

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION**

SOUNDCLEAR TECHNOLOGIES LLC,

Plaintiff,

v.

GOOGLE LLC,

Defendant.

Case No. 1:24-cv-00729

Jury Trial Demanded

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff SoundClear Technologies LLC (“SoundClear”) files this complaint against Google LLC (hereinafter collectively “Google” or “Defendant”) for infringement of United States Patent Nos. 9,031,259; 9,070,374; and 9,804,819 (the “Patents-in-Suit”) , attached here as Exhibits 1-3.

NATURE OF THE ACTION

1. This is an action for patent infringement arising under the patent laws of the United States, 35 U.S.C. §§1 *et seq.*

THE PARTIES

2. SoundClear is a limited liability company organized under laws of the Commonwealth of Virginia with its principal place of business at 1900 Reston Metro Plaza, Suite 600, Reston, VA 20190.

3. On information and belief, defendant Google is a corporation organized and existing under the laws of the state of Delaware with a principal place of business at 1600 Amphitheatre Parkway, Mountain View, California 94043.

4. On information and belief, Google.com, Inc. may be served with process through its registered agent, Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, or anywhere it may be found.

5. Google does business across the United States, including in the Commonwealth of Virginia and, more specifically, in the Eastern District of Virginia through at least its offices at 1900 Reston Metro Plaza, Reston, Virginia 20190.

6. On information and belief, Google has been authorized to transact business in the Commonwealth of Virginia and the Eastern District of Virginia since on or about October 31, 2017, under Virginia Entity ID T0723124.

7. On information and belief, Defendant sells and offers to sell products and services throughout Virginia, including in this judicial district, as well as throughout the United States, and introduces products and services that perform infringing processes into the stream of commerce knowing that they would be used, offered for sale, or sold in this judicial district and elsewhere in the United States.

8. On information and belief, Google has made, used, offered to sell, offered to sell access to, sold, and/or sold access to products and services, including the following specifically accused products and services: (1) Google Home, Google Nest Mini (1st Gen), Google Home Mini (1st Gen), Google Home Max, Google Nest Audio, Google Nest Hub, Google Nest Hub Max, and Google Nest Hub (2nd Gen.), and Google Assistant (collectively “Google Home Products”); (2) current or legacy products or services, which use, or have used, one or more of

the foregoing products and services as a component product or component service; (3) combinations of products and/or services comprising, in whole or in part, two or more of the foregoing products and services; and (4) all other current or legacy products and services imported, made, used, sold, or offered for sale by Google that operate, or have operated in a substantially similar manner as the above-listed products and services. (As used herein, one or more of the foregoing products and services are individually and collectively referred to as “the Google Products and Services”).

9. On information and belief, Google, as well as the hardware and software components comprising the Google Products and Services and/or that enable the Google Products and Services to operate, including but not limited to servers, server software, webserver software, webserver hardware, email server hardware, email server software, website client software, mobile computing device client application software, networked communications hardware, network routers, network switches, network hubs, WIFI access point hardware, WIFI access point software, point-of-sale hardware, point-of-sale software, back-end hardware, back-end software, cloud-based software, cloud-based hardware, and other hardware and software computing systems and components infringes (literally and/or under the doctrine of equivalents) at least one claim of each of the Patents-in-Suit.

JURISDICTION AND VENUE

10. This civil action arises under the Patent Laws of the United States, 35 U.S.C. § 1 *et seq.* Accordingly, this Court has subject matter jurisdiction under at least 28 U.S.C. §§ 1331 and 1338(a).

11. This Court has general and specific personal jurisdiction over Google because it regularly conducts and solicits business, or otherwise engages in other persistent courses of

conduct in this judicial district, and/or derives substantial revenue from the use, sale, and distribution of goods and services, including but not limited to the accused Google Products and Services provided to individuals and businesses in the Eastern District of Virginia.

12. Google has committed and continues to commit acts of infringement within this district and, thereby, giving rise to this action and establishing minimum contacts with this forum such that the exercise of jurisdiction over Google would not offend traditional notion of fair play and substantial justice. Google has employees, offices, and facilities in this District and has purposefully conducted and continues to purposefully conduct business in this District, as demonstrated by (a) Google's maintenance of regular and established places of business in this District, including its office at 1900 Reston Metro Plaza, Reston, VA 20190 (*see* <https://www.restonnow.com/2021/03/18/just-in-google-to-lease-more-space-at-reston-station/>), (b) Google's advertisement of 65 available job postings for its Reston office as of April 2023 (*see* <https://careers.google.com/locations/reston/>), and (c) Google's economic impact report stating that Google also provided "more than 475,000 Virginia businesses" with "direct connections to their customers" in 2021 including by, *inter alia*, providing directions requested by a user, and has invested \$1.2 billion in Loudoun County, VA, including investments in the construction and maintenance of multiple data centers. (*See id.*; <https://www.google.com/about/datacenters/locations/loudoun-county/>).

13. Google has previously submitted to the jurisdiction of this Court.

14. Venue is proper pursuant to 28 U.S.C. §§ 1391 and/or 1400(b), at least because Google has committed acts of infringement in this judicial district and has a regular and established places of business in this judicial district.

THE ASSERTED PATENTS

U.S. Patent No. 9,031,259

15. On May 12, 2015, the USPTO duly and legally issued United States Patent No. 9,031,259 (“the ’259 patent”) entitled “Noise Reduction Apparatus, Audio Input Apparatus, Wireless Communication Apparatus, and Noise Reduction Method” to inventor Takaaki Yamabe.

16. The ’259 patent is presumed valid under 35 U.S.C. § 282.

17. SoundClear owns all rights, title, and interest in the ’259 patent.

18. SoundClear has not granted Defendant an approval, an authorization, or a license to the rights under the ’259 patent.

19. The ’259 relates to, among other things, “a noise reduction method that can reduce a noise component varied by a voice signal in a variety of environments.” ’259 patent, Col. 1, lines 41-42.

20. The method determines “whether or not a sound ... is a speech segment.” *Id.* at Col. 2, lines 18-20. When determining that the sound is the speech segment, “a voice incoming direction indicating from which direction a voice sound travels” is detected. *Id.* at 20-22, 25-27. A noise reduction process is then performed based on “speech segment information” and “voice incoming-direction information.” *Id.* at 27-32.

21. This manner of reducing noise also allows for transmission of high quality voice sound even in “an environment of high noise level.” *Id.*, Col. 1, lines 29-24; see also, e.g., Col. 52, lines 60-62.

U.S. Patent No. 9,070,374

22. On June 30, 2015, the USPTO duly and legally issued United States Patent No. 9,070,374 (“the ’374 patent”) entitled “Communication Apparatus and Condition Notification Method for Notifying a Used Condition of Communication Apparatus by Using a Light-Emitting Device Attached to Communication Apparatus” to inventors Masaya Konishi and Tatsuya Onoda.

23. The ’374 patent is presumed valid under 35 U.S.C. § 282.

24. SoundClear owns all rights, title, and interest in the ’374 patent.

25. SoundClear has not granted Defendant an approval, an authorization, or a license to the rights under the ’374 patent.

26. The ’374 relates to, among other things, “a condition notification method that achieve[s] transmission of clear voice sounds with an effective noise-cancellation function.” ’374 patent, Col. 1, lines 56-58.

27. The method switches a “communication mode between a standby mode ... and a transmission mode.” *Id.* at Col. 2, lines 11-15.

28. The method “determine[s] a pick-up state of the voice sound.” *Id.*, lines 16-17.

29. The method “control[s] the light-emitting device ... based on the communication mode ... and the pick-up state of the voice sound.” *Id.*, lines 19-24.

30. The method also “evaluate[s] speech quality of a speech signal.” *Id.*, lines 31-32.

31. This manner of reducing noise also allows for communication with clear voice sounds even in “noisy environments.” *Id.*, Col. 1, lines 25-28.

U.S. Patent No. 9,804,819

32. On October 31, 2017, the USPTO duly and legally issued United States Patent No. 9,804,819 (“the ’819 patent”) entitled “Receiving Apparatus and Control Method” to inventors Kazuomi Tachigi, Kanji Kuroiwa, and Hiroshi Nakamura.

33. The ’819 patent is presumed valid under 35 U.S.C. § 282.

34. SoundClear owns all rights, title, and interest in the ’819 patent.

35. SoundClear has not granted Defendant an approval, an authorization, or a license to the rights under the ’819 patent.

36. The ’819 relates to, among other things, “a volume controller configured to cause” the output of audio “having a volume level corresponding to the operating value in a non-locked state ... and ... corresponding to a lock value in a locked state.” ’819 patent, Col. 2, lines 9-16.

37. This manner of overcoming noise in the environment also prevents the output of “an unintentional volume level ... as soon as the locked state is canceled” when “the volume is reset after the volume has been locked.” *Id.*, Col. 1, lines 30-40.

BACKGROUND OF THE INVENTIONS

38. These patents have been generated by the R&D engineers of a major audio processing product power house, namely JVC, now known as JVC Kenwood (“JVCK”).

39. JVCK is well known for producing quality, leading-edge audio and associated products and has a long and esteemed history in doing so.

40. The Patents-in-Suit were developed within the R&D department of JVCK, which consisted of many thousands of professional engineers spread over a number of R&D facilities.

41. Over the years, JVCK employed the host of audio technologies that it developed to bring forward an array of leading-edge products to market.

42. JVCK typically invested \$260m in R&D per year to develop commercially viable technologies capable of generating substantial revenues.

43. JVCK has, for various reasons, realigned its technology focus over recent years, which has led the company to divest a number of patents it developed.

44. SoundClear has acquired these patents and has worked to identify companies that it believes are utilizing the technologies and profiting from the claimed inventions.

CLAIMS FOR RELIEF

COUNT I - Infringement of the '259 patent

45. SoundClear repeats, realleges, and incorporates by reference, as if fully set forth here, the allegations of the preceding paragraphs above.

46. On information and belief, Defendant (or those acting on their behalf) make, use, sell, sell access to, import, offer to sell and/or offer to sell access to the Google Products and Services in the United States that infringe (literally and/or under the doctrine of equivalents) at least claim 1 of the '259 patent.

47. On information and belief, one or more components of the Google Products and Services is, employs, or provides a noise reduction apparatus (*e.g.*, a sound processing method in one or more of the Google Home Products that perform noise reduction by filtering noise from received audio signals.)

48. On information and belief, one or more components of the Google Products and Services is, employs, or provides a speech segment determiner (*e.g.*, computer hardware/software for performing signal processing (*e.g.*, “keyword spotting” algorithm,

endpointing algorithm, and/or an ASR algorithm)) configured to determine whether or not a sound (*e.g.*, any sound in the area of one or more of the Google Home Products) picked up by at least either a first microphone or a second microphone (*e.g.*, MEMS microphones) is a speech segment (*e.g.*, a “keyword,” “trigger phrase,” voice request that follows the keyword/trigger phrase) and to output speech segment information (*e.g.*, details/parameters of the speech segment itself) when it is determined that the sound picked up by the first or the second microphone is the speech segment.

49. On information and belief and as an example, one or more components of the Google Products and Services include two microphones, such as the InvenSense INMP621 MEMS microphones, that form a microphone array, which receives audio from one or more sound sources including the voice of a person. *See* <https://www.ifixit.com/Teardown/Google+Home+Teardown/72684>.

50. On information and belief, one or more components of the Google Products and Services determines whether sounds that are picked up are speech segments. *See* <https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/46554.pdf> (Google Home Products use “endpointing” to “detect quickly and accurately when the user started and finished speaking their query.”)

51. On information and belief, one or more components of the Google Products and Services outputs speech segment information (*e.g.*, details/parameters of the speech segment itself) when it is determined that the sound picked up by the first or the second microphone is the speech segment. *See* <https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/46554.pdf>; *see*

also <https://storage.googleapis.com/gweb-research2023-media/pubtools/pdf/bbd259619fdae1b2e8108348753c91c4a8f081fd.pdf>.

52. On information and belief, one or more components of the Google Products and Services is, employs, or provides a voice direction detector (e.g., using an algorithm for detecting the location of the voice audio source (e.g., “neural network adaptive beamforming (NAB)”) configured, when receiving the speech segment information, to detect a voice incoming direction (e.g., direction from voice audio source location) indicating from which direction a voice sound (e.g., audio sound of a voice) travels, based on a first sound pick-up signal (e.g., $x_1(k)[t]$) obtained based on a sound picked up by the first microphone (e.g., a sound on a first Mic Input signal) and a second sound pick-up signal (e.g., $x_2(k)[t]$) obtained based on a sound picked up by the second microphone (e.g., a sound on a second Mic Input signal) and to output voice incoming-direction information (e.g., “frequency responses of the predicted beamforming filters at the target speech...direction[.]”) when the voice incoming direction is detected. See <https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/45399.pdf>.

53. On information and belief and as an example, one or more components of the Google Products and Services determines that a sound picked up by one of its microphones is a speech segment.

54. On information and belief, one or more components of the Google Products and Services also detects a voice incoming direction indicating from which direction a voice sound travels. For example, one or more of the Google Home Products include and/or utilize hardware and software that perform a “neural beamforming” technique which determines the location of the audio source. See <https://www.youtube.com/watch?v=vWLCyFtni6U> at 5:29-5:49. Google’s neural beamforming technique is also called “neural network adaptive beamforming (NAB).”

See <https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/45399.pdf>.

The NAB process is based on voice incoming-direction information (e.g., “frequency responses of the predicted beamforming filters at the target speech...direction[.]”) and the speech segment information (e.g., details/parameters of the speech segment itself). See

<https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/45399.pdf>.

55. On information and belief, one or more components of the Google Products and Services is, employs, or provides a noise reduction apparatus comprising an adaptive filter configured to perform a noise reduction process (e.g., a sound processing method of one or more of the Google Home Products that performs noise reduction by filtering noise from received audio signals) using the first and second sound pick-up signals based on the speech segment information (e.g., details/parameters of the speech segment itself) and the voice incoming-direction information (e.g., “frequency responses of the predicted beamforming filters at the target speech...direction[.]”). See

<https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/45399.pdf>.

56. On information and belief, Defendant directly infringe at least claim 1 of the ’259 patent in violation of 35 U.S.C. § 271(a) by making, using, selling, selling access to, importing, offering for sale, and/or offering to sell access to the Google Products and Services.

57. Defendant’ infringement has damaged SoundClear and caused / continues to cause it to suffer irreparable harm and damages.

COUNT II - Infringement of the ’374 patent

58. SoundClear repeats, realleges, and incorporates by reference, as if fully set forth here, the allegations of the preceding paragraphs above.

59. On information and belief, Defendant (or those acting on their behalf) make, use, sell, sell access to, import, offer to sell and/or offer to sell access to the Google Products and Services in the United States that infringes (literally and/or under the doctrine of equivalents) at least claim 9 of the '374 patent.

60. On information and belief, one or more components of the Google Products and Services is, employs, or provides a communication apparatus, such as the Google Home Products.

61. On information and belief, one or more components of the Google Products and Services is, employs, or provides a first pick-up unit (e.g., a first microphone) configured to pick up a voice sound (e.g., a spoken sound originating from a person (e.g., a voice request and/or wake word)). *See e.g.*, <https://www.ifixit.com/Teardown/Google+Home+Teardown/72684>; *See* <https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/46554.pdf>.

62. On information and belief, one or more components of the Google Products and Services is, employs, or provides a transmitter unit (e.g., unit in one or more of the Google Home Products that sends the trigger phrase and/or voice request to Google's secure server) configured to transmit the voice sound picked up by the first pick-up unit to outside (e.g., Google's secure server) as a first speech signal (e.g., data signal representing the trigger phrase and/or voice request).

63. On information and belief, one or more components of the Google Products and Services uses a client-server keyword spotting system ("KWS") triggered by a keyword or key phrase such as "Ok, Google." *See* <https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/46554.pdf>.

64. On information and belief, Google Home Products transmit the voice sound (e.g., the keyword and/or the phrases after the keyword) to the server via a transmitter. *See*

<https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/46554.pdf>.

65. On information and belief, one or more components of the Google Products and Services is, employs, or provides comprise a communication-mode switching unit (e.g., unit in one or more of the Google Home Products that causes the transmitter unit to send or not send the trigger phrase and/or voice request to Google’s secure server) configured to switch a communication mode (e.g., operation mode of the transmitter unit) between a standby mode (e.g., when the microphones are on but the trigger phrase is not detected) in which the transmitter unit does not transmit the speech signal and a transmission mode (e.g., when microphones are on and the trigger phrase is detected) in which the transmitter unit transmits the speech signal.

66. On information and belief, the processor in the one or more components of the Google Products and Services transmits the first speech signal when the keyword is detected using the “keyword spotting” feature. *See*

<https://www.ifixit.com/Teardown/Google+Home+Teardown/72684>; *See*

<https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/46554.pdf>.

67. On information and belief, one or more components of the Google Products and Services controls the transmitter unit to transmit the first speech signal when the keyword/trigger phrase (e.g., “OK Google”) is detected using the keyword spotting feature. *See*

<https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/46554.pdf>

(“Once a trigger phrase is detected on device, typically the connection is opened to the server and the audio corresponding to the rest of the query (e.g. ‘play some music’) is sent for

transcription using a server-side [automatic speech recognition] ASR system.” *See*

<https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/46554.pdf>.

68. On information and belief, one or more components of the Google Products and Services is, employs, or provides a sound pick-up state determination unit (e.g., (1) hardware/software for performing audio signal processing and filtering (e.g., “neural network adaptive beamforming (NAB)”), *and* (2) computer hardware/software for performing a speech recognition algorithm (e.g., a “keyword spotting” algorithm and/or an ASR algorithm)) configured to determine a pick-up state (e.g., signal characteristics) of the voice sound picked up by the first pick-up unit. *See* <https://www.youtube.com/watch?v=vWLCyFtni6U>;

<https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/45399.pdf>;

<https://support.google.com/assistant/answer/9712065?sjid=16295118774734419352-AP>.

69. On information and belief, one or more components of the Google Products and Services is, employs, or provides a light emission device (e.g., an LEDs) configured to emit light. *See* <https://support.google.com/googlenest/answer/7073219?hl=en#zippy=%2Cgoogle-home>.

70. On information and belief, one or more components of the Google Products and Services is, employs, or provides a control unit (e.g., unit in one or more of the Google Home Products that controls the LED lights to operate in a variety of modes) configured to control the light-emitting device so that the light-emitting device is turned off, turned on or repeatedly turned on and off (e.g., “spin,” “continuously spin,” “pulse,” “continuously pulse,” “solid”) based on the communication mode switched by the communication-mode switching unit, and the pick-up state of the voice sound picked up by the first pick-up unit and determined by the sound pick-up state determination unit.

71. On information and belief, one or more components of the Google Products and Services controls the LED ring light to operate in a variety of modes based on the pick-up state of the voice sound. For example, the devices include two “NXP PCA9956BTW LED drivers” and one “Atmel ATSAMD21 32-bit ARM Cortex-M0+ microcontroller.” *See* <https://www.ifixit.com/Teardown/Google+Home+Teardown/72684>. Together these components form a unit that controls the operational states of the LEDs based on other functions and operations of the device (e.g., the communication mode and the pick-up state of the voice sound). *Id.*

72. On information and belief, one or more components of the Google Products and Services is, employs, or provides a speech-quality evaluation unit (e.g., hardware/software for performing audio signal processing and filtering (e.g., “neural network adaptive beamforming (NAB),” “‘Hey Google’ sensitivity”)) configured to evaluate speech quality (e.g., determine the degree of signal processing/filtering necessary to produce an “enhanced speech signal,” and produce an enhanced speech signal) of the first speech signal to be transmitted by the transmitter unit, wherein the sound pick-up state determination unit determines the sound pick-up state of the voice sound picked up by the first sound pick-up unit based on the speech quality of the speech signal evaluated by the speech-quality evaluation unit.

73. On information and belief, one or more of the Google Products and Services includes hardware/software for performing a “neural beamforming” technique which increases the quality and accuracy of speech recognition while only using two microphones. *See* <https://www.youtube.com/watch?v=vWLCyFtni6U> at 5:29-5:49. Google’s neural beamforming technique is also called “neural network adaptive beamforming (NAB).” *See* <https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/45399.pdf>.

74. On information and belief, Google’s NAB process uses “[Long Short-Term Memory] LSTM layers to predict time domain beamforming filter coefficients at each input frame,” thereby allowing the algorithm to “adapt to previously unseen or changing conditions.” *Id.* at 1. The NAB process evaluates speech quality by adjusting filter coefficients on a frame-by-frame basis of the received audio signal. *Id.* (The NAB model “re-estimates a set of spatial filter coefficients at each input frame using a neural network. Specifically, raw multichannel waveform signals are passed into a filter prediction (FP) LSTM whose outputs are used as spatial filter coefficients. These spatial filters for each channel are then convolved with the corresponding waveform input, and the outputs are summed together to form a single channel output waveform containing the enhanced speech signal.”). *Id.*

75. On information and belief, one or more components of the Google Products and Services is, employs, or provides a speech-segment determination unit (e.g., computer hardware/software for performing a speech recognition algorithm (e.g., a “keyword spotting” algorithm, endpointing algorithm, and/or a ASR algorithm)) configured to determine whether or not the first speech signal to be transmitted by the transmitter unit is a speech segment (e.g., a “keyword,” “trigger phrase,” voice request that follows the keyword/trigger phrase), wherein, the sound pick-up state determination unit determines the sound pick-up state of the sound to be transmitted as the first speech signal based on a determination result (e.g., a “spotted” or “detected” keyword/trigger phrase) at the speech-segment determination unit and an evaluation result (e.g., “enhanced speech signal”) at the speech-quality evaluation unit.

76. On information and belief, one or more components of the Google Products and Services includes a client-server KWS (keyword spotting system) triggered by a keyword, e.g., “OK google.” *See*

<https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/46554.pdf>.

The products include a transmitter unit (e.g., a Marvell Avastar 88W8887 WLAN/BT/NFC SOC (see chip in yellow box below)) which communicates with a server in the KWS system. *See*

<https://www.ifixit.com/Teardown/Google+Home+Teardown/72684>; *see also*

<https://support.google.com/googlenest/answer/7072284?hl=en&sjid=18139057093911631537-NA#zippy=%2Cgoogle-home>. Google Home Products transmit the voice sound (e.g., the

keyword and/or the phrases after the keyword) to the server via a transmitter. *See also See*

<https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/46554.pdf>.

77. On information and belief, Defendant directly infringe at least claim 9 of the '374 patent in violation of 35 U.S.C. § 271(a) by making, using, selling, selling access to, importing, offering for sale, and/or offering to sell access to the Google Products and Services.

78. Defendant' infringement has damaged SoundClear and caused / continues to cause it to suffer irreparable harm and damages.

COUNT III - Infringement of the '819 patent

79. SoundClear repeats, realleges, and incorporates by reference, as if fully set forth here, the allegations of the preceding paragraphs above.

80. On information and belief, Defendant (or those acting on their behalf) make, use, sell, sell access to, import, offer to sell and/or offer to sell access to the Google Products and Services in the United States that infringes (literally and/or under the doctrine of equivalents) at least claim 8 of the '819 patent.

81. On information and belief, one or more components of the Google Products and Services is, employs, or provides a control method (e.g., a method for regulating and processing

sound signals) for a receiving apparatus (e.g., one or more of the Google Home Products). *See* <https://www.ifixit.com/Teardown/Google+Home+Teardown/72684>.

82. On information and belief, one or more components of the Google Products and Services is, employs, or provides a control method for a receiving apparatus comprising an audio output unit (e.g., a speaker) configured to output audio (e.g., the sound from a speaker of Google Assistant's spoken responses) corresponding to an audio signal (e.g., input signal to the speaker representing Google Assistant's spoken responses). *See* <https://www.ifixit.com/Teardown/Google+Home+Teardown/72684>.

83. On information and belief, one or more components of the Google Products and Services is, employs, or provides a control method for a receiving apparatus comprising a volume operating unit (e.g., software in one or more of the Google Home Products that controls the volume of Google Assistant's spoken responses) configured to output an operating value (e.g., an electronic signal value representing the volume level for outputting Google Assistant's spoken responses) indicating a volume level (e.g., the volume level for outputting Google Assistant's spoken responses) of the audio according to a user operation (e.g., a user's interaction with the software that controls the volume of Google Assistant's spoken responses through, e.g., (1) physical operation of the hardware components related to volume control (e.g., a volume control button/sensor on one or more of the Google Home Products), (2) voice commands pertaining to volume control, or (3) the volume control user interface on the Google Home application). *See* [https://support.google.com/assistant/answer/7538817?hl=en#:~:text=How%20to%20change%20the%20volume,Increases%20volume%20by%2010%25](https://support.google.com/assistant/answer/7538817?hl=en#:~:text=How%20to%20change%20the%20volume,Increases%20volume%20by%2010%25;); *See* https://support.google.com/googlenest/answer/7072489?hl=en#app_volume_control&zipy=%2

[Ccontrol-media-volume%2Cgoogle-nest-audio](#); *see also*

<https://support.google.com/googlenest/answer/7072889?hl=en#zippy=%2Cgoogle-nest-audio>.

84. On information and belief, one or more components of the Google Products and Services is, employs, or provides a control method for a receiving apparatus comprising a volume controller (e.g., processor and/or component circuitry for controlling the volume operating modes of one or more of the Google Home Products) configured to cause the audio output unit to output the audio having a volume level corresponding to the operating value in a non-locked state (e.g., operating mode when the volume level is automatically adjusted by volume control bypass software (e.g., Ambient IQ, Media EQ) independent of the volume level set by the user through a user operation) in which the volume level of the audio can be varied based on the operating value (e.g., output the Google Assistant's spoken responses at, e.g., a higher level than the set volume level (e.g., an increased level through Ambient IQ to overcome loud ambient noise)) and to cause the audio output unit to output the audio having a volume level corresponding to a lock value (e.g., the default volume level set by the user through a user operation) in a locked state (e.g., default operating mode when the volume control bypass software (e.g., Ambient IQ, Media EQ) is not activated and/or is otherwise *not* independently adjusting the volume level set by the user) in which the volume level of the audio is fixed by a constant lock value (e.g., the value of the volume level set by the user through a user operation) for the operating value.

85. On information and belief, certain volume operation modes of one or more of the Google Home Products permit the volume of Google Assistant's spoken responses to automatically deviate from the volume level that was set by the user. These modes include the Ambient IQ mode. In the Ambient IQ mode, Google Assistant's spoken responses are provided

at the volume level generally higher than the set value so that the responses may be heard over loud ambient noise in the room. This mode corresponds to a “non-locked” state because the volume is allowed to automatically deviate from the volume level set by the user. *See* <https://blog.google/products/google-nest/new-nest-audio/> (“Ambient IQ lets Nest Audio also adjust the volume of Assistant, news, podcasts and audiobooks based on the background noise in your home, so you can hear the weather forecast over a noisy dishwasher.”). By contrast, when this volume control bypass software feature is not enabled or active, the volume of one or more of the Google Home Products generally does not automatically deviate from the set volume level. This mode, when activated, corresponds to a “non-locked” state because the volume is allowed to automatically deviate from the volume level set by the user.

86. On information and belief, one or more components of the Google Products and Services is, employs, or provides a control method comprising when a predetermined operating part (e.g., volume control bypass software (e.g., Media EQ and/or Ambient IQ)) is turned on (e.g., activates) in the locked state, switching the locked state to the non-locked state for a period of time (e.g., the duration of broadcasting Google Assistant’s spoken responses) that starts when the operating value becomes a value that falls within a predetermined range (e.g., a value corresponding to a volume level based on the ambient noise that is higher than the volume level set by the user) based on the lock value and ends when the predetermined operating part is turned off (e.g., deactivates (e.g., when Google Assistant’s broadcasted voice response is complete)).

87. On information and belief, certain volume operation modes of one or more of the Google Home Products permit the volume of the Google Assistant’s spoken responses to automatically deviate from the volume level that was set by the user. These modes include the Ambient IQ and Media EQ. The Ambient IQ feature is turned on based on the media or the

background noise. *See* <https://blog.google/products/google-nest/new-nest-audio/> (“Ambient IQ lets Nest Audio also adjust the volume of Assistant, news, podcasts and audiobooks based on the background noise in your home, so you can hear the weather forecast over a noisy dishwasher.”). These modes correspond to a “non-locked” state because the volume is allowed to automatically deviate from the volume level set by the user. By contrast, when these volume control bypass software features are not enabled or active, the volume of one or more of the Google Home Products generally does not automatically deviate from the set volume level.

88. On information and belief, one or more components of the Google Products and Services is, employs, or provides a control method comprising when the predetermined operating part is turned off after having switched to the non-locked state (e.g., when the volume control bypass software (e.g., Ambient IQ, Media EQ) subsequently deactivates after being activated for the broadcast of Google Assistant’s voice response), updating the lock value with the operating value (e.g., resetting the volume level to the volume level set by the user) and switching the non-locked state to the locked state.

89. On information and belief, when Ambient IQ is activated, after Google Assistant’s spoken response is broadcasted at a high volume to account for ambient noise, the volume level returns to the level set by the user. *See* <https://blog.google/products/google-nest/new-nest-audio/>; <https://www.youtube.com/watch?v=R-6RFPcXL68&t=1809s>.

90. On information and belief, Defendant directly infringe at least claim 8 of the ’819 patent in violation of 35 U.S.C. § 271(a) by making, using, selling, selling access to, importing, offering for sale, and/or offering to sell access to the Google Products and Services.

91. Defendant’s infringement has damaged SoundClear and caused / continues to cause it to suffer irreparable harm and damages.

JURY DEMANDED

92. Pursuant to Federal Rule of Civil Procedure 38(b), SoundClear hereby requests a trial by jury on all issues so triable.

PRAYER FOR RELIEF

SoundClear respectfully requests this Court to enter judgment in SoundClear's favor and against Google as follows:

- a. finding that Google has infringed one or more claims of the '259 patent under 35 U.S.C. § 271(a);
- b. finding that Google has infringed one or more claims of the '374 patent under 35 U.S.C. § 271(a);
- c. finding that Google has infringed one or more claims of the '819 patent under 35 U.S.C. § 271(a);
- d. awarding SoundClear damages under 35 U.S.C. § 284, or otherwise permitted by law, including enhanced damages for willful infringement and/or supplemental damages for any continued post-verdict infringement;
- e. awarding SoundClear pre-judgment and post-judgment interest on the damages award and costs;
- f. awarding cost of this action (including all disbursements) and attorney fees pursuant to 35 U.S.C. § 285, or as otherwise permitted by the law; and
- g. awarding such other costs and further relief that the Court determines to be just and equitable.

Dated: May 1, 2024

Respectfully submitted,

/s/ Chandran B. Iyer

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