployments and studies related to area wide WiFi

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over cable development. For CableLabs and CSC, acted as the CableLabs representative developing Industry Requirements for the cable access network for the NGETS (Next Generation Emergency Telecommunications System) project, with responsibilities to define the cable access network interface to IMS SIP proxy servers and the DOCSIS requirements to enable emergency communications in time of extreme network overload.

7. I am a named inventor on 8 issued U.S. patents and 9 pending U.S. patent applications, which relate to communication and messaging systems, protocols and methods.

II. MY STATUS AS AN INDEPENDENT DECLARANT

8. I have been retained in this matter by Voxer, Inc. to provide an analysis of the scope and content of their U.S. Patent Application Serial No. 13/555,034 entitled Telecommunication and Multimedia Management Method and Apparatus (hereinafter referred to as "the '034 application") relative to that of U.S Patent 7,283,809 (hereafter referred to as "Weinman"), which was cited as a reference in the Office Action dated April 17, 2013.

9. I am being compensated for my time spent on this matter at a rate of $200 per hour, but I have no financial interest in the outcome of this or any related proceeding. My compensation is not contingent upon the outcome of this proceeding, or dependent upon the content of my opinions.

10. As described above, I have extensive experience in the relevant field. Based on my experience, I have a good understanding of the relevant field at the time the '034 application was filed.

III. DESCRIPTION OF THE RELEVANT FIELD OF ENDEAVOR

11. Historically, there have been two types of electronic communication systems, synchronous and asynchronous, store and forward, messaging.

12. Synchronous communication systems support "live" or real-time communication. Synchronous communication systems require the involved parties to coordinate with one another (i.e., "synchronize") before any communication may take place. The synchronization effort typically requires the parties to establish a circuit or some other network connection defining a communication path between the parties before any communication may begin. Once the connection is established, the parties may exchange media. Telephone calls are the most common type of synchronous communication.

13. With store and forward messaging, communication takes place in the form of asynchronous messages. As a message is created, the media is locally stored on the transmitting device. Once complete, the user typically implements a "send" or an analogous command, resulting in the transmission of the message. One or more servers on the network then route the message to the recipient. At each server, the entire message is saved and the integrity of the entire message is verified before forwarding the message. When the message arrives at a receiving device associated with the recipient, an audio and/or visual notification is typically generated. The recipient may then review the message from storage on the receiving device, whenever convenient. Store and forward systems are considered asynchronous because no effort to coordinate or otherwise synchronize between the parties needs to take place before a message is sent.

14 Although both relate to electronic communications, synchronous and store and forward, messaging communication systems have opposing objectives. Synchronous systems provide timely delivery of media in support of live or real-time communication, at the expense of ensured or guaranteed delivery. Synchronous communications rely on first establishing agreed upon media path(s) between the communicating parties and then transmitting media over the agreed path(s) in real-time. If the connection or link cannot be established, or breaks, then no communication may take place.

15. On the other hand, store and forward, messaging provides ensured delivery at the expense of timely delivery. Store and forward systems rely on an agreed message structure between a communicating party and its network server. When either the server or the communicating party have a message available for transmission, they send it using the

agreed messaging structure and the communicating party's reported location and availability to send or receive messages. In a store and forward system, there are no end-to-end network connections or links between the sending and receiving parties. Instead, all media paths are link-by-link, meaning at each transmitting device along the delivery path to the recipient, the complete message is stored, the integrity of the message is checked, and then the message is forwarded to the next device along the delivery path. With storage and integrity checking, delay is allowed and error checking is enabled between devices. As a result, conventional, store and forward, messaging systems are incapable of supporting live or real-time communication, since media is not progressively transmitted as it is created. Due to the protocols that dictate how each works, the features and attributes of synchronous systems and store and forward systems are not interchangeable. For this reason, the two types of communication systems have remained separate and distinct.

16. Prior to June 28, 2007 (the earliest priority date of the '034 application), known cellular communication systems could generally be categorized into one of two types; either cellular phone calls over wireless networks, or, store and forward messaging systems.

17. Early cellular voice communications systems were modeled on the existing wire-line circuit switching systems and connected directly to them. They required first setting up a circuit connection between the end parties and then communicating in real time over the established connection. Since cellular communication allows a user to move from one location to another, cellular devices are required to identify themselves to the network. In addition, protocols that allow the sharing of the airways between multiple devices are needed. For a landline phone, the connections were very reliable, but for a cellular user, the over-the-air link between the user's phone and the network was often unreliable and temporarily unavailable.

18. Voice over IP (VoIP) systems have more recently been deployed in place of the existing circuit switched connections for both landline and cellular over IP networks. Unlike the direct-wired connection between a landline and a central office switching

system, a smart IP aware client is placed in the user's device and an IP connection is created between the user's device and an IP aware network server. VoIP systems do not rely on a fixed wired relationship between a user's device and a network switching system server. Because of the wide variety of potential client devices and codecs, signaling standards (e.g. Session Initiation Protocol or "SIP") were defined by the industry and are used to negotiate between potentially dissimilar client devices in setting up communication links between the parties.

19. Landline and cellular phone calls, regardless if based on circuits or SIP connections, are real-time systems that are limited by the underlying reliability of the network. Landline, circuit switched, telecommunications systems have evolved to provide high quality real-time communication services by carefully controlling the network from end-to-end. The reliability of cellular systems, however, is inherently limited by the capability of the over-the-air network. Since there is no control on where the end user's device (e.g., cell phone) is located, or if it is turned on, there is no way to guarantee the quality of a connection or that a connection can be established. For example, if a network connection cannot be established, or if a connection between two parties breaks, then no communication may take place. Any media transmitted over a non-existent and/or broken link will not be delivered and will be irretrievably lost.

20. To address both the cost and unreliability of cellular communications, cellular text messaging systems were created. Cellular messaging systems are based on the store and forward model. Created messages are stored on transmitting devices and then transmitted over shared over-the-air links to reliably deliver the messages, when the sender and/or recipient have suitable quality links. These messages were limited in size and various error correction methods were used to ensure their transmission.

21. Since cellular store and forward messaging systems are not real-time systems, it is possible to create mechanisms to ensure delivery and quality. This may mean waiting several hours or days until a suitable link is available to transmit the message, for example, in a situation when a recipient is out of network coverage when a message is sent. Upon

returning to network coverage, the network delivers the message out of storage. In addition, transmission techniques may be used that break a message up into pieces and then send the pieces with error detection bits to enable the receiver device to detect erred or missing packets and to request retransmissions until the message is successfully received.

22. I am not aware of any store and forward messaging systems that progressively transmit media content as it is created. As a result, I am not aware of any store and forward, messaging system capable of supporting real-time communication.

IV. THE VOXER INVENTION- STORE & STREAM

23. Paragraph [0158] of the '034 application defines progressive communication as: ". . . ***the term progressive or progressively is intended to be broadly construed and generally mean the continuous processing of a data stream based on availability of the data.***" This definition is consistent with the use of "progressive" by those skilled in the art in the context of transmission and/or progressive rendering of a data stream.

24. The 13/555,034 application describes progressive, store and forward, messaging. Unlike conventional messaging where only complete messages are transmitted out of storage, with progressive, store and forward, messaging, the transmission and storage of a voice (or possibly other types of media) message begins and proceeds as the voice message is created. That is, when a user starts to talk (or otherwise creates media), the ***transmission*** and storage of the message begins and continues ***progressively*** as the media of the message is created, so that an intended recipient may review the message in near real-time. (See for example the general discussion of the Store and Stream module 24 provided in paragraphs [0106] through [0112], the Transmit function performed by the Store and Stream module 24 in paragraph [0120] and the operational flow diagrams of the Store and Stream module 24 as described in paragraphs [0149] through [0158] with respect Figs 8A-8F.) In addition, each Server 16 along the delivery path also progressively stores and progressively transmits the message until the message is delivered to and stored on a communication

device associated with the recipient. (See the description of the Server(s) 16 provided in paragraphs [0124] through [0130] with respect to Fig. 3 and operational flow diagrams 8A-8F as described in paragraphs [0149] through [0158].) Similar to real-time communication systems, the progressive transmission and delivery of messages, as the voice media is created, enables the recipient to selectively review the message in near real-time (delayed only by the inherent latency on the network). But unlike real-time systems, no circuit or other network connection between the parties is needed before the message can be sent. See the Summary of the Invention provided in paragraphs [0017] through [0021] and the "Functional Overview" provided in paragraph [0039].

V. SCOPE AND CONTENT OF WEINMAN – STORE & FORWARD

25. Weinman is directed to a conventional, store and forward, system. The Abstract of Weinman explains that users of a mobile device (e.g., cell phone) "*can compose and store audio messages in their respective local devices whereby the messages are subsequently forwarded to a network entity for eventual transmission to one or more destination devices*." This suggests that Weinman contemplates the use of a conventional, store and forward, messaging technology.

26. Weinman is directed to improving the transmission of voicemail messages over the unreliable and/or unavailable wireless network connection between a user's mobile device and a base station. Prior to Weinman, as explained above, voice messaging relied on a real-time connection to a voice mail server in the network, typically associated with the recipient of the message. The voice mail server was responsible for receiving uploaded messages, storage of the messages, and downloading the messages to intended recipients. This model is still used today with most mobile phone subscribers, with the exception that received messages are sometimes now locally stored with certain "smart" phones. The above-described voice messaging system works well for landlines, where reliable and continuous network connections exist. For a cell phone user, however, an unreliable or non-existent network connection creates a problem where the user may not be able to deliver a voicemail message or the message may be unintelligible by the recipient.

27. In the Background of the Invention, Weinman discusses the above-defined problem in detail. Weinman recites (in column 1, lines 58 through 62):

> "*Similarly, consider a situation such as a user with a call phone driving through an area with spotty reception. The user may start leaving a message, only to lose reception. The user would then be unsure of whether the message was fully received, whether it was garbled, and so forth.*"

28. Weinman's solution for such unreliable connections is a system similar to text messaging, but for voice messages. Weinman applies specific algorithms to address the unreliability or unavailability of the network connection between a sending mobile device and the network, with focus on the over-the-air link between a mobile device and the base station. To do this, Weinman adds voice message storage on the transmitting mobile device to allow message creation offline (e.g., while in an airplane in Weinman's example) and/or in situations of "***spotty***" or non-existent network connectivity. Weinman further describes how the packets of uploaded messages are reliably transmitted, reassembled in their proper order on the network (Column 4, lines 11-29, including two transmission algorithms provided in Column 4, line 30, through Column 5, line 24), and then stored in a network message store 430. Only after the "***complete message***" is received and stored in the message store 430 (Fig. 4, and Column 7, lines 44 through 47), is the message available for delivery over the recipient's network(s) 500 to the destination device. In all described examples, Weinman is showing how to solve the problem of voicemail message transmission and delivery by an originating mobile device over unreliable or unavailable wireless links by transmission out of storage.

29. Fig. 2 of Weinman is a flow chart that illustrates the steps performed by the originating mobile device and the network for the creation and reliable delivery of messages. The sequence includes: creating and editing message(s) on an originating mobile device (step 110); local storage of the message(s) on the originating mobile device (step 120); the reliable transmission of the message(s) from the originating mobile device to an edge device or base station located on a wireless network (step 130); and the delivery of the message(s) to a destination mobile device (step 140). In addition, a feedback arrow

from box 120 to box 110 signifies that messages may be edited and/or re-recorded before transmission in step 130.

30. With regard to step 130, Weinman provides pseudo-code that is suitable for reliably delivering messages out of storage by an originating mobile device over a possibly intermittent connection in accordance with his invention. More specifically, two pseudo-code examples are provided at Column 4 line 25 through Column 5, line 24.

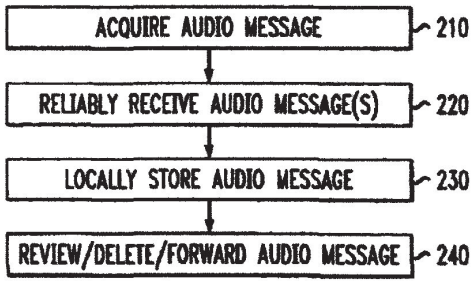
31. In the first pseudo-code example (Column 4, lines 31-58), a message is divided into "***n***" numbered packets. The total packet count "***n***" is then transmitted with each packet. Therefore, the total packet count "***n***" associated with a message must be known before the message is transmitted. At the base station receiver, the value of "***n***", along with the packet sequence numbers, is used to identify when all of the packets of the message have been received. When all packets have been received, the message is reassembled (Column 4 line 58), and then in step 140, the message is forwarded to its ultimate destination (Column 5, line 34-35).

32. In the second example, pseudo-code is provided for sending multiple messages "***m***". In this example, the messages to be sent are divided into packets and marked as unsent. Thus, the number of messages "***m***", and presumably the number of packets per message "***l***", must be known before transmission begins. (Although the term "***l***" is not explicitly defined, I understand "***l***" as referring to the number of packets per message "***m***"). (Column 4, line 65 through Column 5, line 24).

33. Both these pseudo-code examples require that the voice message(s) be completed and stored before the message(s) are transmitted. With the first example, the number of packets "***n***" must be known before transmission may start. With the second example, the number of messages "***m***", and the number of packets per message "***l***", must be known before transmission starts. In either case, the voice media of messages is not progressively transmitted as the voice media is created.

34. Fig. 3 illustrates the steps involved in forwarding messages from the network to a destination mobile device. In the discussion of Fig. 3, Weinman states with regard to step 210 that "***one or more messages are acquired from one or more sources, such as voicemail by a subsystem associated with the base station.***" (Column 5, line 59-61). This passage reiterates that Weinman is describing a store and forward system, since the system contemplates the storage of messages on the network before forwarding the messages to a destination mobile device. See step 210 of Fig. 3, reproduced below:

FIG. 3



35. Fig. 4 provides details of the network 400. In the discussion of Fig. 4, Weinman specifically describes the transmission of a message from the originating device to the network message processor 410, the acquisition of the message parts, and the placement of the parts in the message store 430. (Column 7 lines 34-42) Weinman further explains that message delivery occurs when the network store 430 has a "***complete message***". (Column 7, line 44-48). With respect to step 140, Weinman further mentions that messages may be delivered to recipients over many different types of networks (Column 5, line 34-40). Nowhere, however, does Weinman address or describe the progressive processing of messages or any mechanism for handling partial and incomplete messages. On the contrary, Weinman states only that "***the message is delivered***" (Column 5, line 37), consistent with earlier statements that complete messages need to be received and stored on the network before forwarding to their intended recipients. Again, this description makes clear that Weinman is directed to a conventional, store and forward, messaging system.

36. Weinman provides specific examples of delivering complete messages located in the message store 430 to destination devices. The described delivery methods include setting up circuit or Voice over IP calls, leaving a voicemail for the intended recipient in their voicemail system, or encapsulating the voice message into a wave file and sending the wave file as an attachment to an email. (Column 7, line 48 through Column 8, line 3).

37. Weinman describes in the Summary that it is possible to incrementally and/or intermittently transmit messages from storage contained on an originating mobile device. The incremental and/or intermittent transmission of one or more message(s) out of storage is not the same as progressive transmission of a message (i.e. store and stream) as it is created. That is, incremental transmission of a message from storage over an intermittent network connection is simply a description of how individual packets are transmitted in situations of poor network connectivity, consistent with the two transmission algorithms described in detail above. This passage does not suggest the progressive or continuous processing of a voice data stream based on the availability of voice data as the voice data stream is being created.

38. I understand that the USPTO Office Action dated April 17, 2013 cites Column 5, lines 41-50 of Weinman, as disclosing progressive asynchronous transmission of voice media. (See, e.g., pages. 2-6 of the Office Action). The cited section of Weinman reads:

> *It is worth noting that the steps shown in FIG. 2 and described herein may occur sequentially, i.e., create the message, store the message, transmit the message, and then deliver the message. Or, they may occur in overlapping fashion, where message delivery, even to a live user actively listening to the message may have begun even as the message is being created and stored.*

39. As explained above, Weinman describes conventional, store and forward, messaging, not progressive, store and forward, messaging. As such, the above-identified passage, read in context with the remainder of the Weinman disclosure, does not refer to progressive store and forward as claimed in the Voxer patent application. In fact, the very next sentence immediately following the above-quoted passage reinforces the notion that

Weinman is directed to conventional, store and forward, messaging. Specifically, the next sentence recites:

> "*Advantageously, this means that buffering and reliable message delivery can be used to provide robust communications even over connections of intermittent quality.*"

40. In this sentence, Weinman's reference to "***buffering***" refers to the transmission of messages out of storage, as described with respect to the "***Locally Store Audio Message***" step 120 of Figure 2 (Column 4, lines 3 through 10). Further, Weinman's statement "***reliable message delivery***" refers to the use of the two pseudo-code algorithms defined by Weinman (Column 4 lines 30 through Column 5, line 24), as described above. Finally, Weinman's statement of providing "***robust communications even over connections of intermittent quality***" infers that messages may be created and intermittently transmitted even in situations when network conditions would otherwise prevent the progressive transmission of a message as it is created. The use of the term "*overlapping*" by Weinman, therefore, was not intended to teach or even suggest an alternative embodiment for progressive, store and forward, messaging.

41. The term "overlapping", while not explicitly defined by Weinman, presumably means the processing of two or more messages at the same time. Throughout Weinman, numerous examples of processing two or more messages are provided. For example:

(i) Weinman discusses the possibility of numerous messages being created and stored on an originating mobile device with respect to steps 110 and 120 of Figure 2 (Column 4, lines 3-10);

(ii) Weinman's second pseudo-code algorithm clearly contemplates the simultaneous transmission of multiple messages "***m***" (Column 5, lines 1-24);

(iii) Weinman's example of an airline passenger transmitting or receiving multiple messages during "***one***" session with a network interface 420 (Column 7, lines 15-18); and

(iv) Weinman's example of another airline passenger uploading "***a half hour worth of messages***" as they drive across multiple cell sites (Column 7, lines 19 through 23).

42. The reason "overlapping" cannot refer to the progressive storing and progressively transmitting voice media as recited in the Voxer claims is because the mechanisms described by Weinman are systemically incompatible with near real time functionality. Applying the described system of Weinman to every practical example he describes, the impossibility of such an interpretation of overlapping is demonstrated.

(i) The only transmission algorithms provided by Weinman support the "***reliable***" delivery of message out of storage, not speedy or timely delivery of the messages using a progressive transmission algorithm as described in the '034 application. Again, transmission of message(s) may begin only after the number of packets per message ("***n***" or "***l***"), and/or the number of messages ("***m***") is known;

(ii) Weinman's step 210 of Figure 3 clearly supports the proposition that complete messages are "***acquired***" from a memory store located on the network, before the messages are transmitted to a destination mobile device of a recipient;

(iii) According to Weinman, the message store 430 in Fig. 4 requires that a "***complete***" message be stored on the network 400 before the message is forwarded to a destination mobile device;

(iv). Weinman recognizes that in situations of intermittent network connectivity, the packets of uploaded messages will often be lost and/or received out of order at a network base station. See the retransmission of unacknowledged packets in both of Weinman's two pseudo-code examples (Column 4, line 30 through Column 5, line 24). To overcome this problem, Weinman discloses the reassembly of all the packets of messages (see the last line of pseudo code of the first algorithm "***Reassemble M from All Packets***", Column 4, line 58) and the operation of the network processor 410, which marks uploaded packets of messages as "***fully received***" (See Column 7, lines 34-43). Weinman, therefore, clearly requires that "***complete***" messages be received and stored on the network

400 before forwarding to intended recipients. Weinman provides absolutely no teaching for streaming packets to recipients across networks 400 and 500, as voice media is created, as is requires for progressive, store and forward messaging. Furthermore, to do so, would be nonsensical within the context of Weinman, since the progressive streaming of packets would prevent the reassembly of out of order and/or lost packets into a complete message on the network 400. As a result, the streaming of messages, without the reassembly of out of order and/or lost packets, would potentially result in the delivery of unintelligible (i.e., "***garbled***") messages, the very problem Weinman set out to solve.

(v) Finally, none of the specified delivery methods for transmitting a message provided by Weinman, as discussed below, support the progressive transmission of a message, across the networks 400 and 500, as media is created. In addition, Weinman does not specify any mechanisms for the destination network 500 or destination devices to process in real-time partial messages with possibly out of order and/or lost packets:

(a) Email is a conventional, store and forward, protocol that relies on the Internet standard Simple Mail Transfer Protocol (SMTP), which defines the format for the creation and transport of email messages. SMTP is not a real-time transmission protocol. If email is used in Weinman for the delivery of a voice message, then the entire message would have to be received and stored in network store 430 before it could be encapsulated into a wave file, attached to an email, and then emailed to the recipient. At each hop along the delivery path, the email message, including the wave file attachment, would be saved, its integrity checked, and then forwarded to the next hop, in accordance with SMTP. When the email message is eventually delivered, the recipient would then have to receive and open the email before accessing the wave file and feeding it to the appropriate media playing application to listen to the message;

(b) The other proposed delivery methods, including circuit switched calls, VoIP calls, or leaving messages on a voicemail system, are each examples of synchronous, not store and forward, communication. As synchronous systems, they provide no mechanisms for ensuring delivery;

(c) In the case of circuit switched or VoIP calls, the recipient's telephone number would have to be dialed, the recipient would have to answer their phone, establishing a synchronous connection via network 500 with the network 400, all while the sender is creating, recording, "***incrementally***" and "***reliably***" uploading the message to the network. This scenario is implausible for several reasons. First, Weinman provides no details for establishing synchronous communication between network 400, over network(s) 500, with the recipient, while receiving an asynchronous message from the sender. On the contrary, the synchronous delivery methods of Weinman each contemplate that a complete message be received and stored on the network before forwarding to the recipient. Second, such a scenario completely contradicts the explicit teachings of Weinman, as specified in (i), (ii) and (iii) recited above in paragraph 42; and

(d) Finally, in the case of leaving a voicemail in the recipient's voicemail system, at the time of the invention (i) a calling party would have been "rolled over" to a voicemail system if a called recipient did not answer their phone and (ii) the message would be accessed only after the complete message is recorded and the recipient notified.

STATEMENT UNDER 18 U.S.C. §1001

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both (under Section 1001 of Title 18 of the United States Code).

Signed: Thomas D Hall

Date: 9/6/2013

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