Misreading the Supreme Court:
A Puzzling Chapter in the History of Radio

by David Wunsch

and

Rereading the Supreme Court:
Tesla's Invention of Radio

by Wallace Edward Brand

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Foreword

Leland Anderson comments on the 1998 *ANTENNA* article "Misreading the Supreme Court." The article questions Nikola Tesla's priority in the invention of radio. A rebuttal article, "Rereading the Supreme Court" argues Tesla's priority in this regard.

Introduction

The attachments are an article by Professor A. David Wunsch attempting to diminish Nikola Tesla as the inventor of the basic radio system patent(s), based on a superficial examination of the 1943 U.S. Supreme Court decision invalidating the Marconi patent, and a rebuttal by Wallace Edward Brand effectively dismissing it, both appearing in *ANTENNA*[1], November, 1998 and May, 1999 issues. I an gratified that my early attempt[2] to explain the Court's ruling caught Brand's attention arousing interest to fully examine the case.

Wunsch's article invited rebuttal. The force of his argument, valuing the weight of number of pages in the Court's decision devoted to John Stone Stone versus Tesla, is ludicrous. The four-tuned *system* description in Tesla's patents are rather simply expressed, whereas volumes have been written through decades on tuned coupled-circuit selectivity with Stone's analysis prevailing. It is worthy to note that Stone never claimed the invention of radio.[3]

It would appear that Wunsch had as an objective reducing Tesla as the inventor by employing reference notes as 4), the New England Wireless and Steam Museum's founder has been an antipathetic critic of Tesla, and 6), a denigrating out-of-context quote from a hand-writing analyst biographer having no formal education in the technical sciences.

L.I.A.
June 11, 1999

1. Published by the Mercurians. Special Interest Group in the Society for the History of Technology.

2. *Priority in the Invention of Radio—Tesla vs. Marconi*, A. W. A. Monograph (New Series No. 4) Mar. 1980.

3. Stone's acknowledgement to Tesla initially appeared in Radosavljevic, Paul R. *Who Are the Slavs* (Boston: Richard Badger, 1919). The full text of Stone's tribute appears in Anderson, L.I., "John Stone Stone on Nikola Tesla's Priority in Radio and Continuous-Wave Radiofrequency Apparatus," The A. W. A. Review, 1986.

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by David Wunsch

On the night of January 18, 1903, Guglielmo Marconi and his associates gathered at the Marconi Wireless Station near South Wellfleet, Massachusetts. A message of greeting in Morse code was sent from President Theodore Roosevelt to King Edward VII of England. The event made the front page of the *New York Times* as the first transatlantic wireless message from an American president to a European head of state. Although the station was dismantled about eighty years ago, its site, now within the Cape Cod National Seashore, is marked by a nearby National Park Service information center. Available there is a Park Service leaflet that tells visitors that the inventor Nikola Tesla "proposed the essential elements of radio communication in 1892 and 1893" prior to Marconi, and that "the U.S. Supreme Court in 1943 decided that Marconi's basic patents were 'anticipated' and therefore were invalid."[1]

The Supreme Court case referred to is *Marconi Wireless Telegraph Corporation of America v. United States*, 320 US 1 (1943), which was argued in April and decided on June 21, 1943. References to this case are not uncommon and repeat the Court's finding that Tesla, not Marconi, invented the first radio. For example, writing in the *New York Times* of August 28, 1984, science reporter WIlliam Broad noted that: "It was Nikola Tesla, not Marconi, who invented radio.[2] Indeed in 1943 the Justices of the Supreme Court of the United States overturned Marconi's patent because they found it had been preceded by Tesla's practical achievements in radio transmission."[3]

Tesla's priority over Marconi in the invention of radio is not the only conclusion often drawn from that court case. The following, for example, is from a letter sent by the inventor Lee de Forest to the radio historian George Clark in July of 1943: "You will be tickled as I am . . . to know that at long last, the U.S. Supreme Court has held the Fleming Valve Patent to be invalid. . . . Also that John Stone Stone, and not Marconi, was the first inventor of the so-called 4-tuned circuit."[4] In addition, radio historian Hugh G. J. Aitken observed: "in 1943, . . . in a decision by the U.S. Supreme Court, [Oliver] Lodge's patent was the only one of the three principal Marconi Company patents to be completely upheld, the Marconi tuning patent, once the keystone of the Corporation's patent structure, being declared invalid."[5]

Clearly, interpretations of this court case have differed greatly. The lengthy opinion is technical and not light reading, so to resolve differing historical claims, we must study it for ourselves. An examination reveals that the Court did not rule on who invented radio: "Marconi's reputation as the man who first achieved successful radio transmission rests on his original patent . . . which is not here in question."

The 1943 Supreme Court ruling began as a lawsuit initiated by the Marconi Wireless Telegraph Company of America. Marconi invoked title 35 of the U. S. Code, section 68, and sued the U.S. government for patent infringement in the U.S. Court of Claims. This section of the U.S. Code permitted patent holders to sue if they believed that the government had bought or used equipment that infringed on their patents. The Supreme Court case resulted from appeals of both the government and Marconi Wireless of decisions from the Court of Claims.

In the Court of Claims, Marconi Wireless asserted that the government had infringed four U.S. patents, among which were No. 763, 772 and reissue patent No. 11,913. Both had been issued to Guglielmo Marconi himself. Additional Marconi company patents alleged to be infringed were one issued to Oliver Lodge, No. 60,9154, and Ambrose Fleming's patent No. 803,684. In its 1935 decision, the Court of Claims ruled that the radio equipment used by the government had not infringed on the Marconi patent.

The reissue patent No. 11,913 was a modification of Marconi's original radio patent granted in 1897 and covered the invention that gained the young Marconi his initial fame over the period 1896 to 1900. That equipment lacked any means for tuning either the transmitter or the receiver. Attempts to devise tuning circuits began as early as the 1890s. The goal was to create transmitters and receivers that operated at a

single, well defined frequency. Notable in this effort was Marconi's British patent No. 7,777 for the use of two tuned circuits at the transmitter and two at the receiver. The American counterpart of this patent was No. 763,772, granted in 1904, and one of the patents said to be infringed in the 1943 Supreme Court case.

In its 1943 decision, however, the Supreme Court rejected the broad claims of this Marconi patent, for the most pan declaring it invalid. Indeed, the majority Supreme Court opinion stated that Marconi 's work had been anticipated by John Stone Stone (patent No. 714,756) and Oliver Lodge (patent No. 609,154). The Supreme Court also examined Tesla's patent No. 645,576 and noted that Tesla had used four tuned circuits before Marconi. In addition, the Court observed that Lodge had provided a means for varying the tuning frequency, which was lacking in Tesla's patent.

Thus, while the Supreme Court declared the Marconi patent invalid, it affirmed prior work and patents by not only Tesla, but by Lodge and Stone as well. As for the Lodge and Tesla patents, the Supreme Court's opinion discussed Tesla's and Lodge's work in two pages and three pages respectively, but devoted a full twenty pages to Stone's work. What was so important about Stone's radio patent? "Stone's [patent] application," the Court wrote, "shows an intimate understanding of the mathematical and physical principles underlying radio communication and electrical circuits in general."

The Supreme Court also ruled on Ambrose Fleming's patent, issued in 1905, for a diode vacuum tube capable of "converting alternating electric currents and especially high-frequency alternating electric currents or electric oscillations, into continuous electric currents for the purpose of making them detectable by and measurable with ordinary direct current instruments." The Supreme Court ruled the Fleming patent invalid because of an improper disclaimer. In November of 1915, the Marconi Corporation issued a disclaimer to the Fleming patent that restricted the invention to use with high frequency alternating electric currents such as are used in wireless telegraphy. The Court maintained that using the diode for rectification of low frequency currents, as stated in the original patent, was known art at the time Fleming filed his patent application and therefore ruled that the original patent was invalid. Moreover, it decided that the disclaimer filed in November 1915 could not prevent the patent's invalidity unless it occurred "through inadvertence, accident, or mistake, and without any fraudulent or deceptive intention." The Supreme Court also judged that Fleming had delayed an unreasonable length of time in making his disclaimer. Therefore, because U.S. patent law holds that an invalid disclaimer automatically invalidates the patent to which it refers, Fleming's patent was invalid.

From this examination of the actual 1943 Supreme Court documents, we see that the statements about the Supreme Court ruling by the Park Service flier, the *New York Times*, Lee de Forest and Hugh Aitken are, in varying degrees, inaccurate. The Supreme Court never determined that Tesla invented radio. Contrary to Aitken's account. The validity of the Lodge patent was not in dispute before the Supreme Court; it was upheld in the Court of Claims where it was ruled that the government had infringed the patent. The matter was not appealed. Lee de Forest, though, came closest to the actual Court documents, but he did not acknowledge that Tesla was ahead of Stone in using four tuned circuits, even if Tesla failed to provide a variable inductance for adjusting them.

What can we learn from these discordant interpretations? A court opinion in a patent case can be difficult reading, and historians should be mistrustful of secondhand analysis. In particular, historians should be skeptical about claims made for Nikola Tesla as an inventor by zealous devotees. As a recent Tesla biography states, he is "Revered as a demigod by some in the New Age community."[6]

Finally, we might question whether the Court was correct in largely rejecting the Marconi tuning patent. The judgment in this matter was not unanimous. Chief Justice Harlan Stone wrote the majority opinion for five justices. One justice abstained and three, including the distinguished Felix A. Frankfurter, dissented. Both Justices Frankfurter and Rutledge argued in favor of the Marconi patent and against the importance of John Stone's invention. Historians might well continue to scrutinize this case.

References

1)Glen Kay, *Marconi and His South Wellfleet Wireless* (National Park Service) no date.

2)I am using "radio" in the most general sense to include wireless telegraphy as well as broadcasting.

3)See also Margaret Cheney, *Tesla: Man Out of Time* (New York: Dorset Press, 1981), p. 176.

4)Quoted in Thorn Mayes, *Wireless Communication in the United States* (E. Greenwich, RI: New England Wireless and Steam Museum, 1989), p. 222.

5)Hugh G. J. Aitken, *Syntony and Spark: The Origins of Radio* (Princeton: Princeton University Press, 1985), pp. 167-8.

6)Marc J. Seifer, *Wizard: The Life and Times of Nikola Tesla* (Secaucus, NJ: Carol Publishing Group, 1996), p. xiii.

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Rereading the Supreme Court:
Tesla's Invention of Radio

by Wallace Edward Brand

Editors' note: We are struck, once again, with how the importance of communication technologies inspires continuing debate regarding their invention and development. The complex evolution of these complicated devices and systems makes the process of attribution exceptionally difficult. This essay responds to "Misreading the Supreme Court: A Puzzling Chapter in the History of Radio" by A. David Wunsch in the November 1998 issue of Antenna.

As regular readers of this newsletter know, on June 21, 1943, the Supreme Court affirmed a 1935 ruling of the United States Court of Claims which essentially invalidated Marconi's claim of having invented radio, and clarified Tesla's role in inventing radio.

The granting of a patent in itself does not help to establish priority of invention. Unlike an infringement action, in a patent grant application no one but the examiner goes out of his way to dig up facts that provide a basis for the rejection of the patent. The patent examiner tries to do this, but is limited to papers on file in the patent office or available to him without great effort or expense. The applicant's attorney is supposed to bring to the examiner's attention all the adverse information he runs across, but he doesn't waste his client's money trying to find data which will help the examiner find grounds to deny the patent.

The radio litigation discussed here arose in the Court of Claims, in a claim for taking intellectual property that was basically the same as an infringement action. Marconi filed a claim against the U. S. government for taking four patents. The patents were: reissue No. 11,913 of patent No. 586,193, granted to Marconi on June 4, 1901, for a two-circuit system for transmitting and receiving signals (one circuit in the transmitter; another in the receiver); patent No. 763,772, granted to Marconi on June 28, 1904, for a four-circuit system of wireless telegraphy; and two patents granted to Oliver Lodge and John Fleming, but assigned to Marconi. The total claim was for $6,000,000, a lot of money in 1916, and justified full development of the facts by the parties to the litigation. It was worthwhile to the government to spend the money to determine whether there was prior art that would invalidate Marconi's patent.

I will first summarize the rulings of the Court of Claims and the Supreme Court, which took the case on petition, then provide more detail on their decisions. I focus on the decision of the Court of Claims, because unless the upper court says it is reversing or vacating the decision below, or affirming it on other grounds, the opinion of the upper court should be read as additional to the opinion of the trial court, not in lieu of it. In fact, more attention should be paid to the affirmed lower court's opinion, because the trial court is closer to the facts. Its decision recites a view that has been accepted by two courts, not just one.

The Court of Claims decided that the government did not infringe Marconi's two-circuit patent. That patent was not an issue before the Supreme Court, which had no jurisdiction to rule on the patent, because the Constitution limits the Supreme Court to ruling on cases in controversy. Furthermore, even if the two-circuit system were found to be a viable system of radio communication, the four-circuit system made it obsolete. The focus of the Court of Claims litigation thus was on the four-circuit patent.

Fifteen of the twenty claims made in the four-circuit patent application were the subject of the litigation. The Court of Claims found for Marconi only one, claim 16, which the Supreme Court sent back for reconsideration. It never was reconsidered; Marconi settled all claims for about $34,000 plus interest.

As for the validity of Marconi's four-circuit patent, No. 763,772, the Court of Claims noted the great difficulty Marconi had in obtaining the patent Marconi repeatedly filed new specifications and claims, but

these were rejected because of prior art. After J. P. Morgan became one of Marconi's backers, Marconi presented another petition for revival on February 19, 1904. The Commissioner of Patents granted it. A new examiner acted on the case and allowed all claims formerly rejected for reasons stated in a brief letter.

The Court of Claims, however, disagreed with the new patent examiner. The initial examiner had disallowed Marconi's patent based on, among several others, two patents of Tesla that preceded Marconi's, numbers 645,576 and 649,621, in which he used four tuned circuits. Although Tesla had not specified how to tune the circuits, one of the patent examiners stated that it was fair to assume Tesla intended to use either of the two available methods. Furthermore, Tesla's earlier patent No. 645,576 of March 20, 1900, referred to tuning no less than six times.

In the opinion of the Court of Claims, Tesla had shown the advantage of all four circuits being tuned. Oliver Lodge had taken the two-circuit system and tuned the open circuits in the same way used later by Marconi. Stone described a four-circuit system with the closed circuits tuned together." A consideration of these three systems," the Court decided, "would naturally suggest to one skilled in the art the tuning of all four circuits together by the use of the adjustable self-inductance method in the manner proposed by Lodge, and Stone put this suggestion into practice when he filed the amendment to his specifications. Marconi used the suggestion earlier in the application for his patent, but under the circumstances we think neither Stone nor Marconi was entitled to credit for it." That is because Stone had acknowledged Tesla's priority.

In summary, I read the Court of Claims' opinion as deciding that the four-circuit system was invented by Tesla, based specifically on the above statement of the Court of Claims. Also persuasive is the reading of the Court of Claims opinion in the same way by Marconi's attorney. Specifically, in his brief to the Supreme Court in 1943, he stated: "It is not quite clear whether the Court [of Claims] thought that the Tesla patents alone fully anticipated the Marconi claims, or whether a combination of Tesla, Lodge and Stone made the Marconi claims invalid "

Does the Supreme Court's considerable reliance on the work of Stone in their opinion detract from Tesla's deserved priority of invention? I think not for at least four reasons.

First, the Supreme Court affirmed the Court of Claims rejection of Marconi's claims under the four-circuit patent (all except the lower court's ruling in favor of Marconi on claim 16, which the Supreme Court vacated).

Second, it is reasonable to expect the Supreme Court to emphasize the work of Stone to buttress the Court of Claims opinion. Marconi's lawyer attacked the Tesla patent before the Supreme Court as being science fiction worthy of Jules Verne. It therefore was reasonable for the Supreme Court to respond to the argument by showing that Stone, a distinguished scientist, had priority over Marconi (based on Stone's letters to Butler), but not Tesla.

Third, as the Supreme Court mentioned, Stone, in a letter to his friend Butler, acknowledged that his four-circuit apparatus basically was the same as Tesla's.

Fourth, the Court of Claims said it was unnecessary to find that Stone had priority because of Tesla's priority.

All that is left is the significance of the Court of Claims' marginal award of invention to Marconi for the two-circuit system. The government's lawyer claimed that Marconi's two-circuit system essentially was the same as that used by Hertz to verify the theories of James Clerk Maxwell. Furthermore, Marconi's own lawyer said that the two-circuit system "would operate, but only at short distances, because there was too much waste of energy."

Even Justice Frankfurter, who dissented bitterly in favor of Marconi, acknowledged that the two-circuit patent was not a significant factor in the innovation of radio.

Finally, there are the two portions of the Supreme Court Opinion sometimes cited as preserving Marconi's priority of invention. The first is the sentence in the majority opinion that declares: "Marconi's reputation as the man who first achieved successful radio transmission rests on his original patent, which became reissue No. 11, 9013, and which is not here in question." The pronoun "which" has an ambiguous antecedent. Is it Marconi's reputation or the validity of the patent that is "not here in question"? I interpret it as referring to Marconi's reputation, as neither party sought review of the Court of Claims decision on the reissue patent. Even if it did refer to the patent, the statement would be significant only if Marconi's combination of elements invented by others played an important role in the progress of radio. It did not, because the two-circuit system could transmit only a few miles.

The second citation is to Justice Frankfurter's dissenting opinion. It is clear that he found it difficult to understand the facts, because he failed to cite a single one in support of his view that those prior to Marconi lacked "the flash─that begot the idea in Marconi." Perhaps it was for that reason that he failed to persuade the majority.

Marconi deserves great credit for his vigorous commercialization of wireless telegraphy and radio. He recognized the business advantages of a claim to invention of the products and services he marketed as a check on his competition. In those days, most monopolies were formed by merging or buying up the competition, or by driving smaller competitors out of business through costly patent litigation where possible. In sum, though, the evidence available from historical documents simply does not support Marconi's claim of invention; it does clarify Tesla's role in inventing radio.

Wallace Edward Brand worked as a federal government lawyer in several jobs, principally as a trial lawyer, including as lead government counsel in the seminal cases under the 1970 revision of the Atomic Energy Act which served to promote competition among electric utilities. From 1974 to 1999 he has been engaged in the private practice of energy law, principally cases involving electric power, representing small municipal and cooperative electric utilities in actions against larger ones. He is currently writing a book about the electric power business.