

MULTIPLEX TELEGRAPHY AND TELEPHONY

LETTER FROM
THE SECRETARY OF COMMERCE

SUBMITTING

IN RESPONSE TO SENATE RESOLUTION No. 149, A REPORT
CONCERNING THE DISCOVERY OF MULTIPLEX
TELEGRAPHY AND TELEPHONY AND
THE EXTENT TO WHICH THIS
SYSTEM IS NOW USED



DECEMBER 9, 1926.—Referred to the Committee on Patents

WASHINGTON
GOVERNMENT PRINTING OFFICE

1926

SUBMITTED BY MR. WALSH, OF MONTANA

IN THE SENATE OF THE UNITED STATES,
December 10 (calendar day, December 11), 1926.

Ordered, That the communication of the Secretary of Commerce relative to the discovery and extent of use of multiplex telegraphy and telephony, together with the accompanying papers, except the briefs for appellant and appellee, transmitted to the Senate on the 9th instant and referred to the Committee on Patents, be printed as a Senate document.

Attest:

EDWIN P. THAYER,
Secretary of the Senate.

LETTER OF TRANSMITTAL

DEPARTMENT OF COMMERCE,
Washington, November 16, 1926.

The honorable the VICE PRESIDENT OF THE UNITED STATES,
Washington, D. C.

DEAR MR. VICE PRESIDENT: Senate Resolution 149, adopted February 16, 1926, directs the Secretary of Commerce, if not incompatible with public interest, to report fully to the Senate—

(1) The circumstances attending the discovery of the method of multiplex telegraphy and telephony described in United States Letters Patent Numbered 980,356, 980,357, 980,358, and 980,359, granted January 3, 1911;

(2) The extent to which this system is now used by the said American Telephone & Telegraph Co. in furnishing communication to the Government and to the public;

(3) The value of such use annually to the said American Telephone & Telegraph Co.; and

(4) What reduction in rates, if any, has resulted from the free use of "wired wireless" by the said American Telephone & Telegraph Co.

Upon receipt of the Senate resolution I requested both Gen. George O. Squier and the American Telephone & Telegraph Co. to furnish me with such information as they had on these subjects. They responded to my request, and I herewith transmit their statements.

Question (1) as to the circumstances attending the discovery of the inventions is fully answered by the detailed descriptions appearing in the inclosures.

Questions (2), (3), and (4) as to the extent and value of the use of these methods by the American Telephone & Telegraph Co. and what reduction in telephone rates has resulted therefrom, are answered by the American Telephone & Telegraph Co. by the statement that the company has not used the system at all. General Squier states that for obvious reasons he is not in a position to report on these matters. Mr. R. Randolph Hicks, of the firm of Satterlee & Canfield, counsel for General Squier in the litigation involving his patents, states affirmatively in a letter addressed to him that there "can be no question that the American Telephone & Telegraph Co. are using the method described in your patents and that the court has justified that use on the ground that your discoveries belong to the public."

The dispute as to whether the method is used in fact by the American Telephone & Telegraph Co. apparently arises from differences in views as to the meaning and validity of various patents and involves questions which I have no means of determining.

The Secretary of Commerce has no authority in law to summon witnesses, compel testimony, or carry on a formal investigation to determine the facts called for under this resolution, and the matters lie outside of the activities of the department. There is no informa-

tion on file regarding it. In complying with the resolution I have therefore been limited to the statements voluntarily made by the parties.

I transmit herewith the following:

1. Statement of Gen. George O. Squier.
2. Letter of Mr. R. Randolph Hicks.
3. Statement of Charles M. Bracelen, vice president American Telephone & Telegraph Co.
4. Opinion of United States district court in case of *Squier v. American Telephone & Telegraph Co.*
5. Opinion of United States Circuit Court of Appeals, Second Circuit, in same case.
6. Brief on behalf of American Telephone & Telegraph Co. in last-mentioned court.

Yours faithfully,

HERBERT HOOVER,
Secretary of Commerce.

MULTIPLEX TELEGRAPHY AND TELEPHONY

METROPOLITAN CLUB,
Washington, D. C., April 21, 1926.

HON. HERBERT HOOVER,
Secretary of Commerce,
Washington, D. C.

MY DEAR MR. SECRETARY: I have the honor to acknowledge the receipt of your communication dated March 6, inclosing copy of Senate Resolution 149, relative to the circumstances attending the discovery of the method of multiplex telegraphy and telephony described in certain letters patent, and other information relative to the use of this system.

I have given careful consideration to the subject matter of the resolution, both as regards the preamble and the resolution proper. The statements made in the preamble are, so far as I know, correct, and represent the facts.

In regard to the resolution proper, calling on the Secretary of Commerce for certain information, I am in a position to report fully and in detail "the circumstances attending the discovery of the method of multiplex telegraphy and telephony covered by patents Nos. 980356, 980357, 980358, 980359, granted January 3, 1911." I am not, for obvious reasons, in a position to report on "the extent to which this system is now used by the said American Telephone & Telegraph Co. in furnishing communication to the Government and to the public, and the value of such use annually to the said American Telephone & Telegraph Co., and what reduction in rates, if any, has resulted from the free use of 'wired wireless' by the said American Telephone & Telegraph Co."

To appreciate more fully the circumstances which led to this invention, and the importance of it in the communication art, it will be useful, if not necessary, to present a brief review of the communication art up to the present time, and the bearing of this invention on the progress and development of the art.

THE BIG FIVE TELEPHONE INVENTIONS

The telephone art is highly technical, its development and perfection has required much scientific knowledge and engineering skill. The engineering staff of the American Telephone & Telegraph Co. deserves great credit for its accomplishments in the development and improvement of many devices and practices necessary for the successful operation of the present day telephone system. They have also contributed much to the theory and engineering technique of the art. If, however, we analyse the subject more closely, we find that all of these developments center around five inventions, "the

big five," which are the key inventions of the art. The seven and a half thousand of patents owned and controlled by the American Telephone & Telegraph Co. relate generally to modifications and improvements of these five fundamental inventions. It is of interest, therefore, to consider what these key inventions are and who created them. I conceive these five fundamental inventions to be:

1. Telephone receiver.
2. Telephone transmitter.
3. Pupin loading coil.
4. Three electrode vacuum tube repeater and amplifier.
5. Wired-wireless, or multiplex.

It is significant to note that these five basic inventions were all made in the United States by independent inventors; none of these inventions resulting from the work of the Bell laboratories. The telephone receiver which has not been improved upon or modified in its essential elements since its inception in 1876, was the work of Professor Bell. The second important step in the progress of the art was the invention of the carbon transmitter, the work of Berliner about 1878. From that time on until 1900, a period of over two decades, no invention of vital importance in the art made its appearance until Professor Pupin, of Columbia University, announced his invention of the "loaded" line, which made possible the extension of distances in telephone communication. The fourth outstanding achievement in the telephone art was the repeater and amplifier based on De Forest's invention of the "audion," or three electrode vacuum tube, first employed by me on wire circuits in connection with my experiments in wired wireless, which led the American Telephone & Telegraph Co. to undertake the development of this device for its purposes in 1912, which has resulted in the repeater and amplifier as now used in the wire art.

Finally we have the fifth of these basic inventions, wired wireless, invented in 1910.

It, therefore, appears that the gigantic telephone system of the United States, admittedly the most efficient telephone system in the world, and the model for all other nations, is beholden to the so-called "man in the garret," entirely outside of the Bell laboratories, for the fundamental inventions which are the foundation stones of the whole art, as we know it to-day.

It will be readily conceded by all engineers competent to judge that I do not overstate the case in saying that the above mentioned five inventions constitute the backbone of the telephone art. How it came to pass that none of these inventions were made in the Bell laboratories, and this in spite of the fact that the need for them was fully appreciated many years prior to their appearance, is in itself an interesting psychological fact. Is it possible that the absorption in the development of details, dimmed the vision of their engineers, making it impossible for them to strike out boldly into new fields? I have found in my own experience in dealing with hundreds of engineers during the World War, that large groups of engineers working under one roof are excellent organizations for development work, but are not suited for originating basic conceptions. As Chief Signal Officer of the Army, for instance, in the vast development of radio for war purposes, instead of one large laboratory, the work

was divided between three laboratories in different places, the leaders meeting in conference frequently, which had the effect of stimulating friendly professional rivalry and producing best results. As Emerson has said of institutions, so we may say of great inventions, that each is "the length and shadow of one man." However that may be, the fact remains that the outstanding contributions to the telephone art did not originate in the Bell laboratories.

Let us now consider briefly the situation connected with the last fundamental contribution to the art, namely, "wired wireless."

SELECTING A NAME FOR THE NEW ART

I had much difficulty in 1910 in deciding upon a name which would describe and indicate to the lay mind what had been accomplished by this invention. It was not an easy task then nor is it easy now. This is indicated by the fact that since this invention was made a number of names have been used to designate this art which has caused great confusion in the technical literature of this subject. Among the names which have been employed in scientific papers on this subject may be mentioned the following: Multiplex telephony and telegraphy by means of electric waves guided by wires, wired radio, multiplex telephone and telegraphy by guided waves, high frequency telephony and telegraphy, wire radio, squier telegraphy and telephony, guided wave telephony and telegraphy, line radio, and more generally by the original popular name which I coined in 1910, wired wireless.

There is one other name for this new art which has been proposed and used extensively in the titles and texts of papers by engineers of the American Telephone & Telegraph Co., viz, "Carrier telephony and telegraphy," or the method is spoken of in the literature of the engineers of that company as the "carrier art," "carrier circuits," etc. The great influence and prestige of this great organization has influenced some others to use this name.

After considerable inquiry among engineers and scientists in this country and in France, England, Italy, Japan, and the United States, I have been unable to find a single engineer of standing outside the American Telephone & Telegraph Co. who favors this name. It is pointed out at once that "carrier art" means nothing more than the older art of telephony and telegraphy where the battery current is the carrier or the carrier wave has zero frequency. It is unscientific in that it does not discriminate nor describe the new method, nor connect it in any way with radio engineering methods. Indeed, the name "carrier art" would probably express to the layman, some function of carrying or transporting commodities, such as an express company or a "common carrier" as known in statutes, and to the business world, and has no defense from a scientific standpoint.

WHAT IS WIRED WIRELESS AND WHO INVENTED IT?

Up to 1910, when my original experiments on "wired wireless" were conducted, the two arts of wireless telegraphy and wire telephony and telegraphy were considered and developed everywhere as two distinct arts. It seemed at that time that there was no prac-

tical connection between these two arts. They were in separate watertight compartments and were fast developing separate techniques, apparatus, nomenclatures, manuals, etc. From a strictly scientific standpoint, the essential difference between the two arts may be said to be the frequency characteristic. On the one hand, in wire telephony frequencies are employed within the range of audition, frequencies below 5,000 cycles per second. The problems connected with wave propagation on wires at such frequencies, and the instrumentalities necessary in the art were fully worked out, and a great deal of data in this field was available for the telephone engineer. In the case of radio telephony and telegraphy, then but 12 years old, the frequencies employed up to that time, the period of the first "wired wireless" experiments in 1910, were above 100,000 cycles per second; in fact, the range of frequencies commonly employed covered the spectrum from 100,000 to a million or more cycles per second. The band of frequencies in between, i. e., between the highest audible frequency and the lowest frequency employed at that time in radio, represented an entirely new, unexplored field which had never been used either in radio or wire practice. There is no record of any experiments in this band of frequencies in any of the literature, or any of the patents up to that time. One main reason for this state of affairs was that there was no apparatus available up to that time for the production of continuous electric waves within this range of frequencies, which would be suitable for such experiments. The technical world had not reached that stage of development until Mr. Alexanderson of the General Electric Co. constructed a machine for Professor Fessenden for use in radio, giving a maximum frequency of 100,000 cycles, and an output of about 2 kilowatts. All other previous attempts at so-called high frequency alternators were of the order of magnitude not above 10,000 cycles per second, well within the range of human audition. I realized the probable practical importance of this totally unused band of frequencies when applied to wire conductors, and foresaw the possibility of linking together these two arts by the use of this particular band of frequencies extending above and below and overlapping on each side, which would ultimately merge the whole art of electrical communication into one unified art. The laws of the propagation of electric waves over this band of frequencies on wires were not only unknown, but the opinion at that time, as indicated very clearly by the discussion of my paper at the Chicago convention of the Institute of Electrical Engineers, was that the use of this range of frequencies on wires did not offer promise of success. There was absolutely no data available which could be of any assistance in predicting what would happen with this range of frequencies over conducting wires. By very simple reasoning, not mathematical, I approached the matter with an open mind and reasoned somewhat as follows, as clearly indicated in the first pages of my memoir on the subject.

Wireless practice of transmitting energy from one antenna to another antenna was impressed upon my mind as being the limit of inefficiency from the standpoint of energy transmission. Nothing could be worse than this system. I reasoned that if the two antennas of a wireless system were connected by a conducting wire only three things could happen:

1. The transmission could be the same as it was before.

2. It could be better.

3. It could be worse.

I reasoned that a metallic conductor, extended and connecting the two stations, could not but improve communication, because in ordinary wireless it was known at that time that the waves attached themselves to the earth's surface or to the sea, and in some unknown manner these conducting surfaces played an important rôle in radio transmission. The character of the surface of the earth between the stations was also of considerable importance in the transmission. I reasoned, therefore, that any form of conducting wire directly connecting the two antennas as a part of each, would be really using a superior form of earth connection between the two stations, and substituting for a heterogeneous surface of land and water a particular kind of earth material (copper), which experience had proved, had wonderful properties in propagating electric disturbances of all kinds. I looked upon the wire as a piece of "specialized earth" that had been found years before to be very suitable for facilitating the propagation of electrical effects. I therefore was perfectly certain in the original conception that connecting the two stations with a wire from transmitter to receiver would produce a highly directive wireless system. This simple basic reasoning, without any mathematical discussion, possessed me for a year or so previous to the actual experiments. I felt morally certain that nothing but some sort of success could come from this simple experiment. I was not sure as to how efficient it would be, as this range of frequencies was as new to the world of physics as the original Hertz experiments. Certainly nobody had explored this band of frequencies, extending over three octaves, for a principal reason, if for no other, that suitable apparatus for the production of these frequencies did not exist up to that time.

The appearance of the Alexanderson high frequency alternator had exactly the same effect at that time as the introduction of a new telescope would have for the astronomer. I realized that I had a new electric telescope, so to speak, in my hands, and was anxious to utilize it to explore the new electric heavens. I did not use this agency as it was intended by Mr. Alexanderson to be used, far from it. Mr. Alexanderson designed it to produce the highest possible frequency for space radio, and great mechanical difficulties had to be overcome in operating his machine to produce these so-called high frequencies. My object, on the other hand, was to operate this machine at as low a speed as possible so that I could utilize this agency, made for another purpose, to experiment over the whole range of a new band of frequencies on wire circuits. I, therefore, ordered the second of these alternators that was ever built, with a view to operating it in this unique manner for this special purpose. I carried out in the autumn of 1910 in the National Bureau of Standards laboratories a set of physical experiments on the propagation of electromagnetic waves of frequencies from 20,000 up to 100,000 over the regular Bell wires of the city of Washington. This part of the work, which is separated and segregated in Section IV of my original memoir first published by the War Department, as Document No. 390, may be regarded as a purely physical research. It makes no special reference to multiplex telephony and telegraphy,

and for the first time proves that this range of frequencies can be propagated on telephone lines; that tuning may be effected at each end throughout this whole range of frequencies; and in general a whole set of purely physical data is given in this section of the paper, which would have been of importance to the scientific world entirely independent of any practical applications of it. This physical research stands to-day as the first in this field. I, however, proceeded further. The memoir and the patents disclose in detail the application of this band of frequencies in the accomplishment of a system of multiplex telephony and telegraphy. This part of the paper may be considered the strictly engineering part, or the applicational part, in contradistinction to Section IV, which is a purely physical research. It has been frequently said that Hertz conducted the physical experiments which are the basis of wireless telephony and telegraphy, and that Marconi interpreted them in the way of turning them to practical account in the wireless art. I did both of these in founding the new art of "wired wireless." I not only entered this new field for the first time, and established the fundamental principles connected with the propagation of these waves over conductors, but also reduced these experiments to practice, and developed a system of multiplex telephony and telegraphy, based on these researches. In other words, a successful multiplex telephone and telegraph system was operated for the first time, the basis of present day practice.

There was another aspect to the invention, which, as a signal officer of the Army, was uppermost in my mind. For national defense the Signal Corps is charged with providing and maintaining electrical lines of communication for the Army in the field. The vast terrain of modern armies has made the Signal Corps key problem largely one of rapidly transporting wire over considerable distances. If, therefore, one wire could be made to do the work of many wires, the main difficulty in field lines communications for war purposes would be solved. Although at that time suitable sources of electric waves for such purposes had not been developed, it was realized that they soon would be, as later development has shown. From the purely military standpoint, therefore, here was a system which offered possibilities for greatly improving the efficiency of the Signal Service, without in any way involving the complicated developments required to fit it in to the Bell system. This purely military aspect of the invention, as a part of the national defense, appealed so strongly to the then Chief Signal Officer of the Army, Gen. James Allen, that he took complete and official charge of the invention as soon as it was reported and demonstrated to him. He arranged for the application of the patents under the law of 1883. The War Department requested the Patent Office not only to prepare the specifications themselves, but requested that the examination of these specifications be made "special and take precedence" under the following regulations of the Patent Office:

Applications wherein the inventions are deemed of peculiar importance to some branch of the public service, and when for that reason the head of some department of the Government requests immediate action and the commissioner so orders.

While I was on duty as military attaché to the American Embassy in London, 1912-1916, I developed in cooperation with Messrs. Muirhead & Co., a simple form of wired wireless telegraph instrument for Signal Corps purposes in war, and forwarded a model to the United States. This apparatus is described in Professor Eccles' book, *Handbook of Wireless Telegraphy and Telephony*, pages 482-484, published in London.

All of the alleged evidence in the matter of publications or patents which have been submitted by the American Telephone & Telegraph Co. as showing priority, fall to the ground, if for no other reason, by virtue of the simple and all-important fact that up to the time of my experiments, there was no apparatus available suitable for the band of frequencies employed in these experiments, and there was no information available regarding the propagational characteristics of waves of such frequencies over wires. I both established the principles, and incorporated them into practice in the development of a multiplex telephone and telegraph system. I imported into this new field all of the many practices, manipulations, and apparatus in toto as they were found in the radio art of 1910, and applied them to the new art of "wired wireless."

On page 58 of my original memoir occurs the following:

It should be noted that throughout these experiments not a single piece of new apparatus was designed or constructed but the conventional apparatus as now employed in wireless telegraph engineering was adopted as a whole, although, as stated above, this apparatus could be materially improved in the line of compactness of design for this range of frequencies.

The four patents are basic and widely cover the subject; I could have applied easily for many subsidiary patents in addition, which would very properly have been granted. I was the first to use detectors, wavemeters, variometers, variable condensers, and air-core transformers on wire lines, and obtained resonance curves and attenuation curves over this band of frequencies, as applied to wire circuits. All of these practices were entirely new in the wire art, and were successful because the key solution of the problem was conceived correctly, which was to unite the young and flourishing art of wireless with the older art by the simple expedient of connecting the two radio stations by a continuous conductor, and utilizing suitable frequencies. At a single stroke I turned the thoughts of engineers throughout the world in an entirely about-face direction from the day of the publication of the patents on January 3, 1911, and the whole attitude of mind of wireless engineers, and wire engineers changed with respect to each other. In fact, as has been said by John Stone Stone in the *Franklin Institute Journal*, I created a new art.

It is, therefore, contended that no amount of piling up of records, from whatever source, can overcome the facts as outlined above, that these experiments presented an entirely new formula in the art of electrical communication. In the efforts extending through four years in the courts which the American Telephone & Telegraph Co. has made to shift the credit for one of the most important advances in telephony (wired wireless) from America to France, reliance was made on Hutin and Le Blanc, of Paris, France, whose work dates in the early nineties before wireless telegraphy was

even known. How these French inventors could have utilized wireless methods and apparatus in their application to wires before wireless was even heard of in a deep mystery which only a large organization like the American Telephone & Telegraph Co. can fathom.

OPINIONS OF THE ENGINEERING PROFESSION

In the last analysis it is the engineer rather than the patent attorney who must be relied upon to furnish the evidence which decides an engineering invention. It is the trained man whose life is spent in the development of an art who knows very well when and where certain improvements were introduced, and can also appreciate truly the significance of an improvement. From this point of view, the opinions of entirely disinterested engineers, at home and abroad, are of the greatest value. To mention only a few:

UNITED STATES—MR. JOHN STONE STONE

In the United States, Mr. John Stone Stone, one of the leading authorities and best posted men on the subject of electrical communication, at one time one of the leading engineers of the American Telephone & Telegraph Co., in an able paper entitled, "The practical aspects of the propagation of high frequency electric waves along wires," discussing my memoir, published in the *Journal of the Franklin Institute*, October, 1912, less than two years after my patents were issued, discusses my invention and makes the following statement:

A new art has been born to us. The infant art of high frequency multiplex telephony and telegraphy is the latest addition to a brood of young electric arts. It is certainly a most promising youngster, and should, after the manner of its kind, call lustily for its share of attention and sustenance.

More than 20 years ago, the advent of this new art was definitely prophesied by the late J. W. Gibbony, the author in this country, and in France by the well known electrical engineers, Maurice Hutin and Maurice le Blanc. Though there was at that time a vigorous contest for priority which extended over a period of years, it is not with these earlier efforts, prophetic though they were, that we have to deal now. They were buried in the archives of the United States Patent Office. Our interest to-day is in the vital, practical aspects of the new art, based upon the propagation of high frequency electric waves along wires, and though 20 years ago there seemed to be much promise in the new art, there were indeed surprisingly few practical aspects to the subject.

ENGLAND—PROF. W. H. ECCLES, F. R. S.

Prof. W. H. Eccles, perhaps the leading authority on radio in Great Britain, a distinguished author on the subject, and technical advisor to the British Government, states in a letter published in the *London Electrician* of January 24, 1921, page 81, as follows:

If we had given the name "Marconi telegraphy" to the one (referring to radio), we could have called the other (referring to "wired wireless"); "Squier telegraphy" in commemoration of the men who have done most to bring the two methods to fruition.

ITALY—PROF. G. VALLAURI

In the course of the proceedings of the committee on Nomenclature of the technical committee on International Radio Communication held in Paris in 1921, where the matter of a suitable name for

the art of "wired wireless" was under consideration, Prof. G. Vallauri, director of the Electrotechnical and Radiotelegraphic Institute, and head of the Italian delegation, proposed on behalf of Italy that the new art be named "Squier telegraphy and telephony," in honor of its inventor. This proposal was agreed to by the United States delegation comprising Austin, Dellinger, Kennelly, and Cohen; by the Japanese delegation, and by Prof. C. O. Mailloux, president of the International Electrotechnical Commission. No final action, however, was taken in the matter.

GERMANY—DR. EMIL MAYER

In a lecture delivered by Dr. Emil Mayer, of the University of Strasbourg, June 6, 1920, he stated that German engineers, elaborating on experiments originally made by General Squier, Chief of the Signal Corps, United States Army, have perfected a method for transmitting telephone and telegraph messages simultaneously over the same wire. He also forecast that this invention will possibly realize the hope of Nicola Tesla in transmitting electrical energy by wireless.

CANADA—CHARLES A. CULVER, PH. D.

In a paper on "Guided-wave telephony," by Dr. Charles A. Culver, chief high frequency engineer, Canadian Independent Telephone Co., published in the *Journal of the Franklin Institute*, March, 1921, he discusses at length the recent developments in multiplex telephony, and in referring to this subject, makes the following statement:

Certain discoveries or achievements in the realm of science stand out pre-eminently as marking the beginning of new epochs in the world's progress. Such was the invention of the magnet telegraph by Morse, the telephone by Bell, the discovery of radio-activity by Becquerel, electromagnetic waves by Hertz, and X-rays by Rontgen; the invention of the audion by De Forest and guided wave or high frequency multiplex telephony and telegraphy by Squier.

Prior to General Squier's invention it had been possible to simultaneously transmit several telegraph messages over a single telegraph circuit, and while certain earlier attempts have been made to develop a system of syntonized multiplex telegraphy, it is to the man who is at present Chief Signal Officer of the United States Army that the world owes the invention of a system of communication by which it is possible to carry on as many as ten or more two-way simultaneous telephone conversations over one electrical circuit. In 1910 Major General Squier (then major), by a bold and ingenious adaptation of the fundamental principles and apparatus previously employed in radiotelegraphy and telephony, developed the multiplex system which bears his name, and thereby established a distinct branch of the art of communication.

THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

My paper on "Multiplex telephony and telegraphy by means of electric waves guided by wires," which was published as War Department Document No. 390, was also presented by invitation at the twenty-eighth annual convention of the American Institute of Electrical Engineers held in Chicago on June 28, 1911. This paper created a great deal of interest and called forth considerable discussion from the prominent telephone engineers present at that meeting.

Dr. Frank B. Jewett, formerly chief engineer of the Western Electric Co., now a vice president of the American Telephone & Telegraph Co., opened the discussion with a prepared statement in

which he discussed at length the various aspects of the paper. He expressed doubt as to the feasibility of applying the method described in the paper to commercial work, pointing out some of the difficulties which might be encountered. In concluding his remarks, however, he makes the following significant statement:

In conclusion and as previously remarked, I would say that I commenced my investigation of Major Squier's work with a great deal of interest, not only on account of the engineering features involved, but also because the fundamental idea of the system appealed to me very greatly. In the course of this investigation I have had not only the pleasure of reading Major Squier's paper, but in addition the further pleasure of discussing his work with Major Squier personally and of examining his apparatus on the line in Washington and I can assure you that the experiments which he has performed over this line are indeed beautiful. There is absolutely no interference between the battery current and the high-frequency current and over the circuit which he was operating, i. e., a relatively short cable circuit, it was easily possible to get a reasonably good volume of transmission with good articulation. As I have already said, however, I have not as yet been able to satisfy myself that there is any affirmative answer to the engineering questions which must be satisfactorily answered before there is any possibility of applying Major Squier's invention generally to a commercial plant used for universal service. I do not say, of course, that it may not be feasible to apply it commercially in certain localized cases where there are special reasons for desiring an additional circuit without the necessity for running additional wires. This could hardly be considered as a general commercial application, for the purpose of extending the range or efficiency of telephonic communication.

Mr. S. G. McMeen, a consulting telephone engineer of national prominence, who presented this paper before the convention in my absence in the field on the Mexican border, effectively answered Doctor Jewett's criticism by the following significant statement:

Doctor Jewett further says that Major Squier's invention is "a beautiful laboratory apparatus." I beg to remind him that the telephone itself was that, and that only, when Professor Bell finished it.

Mr. McMeen also said:

Since 1900 there has been no announcement of large addition to our fundamentals in telephony. We may well consider this work another such addition.

In his reference to the year 1900 he evidently had in mind Professor Pupin's invention of the loaded telephone line.

Another great authority on telephony, Mr. Frank F. Fowle, consulting telephone engineer and formerly editor of the *Electrical World*, discussed the paper at this convention and stated as follows:

Major Squier's achievement in duplexing a telephone circuit by superimposing waves of a frequency beyond the range of audibility will rank high among scientific accomplishments. It marks a new and extremely interesting development in the art of telephony.

The above quotations are taken from the *Transactions of the American Institute of Electrical Engineers*, Volume XXX, 1911.

ACTION OF THE FRANKLIN INSTITUTE

The Franklin Institute of the State of Pennsylvania, one of the oldest scientific institutions in this country, made a thorough investigation of this research and in the report of the committee which examined all the facts and prior publications connected with the invention, the following statement appears:

These quantitative experimental results characterize Major Squier's work as a distinct contribution in the field, separating it from the prior art in which, so far as pertains to multiplex telephony through line wires, no such useful results could be predicated; proving for the first time the practicability of the invention on a commercial scale, and giving good promise of an actual commercial use of the principles involved for multiplex telephony over wires.

The special committee designated to investigate the merits of this invention comprised Prof. Elihu Thomson, of the General Electric Co.; Mr. John Stone Stone, inventor; and Prof. George W. Pierce, of Harvard University. In the course of the preparation of this report Mr. Stone journeyed to Washington and spent several days at the Bureau of Standards in a careful examination of the apparatus used and the operation of the system.

On the basis of this investigation, under date of June 5, 1912, the Franklin Institute awarded me the Elliott Cresson gold medal for "His inventions in multiplex telephony." (Committee Report No. 2507.)

THE FRANKLIN MEDAL

In May, 1919, the Franklin medal, the highest honor in the gift of the institute, was awarded me, with the following citation:

That the Franklin medal be awarded to Maj. Gen. George Owen Squier in recognition of his valuable contributions to physical science, his important and varied inventions in multiplex telephony and telegraphy and in ocean cabling, and his eminent success in organizing and directing the Air and Signal Services of the United States Army in the World War.

UNITED STATES BUREAU OF STANDARDS

In an official manual entitled "The Principles Underlying Radio Communication," prepared by a group of specialists of the Bureau of Standards, headed by Dr. J. H. Dellinger, chief of the radio division, a section is devoted to the discussion of the principles of line radio (wired wireless) communication, pages 530 to 536.

In referring to this subject the following statement is made:

The practical development of line radio communication dates from the pioneer work of Maj. Gen. George O. Squier, Chief Signal Officer of the Army, which is described in his paper "Multiplex Telephony and Telegraphy by means of electric waves guided by wires" (Trans. A. I. E. E., vol. 30, p. 1617, May, 1911); also published as a professional paper of the Signal Corps.

UNITED STATES DEPARTMENT OF JUSTICE

The United States Department of Justice, on behalf of the United States Government, initiated an investigation covering the subject of the validity of my United States patents on wired wireless, and the infringement of these patents by the multiplex telephone and telegraph system of the American Telephone & Telegraph Co. This extensive technical report made by an agent of the Department of Justice, dated June 3, 1921, now on file in the Attorney General's office, specifically finds as follows:

In conclusion, it might be stated that the systems of the American Telephone & Telegraph Co. represent a high degree of development in the art. The systems have embodied in them many refinements and improvements by means of which various advantages are gained and by means of which it might well be contended that infringement is avoided. As above set forth, however, it is

believed to be clear that the fundamental elements of the Squier system are present in each of the American Telephone & Telegraph systems and that the various refinements and improvements are in effect the electrical equivalents of the somewhat simpler circuits or elements shown by Squier.

I therefore believe the Squier patents to be infringed as more particularly pointed out above. Subject to the exceptions noted in detail in the foregoing, I believe the Squier patents to be valid and to define invention over the prior art.

WHO DERIVES THE BENEFIT FROM THE WIRED WIRELESS INVENTION?

Up to the present day I have never received any personal remuneration from the American Telephone & Telegraph Co. for the use of this invention. As stated, the patents were issued on January 3, 1911. The first demonstration of the commercial use of this system by the American Telephone & Telegraph Co. was the Baltimore-Pittsburgh test conducted in December, 1918, over seven years ago, and since that time this system has been put into extensive use on the Bell lines throughout the country. The capacity for service of the Bell lines has been greatly increased by the use of this system; 5 telephone conversations and 20 telegraph messages are being transmitted simultaneously on the same line, all of these superimposed upon the ordinary battery telephone. As a result of the use of this method of multiplexing, the telephone company no longer speaks miles of telephone circuit, but of "channel miles." A single wire circuit now serves for a number of channels, a separate message telegraphic or telephonic transmitted on each channel. For instance, when a brokerage firm obtains a leased wire for its exclusive use between New York and Chicago, it really no longer has an exclusive wire as heretofore, but a "frequency channel," one of many that are used on the same wire circuit. Therefore, a single wire circuit is leased to several customers. The statistics furnished in the last annual report of the American Telephone & Telegraph Co., showing the number of miles of wire in the system is incomplete without a knowledge of the number of "channel miles" in use for furnishing service.

In all other countries the telephone systems are operated by the government itself for the benefit of the public. The United States is the outstanding exception in this respect. In 50 years the American Telephone & Telegraph Co. has grown to be the largest private monopoly in the world. It, therefore, appears evident that I could have dedicated my English patent on wired wireless, for instance, to the people of Great Britain very simply and easily by granting a license to the British Post Office, where the English people would have received full benefit therefrom in increased facilities and reduced rates. In the United States, however, there is no way of dedicating this invention to the public. The only agency to receive and use this invention for the public telephone service is a private corporation interested in earning dividends for its stockholders. Patriotism and altruism, therefore, all disappear in this instance, and an inventor is forced to bestow charity upon a private corporation who has seen fit, up to the present, to appropriate his invention in toto, and use it for its private gain, unless or until it can prove to the people that it has passed on the benefits from this invention to the people themselves through a reduction in rates.

CHANGE OF ATTITUDE OF THE AMERICAN TELEPHONE & TELEGRAPH CO.

The four patents on wired wireless were issued on January 3, 1911, and from that day until the decision of the Attorney General of March 22, 1920, interpreting the act of 1883, an interval of a little over nine years, these patents and the memoir accompanying them were reprinted, translated, and investigated in every important country in the world. In all these nine years no individual, company, or corporation in any country came forward to claim this invention. On the contrary full credit was accorded me by the engineering profession including the engineers of the Bell Co., as indicated by Doctor Jewett's discussion of my paper at the Chicago convention of the American Institute of Electrical Engineers already cited.

Similar patents had been granted to me in other countries as follows: England, France, Italy, Sweden, Canada, Mexico. Negotiations for the sale of these foreign patents were in progress in England with the British post office. In short, I was in full enjoyment for a period of over nine years of not only the prestige for making this invention, but also in a fair way to receive substantial remuneration for the invention in certain foreign countries.

A few days prior to the first public demonstration of the multiplex telephone and telegraph installation between Baltimore and Pittsburgh given in Baltimore on December 9, 1918, the late Mr. Vail, then president of the American Telephone & Telegraph Co., sent to Washington Dr. F. B. Jewett, at that time chief engineer of the Western Electric Co., and Mr. Bancroft Gherardi, engineer of the American Telephone & Telegraph Co., both at present vice presidents of the American Telephone & Telegraph Co., to personally invite me to witness this official inspection of this installation. Accordingly, accompanied by Maj. J. O. Mauborgne, Signal Corps, we motored to the station outside of Baltimore, and were there the guests of Mr. Vail. There was a number of engineers and telephone officials present at this remarkable demonstration, and the whole attitude of the Bell engineers at that time, as it had been previous to that time, was one of general recognition of my invention of "wired wireless." This was in the days a little over a year before the Department of Justice rendered its official interpretation of the act of March 3, 1883, under which the patents had been issued.

The opinion of the Department of Justice of March 22, 1920, came to the attention of the American Telephone & Telegraph Co., and its influence acted like magic on the whole attitude of the American Telephone & Telegraph staff toward this invention thereafter. All of the advertising of multiplex telephony in magazines immediately ceased, and nothing more was said about this subject. The individual engineers of the American Telephone & Telegraph Co. who in previous years were frequently complimenting me on this invention immediately ceased mentioning the subject, and, in fact, an effort was made thereafter directly and indirectly to minimize my contribution to this new art. The large staff of lawyers continuously employed by the American Telephone & Telegraph Co. to protect their interests set to work to prove in court—

(1) That these patents contributed nothing whatever to the art, and were in fact invalid.

(2) That they had been rushed through the Patent Office carelessly.

(3) That the great public attention which they had received in 1911 was due to Signal Corps propaganda.

(4) That the opinion of the Attorney General in his interpretation of the act of 1883 was erroneous.

(5) That even if such opinion were correct, the newspaper accounts published at that time proved my intention to dedicate this invention to the public, and, therefore, to the American Telephone & Telegraph Co.

(6) Even if all the above contentions were erroneous, the American Telephone & Telegraph Co. was not using wired wireless in their present system of multiplex.

After four years of court proceedings, no ruling was obtained on any of the above contentions set up by the American Telephone & Telegraph Co., except on the opinion of the Attorney General, and my alleged intention to dedicate the invention to the public as indicated by newspaper accounts.

The decision of Judge Knox of the United States District Court, Southern District of New York, reversing the opinion of the Attorney General of the United States has already rendered 378 patents, issued under the act of 1883 under guidance of the Attorney General's opinion, valueless to the inventors, who are principally Government employees. All of this attitude dates subsequent to the decision of the Attorney General of March 22, 1920. This about-face attitude of the American Telephone & Telegraph Co. not only struck at my professional reputation as having invented multiplex telephony and telegraphy but operated to injure me financially. The moment it became known that the great American Telephone & Telegraph corporation took the attitude that my patents were invalid, all prospective buyers of the patents, here and abroad, immediately fell in behind the contention of the American Telephone & Telegraph Co. and used it as an excuse to appropriate the patents and in other ways delay any remuneration for them. It had the magic effect of paralyzing the sales of my patents abroad, each one saying that he would wait until the matter of validity was settled in the courts and use the invention in the meantime. This was notably the case in England where all the negotiations which had been in progress for some time were suspended, pending the outcome of any court litigation, depriving me in this indirect manner of any just remuneration for my property even from others outside the United States. The British Post Office authorities, however, paid me a small sum for my British patents, agreeing to a much larger payment if and when the Bell contention of nonvalidity had been settled in my favor in the United States courts. The matter is still in the correspondence stage, and unfortunately this patent expires during the present year.

A Canadian telephone company also sought and purchased my Canadian patent and started development of wired wireless, but soon found that the Bell Telephone Co. of Canada placed so many difficulties in their path that the struggle was abandoned.

THE POLICY OF THE GOVERNMENT TOWARD INVENTORS WHO ARE GOVERNMENT EMPLOYEES

The opinion of the Attorney General of March 22, 1920, interpreting the law of 1883, had established uniform policy on this subject in the Army, the Navy, and in all other departments of the Government. This policy was entirely satisfactory to the Government, the inventor, and to the public. The rights of each were safeguarded, and, in consequence of this decision, there was universal satisfaction on all sides. Government inventors came forward in increasing numbers. The decision of Judge Knox, above referred to, came as a great shock to all government inventors, and completely upset the Government's established policy. The confusion caused in Government administration and the injustice to many innocent inventors who had relied upon the Attorney General's opinion in good faith, is to me an unfortunate by-product of the policy which the Bell organization has pursued during the past four years of attacking my wired-wireless patents from all sides and from every angle.

BROADCASTING BY WIRED WIRELESS

The adaptability of wired wireless for the interconnection of many radio stations in a chain to broadcast a single program, has an immediate appeal to the radio engineer. Using the existing telephone lines with the aid of an extra frequency channel it will be possible to link as many new radio stations as desired for broadcasting a single program and not interfere with the operation of the telephone plant for its regular telephone traffic.

There is no reason why a separate and independent channel should not be created and standardized to be used permanently for this service of interconnecting broadcasting stations, making the channel wide enough to permit the passing of all harmonics of orchestra music. This plan would provide an independent channel which could be rented for broadcasting purposes.

THE NORTH AMERICAN CO.

In my laboratory notebook now on file in the War Department the following note appears:

SUNDAY EVENING, OCTOBER 6, 1910.

Try superimposing wireless telegraphic and telephonic messages upon the ordinary electric light wires in a building or throughout a city.

I see no reason why this same wiring, which is now utilized to carry power, should not serve also for telephony by electric waves. This would simplify house wiring for hotels and office buildings, etc.

In April, 1922, 12 years after the above note was written, I demonstrated in the office of the Chief Signal Officer in Washington, where an ordinary commercial broadcast receiver with loud speaker was installed, the practicability of utilizing power lines for broadcasting purposes. More extensive tests for broadcasting on power lines were carried out soon after by Signal Corps engineers in the city of Chicago over the wires of the Commonwealth Edison Co. This simple demonstration attracted attention among the power engineers of the country, and many journeyed to Washington to witness it.

The North American Co., with headquarters at 60 Broadway, New York, was quick to appreciate the possibilities and potentialities of this demonstration, realizing that this offered an additional use for existing power lines throughout the country; and also for simplifying the broadcasting problems of the future. In consequence this company immediately employed experts to thoroughly investigate the wired wireless patents, the law of 1883, the decision of the Attorney General of the United States thereon, etc.; they also investigated the attitude of the American Telephone & Telegraph Co. in regard to these patents. As a result of these investigations the North American Co. sought and obtained from me, as the inventor of "wired wireless," a contract for the exclusive use of wired wireless on wires employed for furnishing light, heat, and power to the public. A subsidiary company, known as the Wired Radio (Inc.), was organized by the North American Co., which has vigorously pushed this development of this application of wired wireless, and has actually had it in practical operation for some time on Staten Island, N. Y. If it had not been for the opposition of the American Telephone & Telegraph Co. this service would now be available to the American public, vastly relieving the present congested conditions of the broadcasting service. The American Telephone & Telegraph Co. instituted suit against the North American Co. for infringement of subsidiary detail patents, which up to the present time has effectively blocked the North American Co. in its splendid efforts to provide this broadcasting service to American homes.

As a concrete example we have all appreciated the splendid program of music which Mr. Atwater Kent has provided during the past season, and which has been broadcast simultaneously from 12 different stations throughout the East and Middle West of this country. From an engineering viewpoint we find, however, serious drawbacks in the plan employed for this service, and all others similar to it. Since this program must at present originate in New York City, and from there be distributed to various cities, and then rebroadcast from the local stations, already established under separate ownership and operation, we are forced to broadcast this program on 12 different wave lengths which have been previously assigned by the Department of Commerce. The result of this is that a song from the studio in New York is put on the ether on 12 different wave lengths. From a technical viewpoint this state of affairs is certainly most undesirable. A substantial relief from this congestion in the ether would be secured through the development of wired wireless broadcasting over power lines, when the program from New York would be rebroadcast in each of the 12 cities over their local power-distribution systems to the entire urban populations. Furthermore, this service would entirely eliminate "static," day and night effects, seasonal changes, and "fading."

OBSERVATIONS AND SUGGESTIONS

(1) The telephone art is just 50 years old. The whole industry is built upon five key inventions, each of them an American product and averaging one for each decade. None of these inventions originated in the Bell laboratories.

(2) The American people engage in 50,000,000 telephone conversations each day, conducted over 45,000,000 miles of actual wire, which would extend in a single line half the distance from the earth to the sun. One thousand separate investigations are being carried on by 2,000 engineers in the Bell laboratories. If the telephone service of the United States were suddenly discontinued for one hour, the whole fabric of our modern world would be thrown into confusion.

(3) The invention and development of "wired wireless" has already increased the capacity of the standard telephone wire circuit by 400 per cent and the telegraph circuit by over 1,000 per cent. Five separate telephone conversations and over twenty telegraph messages are now transmitted simultaneously over a single standard telephone wire circuit. This scientific dividend should be passed on to the public as far as possible. The wire mileage of the Bell system is therefore no longer of prime importance, the capacity of the system for service should be expressed in the future by the new unit of "channel miles."

(4) Wired wireless as applied to superpower lines and distribution systems should be immediately utilized and applied for broadcasting purposes and thoroughly coordinated with the telephone wire system.

This plan completely eliminates "static," day and night effects, seasonal changes and "fading," and therefore lifts the present standard of the broadcasting service to an entirely new plane of performance.

The far-flung tentacles of the two vast wire networks, telephone wires and electric-light wires, are already side by side in millions of American homes. The people should see to it that these two essential public electric utility channels are required to cooperate promptly in speeding the solution of the difficult and baffling problems of radio broadcasting.

Respectfully submitted.

GEORGE O. SQUIER,
Major General, United States Army, Retired.

SATTERLEE & CANFIELD,
New York, March 23, 1926.

Gen. GEORGE O. SQUIRE,
*Metropolitan Club,
Washington, D. C.*

MY DEAR GENERAL: Your letter of March 20 was duly received, and I hasten to answer same. The circumstances attending your discovery of the method of multiplex telephony and telegraphy described in letters patent Nos. 980356, 980357, 980358, and 980359 have been definitely ascertained in litigation which took place between you as plaintiff and the American Telephone & Telegraph Co.

The facts are as follows:

In the appropriation bill of March, 1909, Congress appropriated the sum of \$30,000 for the purchase and development of wireless telephone apparatus by the Signal Corps.

This appropriation was made at the suggestion of Brig. Gen. James Allen, who at that time was Chief Signal Officer. At the

time of this appropriation you were General Allen's first assistant and held the rank of Major in the United States Army. You had devoted much of your time to scientific research and General Allen delegated to you the duty of developing wireless telephone apparatus. You assembled the apparatus necessary for the performance of your duty and had leased a telephone wire between the Bureau of Standards and the Signal Corps construction laboratory at 1710 Pennsylvania Avenue and in the late summer of 1910 demonstrated that your discovery was practicable and that it solved the question of multiplex telephony and telegraphy. Your conception was that a copper wire not only would carry a telephonic message but that it would guide radio so that telephone signals could be transmitted through radio channels.

In October, 1910, you demonstrated to your superior officers and other engineers the practicability of your ideas. General Allen, as your superior officer, then took charge of the invention and on the 6th day of October, 1910 the Acting Secretary of War wrote a letter to the Secretary of the Interior in which he requested the Secretary to assign an examiner from the Patent Office who was an expert in wireless telegraphy and telephony to assist the Signal Corps in preparing applications for patents and on October 17, 1910, pursuant to this request, the Commissioner of Patents in a letter addressed to the Secretary of War designated Mr. Peter I. Wold, an assistant examiner in division 16 of the Patent Office. Mr. Wold called at the office of Brigadier General Allen, who introduced Mr. Wold to you and thereafter you and Mr. Wold drew up the applications for the above mentioned patents.

On the 5th day of November, 1910, General Allen transmitted these applications to the Commissioner of Patents, stating that the applications were made under the act of March 3, 1883, chapter 143.

Pursuant to the applications thus transmitted to the Commissioner of Patents by Brigadier General Allen, on the 3d day of January, 1911, the above enumerated patents were issued to you.

These applications for patents were signed and sworn to by you on the 3d day of November, 1910. On this date General Allen addressed a communication to The Adjutant General of the Army in which he requested the opinion of the Judge Advocate General as to whom a patent should issue, if applied for under the act of 1883, and in whom the proprietary rights in the patent would vest. The Adjutant General of the Army referred this request to the Judge Advocate General of the Army, who on the 4th day of November, 1910, advised The Adjutant General that a patent granted under the act of 1883 vested the property rights in Major Squier, but that the operation of the final clause of the act defeated his property rights in the patent within the territory limits and jurisdiction of the United States.

The patents were on the 3d day of January, 1911, issued pursuant to the application above mentioned. The applications were made under the act of 1883. General Allen had been advised that by filing under that act the people of the United States acquired a license to the use of your inventions. Accordingly, in announcing the invention or discovery to the public on the date of the issuance of the patent, General Allen used the following language:

The unrestricted use of this method is free to all people in the United States. A description of the method is given in patents Nos. 980356, 980357, 980358, and 980359, copies of which may be purchased from the Commissioner of Patents at 5 cents each. There is no royalty or other expense attached to the use of this system. The system, giving two independent telephone conversations over a single circuit, is now in operation between the research laboratory of the Signal Corps at the Bureau of Standards and the Signal Corps construction laboratory, at 1710 Pennsylvania Avenue NW.

The multiplex is the culmination of the life work of Major Squier. No one connected with the service challenges his unquestioned right to have retained the invention for his own use and profit, and the patents were issued in his name. That he chose to give them freely to the public gives an added and romantic interest to the story of a really wonderful and important invention.

General Allen in directing that you apply for the patents under the act of 1883 did so because, in looking up precedents, he found that, by applying for the patents under that act, a special examiner would be designated by the Patent Office to facilitate the granting of the patents and that the officers and employees of the United States Government would have the right to use the patent without the payment of royalty. The Judge Advocate General advised him that the act of Congress took away from you all property rights in the United States, so that, when General Allen made the announcement of the invention, he was under the impression that the act of 1883 gave your invention to the public in the United States. Of course, you acquiesced in the interpretation of the act by your superior officers and in subsequent interviews stated that your inventions had been given to the public by virtue of the act of 1883.

This act of 1883 never was carefully considered by anyone until 1918. At that time the opinion of the Judge Advocate General, Maj. S. T. Ansell, was asked as to the meaning of the act. After due consideration, Major Ansell came to the conclusion that the act gave the officers, employees, and all other persons a license to use inventions patented thereunder in the prosecution of work of the United States, but that the use of the patent in all other particulars was restricted.

The opinion of the Judge Advocate General was referred to the Attorney General, who, on the 22d day of March, 1920, rendered an opinion, in which he concurred in the construction of the act made by Judge Advocate General Ansell. Thereafter you gave notice, through us, to the American Telephone & Telegraph Co. that it had no right to use your invention in the prosecution of its business. It claimed that the act of 1883 gave it the right and that even if the company did not have the right by virtue of the act of 1883, the declaration of General Allen, at the time of the issuance of the patents, and your declarations made at or about that time gave the American Telephone & Telegraph Co. the right to use your invention without compensation to you.

You thereupon instituted a suit in equity against the American Telephone & Telegraph Co. in the southern district of New York wherein you sought to enjoin them from the use of your invention. The matter was vigorously contested and came to hearing before Judge Knox of the southern district of New York who rendered an opinion on September 3, 1924, in which he disagreed with the Attorney General as to the meaning of the act of 1883 and held that that act gave to the American Telephone & Telegraph Co. the right to use your invention. He further held that, even if the act itself did

not give the right to use the invention to the American Telephone & Telegraph Co., General Allen's announcement at the time of the receipt of the patents gave it to the public. You appealed from Judge Knox's decision to the circuit court of appeals of the second circuit. The case was decided by that court in the spring of 1925. Judge Hough delivered the opinion of the court. He did not interpret the act, but stated that the action of General Allen and your interviews gave the invention to the public and that, therefore, the American Telephone & Telegraph Co. was entitled to use your discovery without compensation to you. There can be no question that the American Telephone & Telegraph Co. are using the method described in your patents and that the court has justified that use on the ground that your discoveries belong to the public.

The facts in connection with your case were succinctly set out in the petition to the Supreme Court for writ of certiorari and I am herewith inclosing you a copy of that petition. On page 5 will be found a copy of the act of 1883 under which your patents were granted. On page 18 will be found a copy of the opinion of the Attorney General as to the meaning of that act. On pages 26, 27, 28, 29, and 30 are set out the facts in connection with the application for the patent. To this petition I have also attached a copy of the decision of Judge Knox and a copy of the decision of Judge Hough on appeal. The motion for writ of certiorari was refused, which refusal ended the litigation.

If I can be of any further service, please advise me.

Yours very sincerely,

R. RANDOLPH HICKS.

WASHINGTON, D. C., May 5, 1926.

Respectfully transmitted to the Secretary of Commerce for his information.

GEORGE O. SQUIER,
Major General United States Army, Retired.

AMERICAN TELEPHONE & TELEGRAPH Co.,
195 Broadway, New York, April 6, 1926.

HON. HERBERT HOOVER,

Secretary of Commerce,

Washington, D. C.

DEAR MR. HOOVER: This is in reply to your letter of March 6, 1926, to Mr. Gifford, which he referred to me, asking for information relative to the discovery and use of General Squier's "wired wireless" system, as requested in Senate resolution No. 149.

Our knowledge of the circumstances attending the discovery of General Squier's multiplex system described in his four patents, Nos. 980356, 980357, 980358, and 980359, is embraced by the evidence on this point in his recent suit against this company in the Federal courts of this district. This is set forth on pages 11 to 31 of the brief on behalf of this company in the court of appeals, a copy of which I am sending you.

All of the other inquiries of the resolution are answered, as we view it, by the statement that this company has not used the system of General Squier at all. In his suit he alleged infringement of but one of the four patents mentioned, and of only 3 out of the 11 claims of that one patent. Those three claims, probably the broadest of all, are too broad to be valid because others, long before General Squier, had secured the same results, as thus broadly stated, by similar means. (See pages 3 to 10 and 43 to 45 of our brief.) The improper allowance of such claims is not surprising under the circumstances. The Patent Office officials believed that the subject matter of the application, in whatever words stated, was being given to the public, and the application was pending before the office only two months altogether, one of these being consumed in the mechanical work of issuing the patent.

But even if these three claims were valid, they would not cover the multiplex system of this company for a number of very definite reasons set forth on pages 51 to 63 of our brief.

Neither the district court nor the court of appeals found it necessary to pass upon the questions of validity and infringement, but the court of appeals did say:

We express no opinion as to defendant's well urged proposition that plaintiff's patent is no more than a restatement of what other and earlier inventors long ago told the world.

The system which this company adopted was its own development based upon patented multiplex systems long antedating General Squier's work. Some of these patents had expired and some this company had acquired the right to use. The three-electrode vacuum tube and the wave filter were the things that made possible the development of these earlier suggestions for multiplex systems into practical commercial apparatus, and General Squier was not responsible for either of these things.

From the foregoing it follows, of course, that this company has not had any "free use of 'wired wireless,'" as suggested in the last lines of the resolution.

Besides a copy of our brief, I am sending you a copy of the opinion of the district court by Judge Knox and a copy of the opinion of the circuit court of appeals, and I will be glad to send you also a copy of the printed transcript of the entire record in the case if you would like to have it.

If after you have examined the papers submitted herewith you desire any further information, please let us know.

Very sincerely yours,

C. M. BRACELEN.

All of the other inquiries of the resolution are answered as we view it by the statement that this company has not used the system of General Spenser at all. In his suit he alleged infringement of but one of the four patents mentioned, and of only 3 out of the 41 claims of that one patent. Those three claims probably the broadest claim of that one patent. Those three claims, however, the broadest of all, are too broad to be valid because others, long before General Spenser, had secured the same results in this broadly stated, by him, in his means. (See pages 2 to 40 and 43 to 45 of our brief.) The improper allowance of such claims is not surprising under the current status. The Patent Office officials believed that the subject matter of the application in whatever words stated, was being given to the public, and the application was pending before the office only two months altogether, one of these being consumed in the mechanical work of issuing the patent.

The even if the three claims were valid, they would not cover the multiply system of this company, for a number of very definite reasons set forth on pages 41 to 43 of our brief.

Neither the district court nor the court of appeals found it necessary to pass upon the questions of validity and infringement, but the court of appeals said:

We express no opinion as to General Spenser's right to issue a patent in his patent is narrower than a claimant of what other men with a invention long ago had the world.

The system which this company adopted was its own development based upon patented multiplex systems long antedating General Spenser's work. Some of these patents had expired and some this company had acquired the right to use. The three-telephone system and the way these were the things that made possible the development of these earlier suggestions for multiplex systems into practical commercial apparatus, and General Spenser was not responsible for either of these things.

From the foregoing it follows of course that this company has not had any "live wire" without wires," as suggested in the last line of the resolution.

Besides a copy of our brief, I am sending you a copy of the opinion of the district court by Judge Knox and a copy of the opinion of the circuit court of appeals, and I will be glad to send you also a copy of the printed transcript of the entire record in the case if you would like to have it.

If after you have examined the papers submitted herewith you desire any further information, please let us know.

Very sincerely yours,

O. M. BRADEN.

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

IN EQUITY, No. 23-211

GEORGE OWEN SQUIER, PLAINTIFF

against

AMERICAN TELEPHONE AND TELEGRAPH CO., DEFENDANT

OPINION OF JUDGE KNOX

CHARLES NEAVE,
WILLIAM R. BALLARD,
C. C. ROSE,

Of Counsel.

SEPTEMBER 3, 1924.

UNITED STATES DISTRICT COURT

Southern District of New York

In Equity, No. 98,911

GEORGE OWEN BOULDER, Plaintiff,

vs.

AMERICAN TELEPHONE AND TELEGRAPH CO., Defendant.

OPINION OF JUDGE KNOX

CHARLES MEAVE,
WILLIAM E. DALLARD,
C. C. ROSE,

Of Counsel.

September 2, 1924

OPINION OF JUDGE KNOX

UNITED STATES DISTRICT COURT, SOUTHERN DISTRICT OF NEW YORK

George Owen Squier, plaintiff, against American Telephone & Telegraph Co., defendant. F-23-211

Wm. H. Davis, R. Randolph Hicks, and Samuel E. Darby, jr., of counsel for plaintiff.

Charles Neave, Wm. R. Ballard, and C. C. Rose, of counsel for defendant.

KNOX, D. J.: At the time this suit was tried, the plaintiff was Chief Signal Officer of the United States Army, with the rank of major general. Since his graduation from West Point in 1887, General Squier has devoted his time and talents to the Army service, giving particular attention to communication systems. Entering the Army's Signal Corps in 1898, he became familiar with all forms of signaling, including wire telegraphy. When wireless communication began to demonstrate its practicality he promptly understood a consideration of its possibilities.

In the appropriation bill of March 1, 1909, the Congress appropriated the sum of \$30,000 for the purchase and development of wireless telephone apparatus by the Army Signal Service. Plaintiff was designated by his then superior officer, General Allen, as the person who should undertake the research work contemplated by the grant of the funds. He proceeded to visit in various sections of the country the laboratories of individuals and companies engaged in experimental work having to do with wireless communication. Returning to Washington, he became absorbed in the study of the art and finally conceived the idea that it was available for use in creating an extra channel of communication in connection with the established lines of telephone systems. That is, the so-called wireless communication was believed to be adaptable to ordinary telephone wire. General Squier realized that if this could be accomplished, it would be a long step forward in the art of multiplex telephony.

Various kinds of apparatus thought to be suitable for experimentation were purchased and installed in a laboratory in Washington. In company with two selected assistants, General Squier enthusiastically went to work. During the course of his activities he kept a notebook in which entries were made of what he did and had in contemplation. For example, he wrote as follows under date of November 18, 1909:

It seems highly desirable to try experiments in wireless transmission of intelligence to determine the effect of high-frequency alternating currents of a period beyond the range of audition.

From then on a series of investigations and experiments took place. As a result he succeeded in evolving the disclosures set forth in

Letters United States Patent No. 980356, which issued upon January 3, 1911.

Before application was made for the patent plaintiff had brought his accomplishments to the attention of General Allen. That officer, being impressed with their importance, was desirous that they should be adequately protected for the United States. Being aware of the existence of the patent provisions contained in the appropriation act of March 3, 1883, it was decided, apparently with plaintiff's approval, to take advantage of its terms. A letter was addressed to The Adjutant General of the Army, which, after setting forth what was in contemplation and pointing out that the laboratory in which the discovery was made had been established for original investigation and that it was desired to proceed so as to establish a precedent, the advice of the Judge Advocate General was sought in answer to the following inquiries:

1. To whom should the patent be issued, and
2. In whom would its property rights rest?

The letter was brought to the attention of the Judge Advocate General, and that official gave expression to his views in a letter to The Adjutant General under date of November 4, 1910. After expressing the opinion that Major Squier might properly apply for and receive the patent, he continued:

It is assumed that the property rights * * * spoken of are those accruing from the issue of the patent. The patent, if issued, will vest the property rights in Major Squier, but the final clause of the above cited act is to defeat any property rights in the patent within the territorial limits and jurisdiction of the United States, as such rights are prevented from accruing, in Major Squier's behalf, in the operation of the last clause of the statute.

It is therefore recommended that Major Squier be authorized to apply for a patent, in the operation of the act of March 3, 1883, as it is the operation of that act to throw it open to public and private use in the United States; no further action would seem to be required of Major Squier.

The pertinent portion of the act of March 3, 1883, reads as follows:

The Secretary of the Interior and the Commissioner of Patents are authorized to grant any officer of the Government, except officers and employees of the Patent Office, a patent for any invention of the classes mentioned in section 4886 of the Revised Statutes, when such invention is used or to be used in the public service, without the payment of any fees: *Provided*, That the applicant in his application shall state that the invention described therein, if patented, may be used by the Government or any of its officers or employees in the prosecution of work for the Government, or by any other person in the United States, without the payment to him of any royalty thereon, which stipulation shall be included in the patent.

Pursuant to departmental instruction, a Patent Office examiner drafted the specifications and claims of the patent, which, with the application, were duly filed and allowed, as above set forth. As issued the patent contained the language of the statute as to the use to which it might be put without the payment of royalties and, in addition, bore this inscription: "Dedicated to the Public."

Coincident with the issuance of the patent, General Allen, with the assent and approval of plaintiff, made this announcement to the press:

The Chief Signal Officer of the Army announces that, as a result of recent experiments by the Signal Corps, multiplex telephony is now practicable; that is, several independent conversations may be carried on simultaneously over the same wire circuit.

It has also been shown that two wires are no longer necessary for efficient telephony, but that a single wire with "silent earth" connections can be used for multiplex telephony. All of the necessary instruments required in multiplex telephony are already developed and can be purchased from dealers in the open market.

The superposition of additional telephone conversations upon a wire circuit does not interfere in the slightest degree with the operation of the present telephone installations, which remain unchanged.

The unrestricted use of this method is free to all people in the United States. A description of the method is given in patents Nos. 980356, 980357, 980358, and 980359, copies of which may be purchased from the Commissioner of Patents at 5 cents each. There is no royalty or other expense attached to the use of this system. The system, giving two independent telephone conversations over a single circuit, is now in operation between the research laboratory of the Signal Corps at the Bureau of Standards and Signal Corps construction laboratory at 1710 Pennsylvania Avenue NW.

The multiplex is the culmination of the life work of Major Squier. No one connected with the service challenges his unquestioned right to have retained the invention for his own use and profit, and the patents were issued in his name. That he chose to give them freely to the public gives an added and romantic interest to the story of a really wonderful and important invention.

This announcement was widely heralded, attracting much attention, both upon the part of the public and of persons interested in the art. Among the latter were representatives of the defendant corporation, which is here charged with having infringed claims 2, 3, and 7 of the patent.

In view of the defense that the patent, if infringed—and this is denied—has been effectually dedicated to the public and will not support the suit, the foregoing statement of facts is believed not to have been without some justification.

If this defense be valid the technical features of the patent and of the alleged infringing devices need not be considered.

Subsequent to the foregoing announcement by General Allen, the plaintiff granted numerous interviews to newspaper reporters and spoke at several meetings and dinners of technical societies.

On one such occasion he spoke substantially to this effect:

I will say that I do not want one penny from anyone for the discovery. There will be no royalties attached to the use of the plans and specifications, and the American Telephone & Telegraph Co., the War Department, you, or I are as welcome as can be to take copies of these specifications and build multiplex telephones. I have arranged it so that these patents are in the name of the Government and the people of the United States.

The following language was employed in the course of a discussion of his invention before the Telephone Society of Washington on March 2, 1911:

We wish it understood that this work is absolutely free to the public, and that the patents which have been taken out are perfectly free to any person or corporation who wishes to use them. The desire is that if they are of any use to anyone, they may be freely used by all who wish to do so * * *. If, by our investigation, we have made any contributions to that happy end (of filling in the gap in the theory between pure radiotelegraphy and wire telegraphy and telephony) we are very much pleased.

On the same evening plaintiff, so it is testified, gave a printed description of his invention to an officer of the defendant, telling him to make whatever use he desired of it. More than three years later General Squier wrote to General Carty, vice president of the Ameri-

can Telephone & Telegraph Co., with regard to later patents, making this reference to certain others, among which was the one in suit:

Although, as you know, my previous United States wired-wireless patents were presented to the public, yet, the present application is my personal property.

Meanwhile, defendant's experts were working along the lines of multiplex telephony. Certain apparatus claimed to have been developed independently of the Squier patent was devised and perfected. In addition, new arrangement of currents, carrier lines, etc., were effected until it became possible for three, and then five, conversations to be carried on simultaneously over the same wire. The first commercial installation was made by defendant upon its lines between Baltimore and Pittsburgh. This occurred in September, 1918. The following December, a number of scientific men made an inspection of the installation at Baltimore. General Squier was among them. When the meeting was over, he returned to Washington by automobile, having as a companion a member of his staff, named Mauborgne, likewise an Army officer. The demonstration they had just witnessed was a topic of conversation, and the plaintiff was much gratified to have repeated to him a remark made earlier in the evening by an eminent engineer of telephony by the name of Colpitts, which was, "When all is said and done, the real credit for this achievement should go to General Squire." By way of reply to Mauborgne, the plaintiff said:

They (the defendant) really have done so much that I think it would be well if you would sit down and write them a letter as my chief engineer and tell them how much we appreciated this, and also suggest that they try out or give some consideration to the idea of using a ground return instead of putting the current in a pair of parallel wires and not grounding the system.

Such letter was written upon December 12, 1918.

Throughout all this period from January 3, 1911, to December 12, 1918, plaintiff's voice was not heard to question, let alone deny, that his invention had been dedicated to the public.

In November, 1918, the Army and Navy Patent Board, an organization created during the war, requested the Judge Advocate General of the Army to render an opinion as to the construction properly to be given to the patent section of the act of March 3, 1883. An opinion was rendered upon March 21, 1918. It held that the words "any other person in the United States" (as used in the act) should be interpreted as equivalent to—

"any other like person in the United States"; that is, any other person "in the public service," or (and I regard this as a mere paraphrase) any other person "in the prosecution of work for the Government."

Later, the matter was placed before the Acting Attorney General of the United States, and upon March 22, 1920, he reached a result, saying:

"It was clearly the intention of Congress to encourage the filing of applications under the act, so that such rights, as defined above, would be available to the Government. To construe the statute to mean that the invention would be dedicated to the public would defeat the very purpose for which the statute was enacted, since it would discourage, rather than encourage, the filing of applications under the act. Also that " * * * it is no serious consideration that he is relieved of the payment of the usual Patent Office fees. Were he not, he would be in the anomalous situation of dedicating his rights to the public and paying for the privilege of doing so."

On March 20, 1919, plaintiff's attorney, in his behalf, wrote to defendant, taking the position upon his behalf, that the act under which the patent issued did not permit of its use by persons not engaged in work for the Government, and that any such use would be prosecuted as an infringement of General Squier's exclusive rights.

The foregoing narrative thus presents the question as to whether the patent, either by operation of the statute under which it was issued, or by the conduct of the plaintiff, has been dedicated or abandoned to the public.

As to the statute, plaintiff takes the position that a patentee thereunder is invested with all the rights which the laws of the United States confer upon inventors who fulfill the requirements of the patent laws, and that the intent and effect of the act of 1883 is to authorize the Secretary of the Interior and the Commissioner of Patents to dispense with the usual patent fees, provided the patentee grants to the United States Government, its officers, employees, and all other persons, the right to use said patent in the prosecution of work for the Government. The argument is to the effect that the United States, with respect to inventions made by persons within the specified classes, consented to waive the ordinary fees in consideration of the definite settlement with such persons of all questions that were likely to arise out of the relation of employer and employee, as between the Government and the Government officers, and which might arise out of the use of such patent by nonofficial persons engaged in the prosecution of work for the United States. In considering this line of argument, it should be recalled that as far back as 1843 the Supreme Court, in *McClurg v. Kingsland* (42 U. S. 202), held that where an employee makes an investigation during the course of his employment and at the employer's expense, the employee retains title to the invention, but the employer has a shop right to it in his own business. While the specific application of the rule to a Government employee seems not to have come before the Supreme Court until the case of *Solomon v. United States* (137 U. S. 342) was presented in 1890, there was no hesitancy either by the court of first instance or by the appellate tribunal in holding that a Government employee, under the circumstances there present, was on a plane no different than that of the employee of a private concern.

Nothing has been called to my attention giving rise to the suggestion that there was any demand upon Congress to legislate so as to bring about the settlement of a question that was causing no agitation or concern to anyone. If the right of the Government to enjoy a shop right in the invention of its employee was not in controversy, and did not move the legislative will, the only possible gain to the Government, through the enactment of the statute, was that such invention might be used by contractors engaged in doing Government work. So far as I can ascertain, no real question upon this proposition had as yet come up, and it is difficult to believe that Congress, in the presence of no special reason for its action, was desirous of settling the rights of patentees whose inventions might be used by contractors engaged in Government work.

Again, if Congress intended to settle the questions suggested by counsel for complainant, the effort was somewhat abortive in that

the act imposes no compulsion upon a Government employee, who had made an invention that he wished to protect by a patent, to make application under the provisions of the act of 1883. So long as he is content to pay the usual patent fees, the employee is at complete liberty to apply for and to receive a patent upon an invention made in the Government service; and thereafter, if the Government or its contractors use the invention, may raise both of the questions which complainant contends were to be of no further moment. Had such really been the purpose of Congress, I think it is not improbable that the statute would require a Government employee, wishing a patent upon his invention made in the public service, to apply for the same under the act of 1883 and not under another.

There is, I believe, no good reason to doubt that the statute under consideration means exactly what its words, as they appear and are arranged, declare. Throughout all of our history, there have been persons in the employment of the United States who wished above all else that their services and accomplishments should be availed of, not alone by the Government as an entity, but also so far as possible, by the people themselves. As regards inventions made by such persons, the statute is well designed to enable them to recognize any sense of obligation and duty to the public which they may feel, and to make certain that no frustration of the objects of their desire shall occur. The act effectually precludes the possibility that an invention which it is desired to dedicate to the public, might, in the absence of legislation, be denied to them; or, if not wholly denied, be made to serve the private ends of some one not responsible for the invention. In other words, the act serves to insure to the people the benefit of such inventions as employees and officers of the Government wish to dedicate to them.

Some such thought as I have attempted to convey gained lodgment in the minds of the officials of the Patent Office, and of numerous employees and officers of the Government. Otherwise there would not have been issued by the office and accepted by patentees over the period of years from 1907 to 1918, 164 patents marked "Dedicated to the public." Subsequent to the enactment of the statute, and prior to 1907, only four patents seems to have issued. They contain a reference to the act under which they were granted but otherwise were in the form in which all patents were issued. While the inscription, "Dedicated to the public" has no statutory authority for its presence upon the patents to which reference has been made, it is indicative of the belief of persons administering the act, and of those seeking the use of its provisions, as to its object and purpose.

Not until the latter part of 1918, and early in 1919 was it that the then Judge Advocate General, and the Acting Attorney General, respectively, rendered an opinion giving the statute the construction for which complainant argues. The Army and Navy Patent Board had then come into existence. In the course of its work, it asked the Judge Advocate General for his views upon the subject of the statute. In reply, that officer said, among other things, the following:

In particular you state that the Patent Office construes the proviso above quoted as giving any person in the United States the right to use an invention patented under the act without the payment of any royalty, whereas your board

contends that it can be so used only by the Government, its officers or employees, or other persons in the prosecution of work for the Government.

The question which interpretation is correct becomes of moment because many members of the military forces have refused to apply for patents under the act for inventions of considerable value to the Government, if the interpretation given to the act by the Patent Office is to prevail, while they at the same time have expressed their willingness that the Government shall use their inventions, if they may retain "the commercial rights" therein. It may be added that the matter is of special interest to the War Department, in view of the invitation recently given by the department to persons in the military service to patent their inventions under this act.

Then followed the opinion above referred to. Neither the Judge Advocate nor the Acting Attorney General, who then discussed the statute, referred to the long-continued practice of the Patent Office in marking patents secured under the act as being "Dedicated to the public," nor to what seems to have been the common acceptance of the meaning of the act. The ruling of the Judge Advocate General in 1910 was likewise not considered. To me, the long continued course of conduct upon the part of persons vitally interested in the administration of the law is not without some persuasive force in an endeavor to reach a correct conclusion.

No purpose will be served by an analysis of the opinions of the Judge Advocate General and the Acting Attorney General. While their arguments have some element of appeal, I find myself unable to adopt their conclusion.

But granting that these officials were correct, and that I am wrong, as not infrequently is the case, what shall be said to be the effect of complainant's action and declarations concerning the patent subsequent to its issuance?

The answer he gives to this query is that all that he said and did in the way of evincing an intent to abandon and relinquish his patent rights, was due to a misconception of the legal effect of his application for and acceptance of the patent under the statutes, and that for such reason, his words and actions in the premises are not to be chargeable against him. Further, it is said that the legal effect of the statute and the patent was open to defendant's judgment and opinion, and that, if these were erroneous, the situation in which defendant finds itself is unfortunate, but it is not to be regarded as affecting plaintiff's rights under the grant.

Had complainant been content to rely upon the legal effect of his patent and refrained from proclaiming his generosity to the public, and from urging the defendant to make use of his invention, his contention might be arguable.

Mr. Walker, at section 89 of the fifth edition of his work on patents, says:

An inventor abandons his invention to the public when he makes an express declaration to that effect. And a declaration that a particular invention is open to anybody, is a declaration of abandonment of any special right thereto.

In support of these statements, the author cites *Kendall v. Winsor* (21 How. 328); *Westinghouse Electric & Mfg. Co. v. Saranac Lake Electric Light Co.* (108 Fed. 224, and 113 Fed. 885). It is further said at section 106 of the same work that no abandonment of an invention after the issue of letters patent has ever been judicially

declared to exist in the United States. While this may be true, the absence of such adjudication, I take it, does not mean that the abandonment of letters patent is impossible. Judge Leavitt in *Bell v. Daniels* (3 Fed. Cases No. 1247) said that:

This abandonment, or dedication to the public, may be made as well after patent granted as before; but, where the patent has actually been granted, it would undoubtedly require a strong case to prove abandonment.

In *Hovey v. Henry* (12 Fed. Cases, No. 6742) the court in charging the jury in a patent case said this:

With regard to the abandonment, there must be evidence of a distinct character showing such an intention.

In *Williams v. Railroad Co.* (4 Bam. & Ard. 441), Judge Wallace intimated that in a proper case an abandonment might take place, and in *Wyeth v. Stone* (30 Fed. Cases No. 18107) declared that it could take place. Abandonment frequently occurs with respect to other species of property, and I am not persuaded that one may not take place as to letters patent.

Regarding the possible loss of the right of property in trademarks upon the ground of abandonment, the Supreme Court had this to say:

There must be an intent to abandon, or the property is not lost; and while, of course, as in other cases, intent may be inferred when the facts are shown, yet the facts must be adequate to support the finding. To establish the defense of abandonment, it is necessary to show not only acts indicating a practical abandonment but an actual intent to abandon. Acts which unexplained would be sufficient to establish an abandonment may be answered by showing that there never was an intention to give up and relinquish the right claimed. (*Saxlchner v. Eisner & Mendelson Co.*, 179 U. S. 19, p. 31.)

In my opinion, the facts in this case, and the explanations that have been given by General Squier, are not such as to overcome his express and frequently repeated declarations of his intent to the effect that "he wished it understood that this work is absolutely free to the public, and that the patents which have been taken out are perfectly free to any person or corporation who wishes to use them."

The desire is that if they are of any use to anyone, they may be freely used by all who wish to do so.

As bearing upon complainant's alleged misconception as to the law under which the patent issued, this much may be said: The evidence establishes his dedicatory intent to have been definitely formed and complete at the time application for the patent was made. Deliberate resort was made to the statute of 1883 because it was intended that the free use of the invention, instead of being limited to the Government and to persons engaged in work upon its behalf, should be open to any person in the United States who desired to take advantage of its disclosures. That the choice of statutes was free and deliberate is evidenced by the fact that complainant collaborated in the official statement made at the time the patent issued, which contained the excerpts hereinbefore quoted.

One more observation and I shall desist. Complainant made no retraction of his words of dedication and abandonment until after defendant had begun the installation of the system of communication claimed to infringe. Had complainant over the preceding seven or

eight years not made use of comprehensive dedicatory statements, and relied solely upon his legal rights, whatever they might otherwise be, it is not unreasonable to suppose that defendant, before committing itself to the development of the particular systems of "wired wireless" that is now employed would have taken steps to acquire a license or by other means have sought to avoid the possibility of an infringement claim such as is now made. That opportunity is gone through its reliance upon the words of the complainant, and I can not believe that defendant, if it makes use of the disclosures made by General Squier, should be called upon to pay tribute to him.

Reaching these conclusions, it is unnecessary to pass upon the merits of complainant's invention. The complaint is dismissed.

U. S. D. J.

SEPTEMBER 3, 1924.

eight years not made use of comparative delictory statements and relied solely upon his legal rights, whatever they might be, it is not unreasonable to suppose that defendant before committing itself to the development of the particular system of "wired wires" that is now employed would have taken steps to acquire a license or by other means have sought to avoid the possibility of an infringement claim such as is now made. That opportunity is gone through its reliance upon the words of the complaint and I can not believe that defendant if it makes use of the clothes made by General Spier should be called upon to pay tribute to him.

Reaching these conclusions it is unnecessary to pass upon the merits of complainant's invention. The complaint is dismissed.

U. S. D. C.

September 8, 1934

UNITED STATES CIRCUIT COURT OF APPEALS
FOR THE SECOND CIRCUIT

GEORGE OWEN SQUIER, PLAINTIFF-APPELLANT

vs.

AMERICAN TELEPHONE & TELEGRAPH COMPANY,
DEFENDANT-APPELLEE

OPINION

CHARLES NEAVE,
WILLIAM R. BALLARD,
C. C. ROSE,
Of Counsel for Defendant-Appellee.

MAY 18, 1925.

UNITED STATES CIRCUIT COURT OF APPEALS

For the Sixth Circuit

GEORGE OWEN ROUTER, PLAINTIFF,

AMERICAN TELEPHONE & TELEGRAPH COMPANY,

DEFENDANT.

OPINION

CHARLES NEAVE,

WILLIAM R. BARLAND,

C. C. ROSE,

Of counsel for Defendant-Appellee.

MAY 18, 1932

OPINION

UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT

George Owen Squier, plaintiff-appellant, *v.* American Telephone & Telegraph Co., defendant-appellee

Before Hon. Henry Wade Rogers, Hon. Charles M. Hough, Hon. Martin T. Manton, circuit judges.

APPEAL FROM FINAL DECREE IN EQUITY, ENTERED IN THE DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

Suit for infringement of claims 2, 3, and 7 of patent 980356, for "Multiplex telephony and telegraph"; the object of which is "the simultaneous transmission of a plurality of telephonic and telegraphic messages over a single telephonic circuit."

It may be assumed, but there was no finding below and will be none here, that the specification discloses patentable invention; the litigation will be disposed of on the circumstances surrounding issuance of the patent in suit.

Plaintiff is an "officer of the Government," i. e., an officer of the "Regular Army" or "permanent establishment," having graduated from the academy at West Point, and served continuously through numerous grades until he passed to the retired list as a major general in the Signal Corps. In 1909-1911 he was a major in that corps and was by the then Chief Signal Officer (General Allen) assigned to use an appropriation of \$30,000 granted by Congress in March, 1909, for research in wireless telephony. Major Squier produced as the result of his labors and the expenditure of the aforesaid public money, this and other patents, which were granted specifically under the act of March 3, 1883 (22 Stat. 625), which statute authorizes the grant of patents to any "officer of the Government," except employees of the Patent Office, "without the payment of any fee," when the patented invention is "to be used in the public service," provided that the applicant "shall state" in "his application" that his invention "may be used by the Government * * * or by any other person in the United States without the payment to him of any royalty thereon, which stipulation shall be included in the patent."

Plaintiff complied with the letter of this statute; his application was made an official War Department affair, and at the request of the latter the Interior Department put an examiner in charge of Major Squier's application, which was signed November 3, 1910, filed two days later, allowed December 6, and patent issued January 3, 1911; a celerity so unheard of, as of itself to indicate a total absence of the usual critical and carping citation of possible prior art.

This patent was "run through" the office so quickly doubtless because the Judge Advocate General of the Army had officially construed the act of 1883 as intending "to throw it (i. e., any patent obtained under the statute) open to public and private use in the United States."

Major Squier's patents having thus hurriedly issued, labeled "Dedicated to the public," no one seems to have doubted that anyone could use their subject matter, until on November 30, 1918, at the request of the Army and Navy patent board, an Acting Judge Advocate General, without referring to his predecessor's opinion of 1910, said that he thought the phrase of the statute "any other person in the United States" meant "any other person in the prosecution of work for the Government," and the same meaning was given by an Acting Attorney General at the request of the same patent board on March 22, 1920. (Op. A. G., vol. 32, p. 145.)

Thus encouraged, plaintiff began this suit in 1922; the facts recited and others to be hereafter alluded to having been shown, his bill was dismissed, whereupon plaintiff appealed. (William H. Davis and Samuel E. Darby, jr., for plaintiff-appellant; Charles Neave for defendant-appellee.)

HOUGH, C. J.: As above noted, we express no opinion as to defendant's well-urged proposition that plaintiff's patent is no more than a restatement of what other and earlier inventors long ago told the world, nor, in respect of the differing and irreconcilable opinions of judge advocates of different years, need we go further than to say that while we should, if it were necessary, prefer the earlier opinion as better reasoned on the wording of the statute, we think this case was rightly decided below, even if the later views of statutory meaning are correct.

Plaintiff's position is that he swore in his application that any person in the United States might use his asserted invention without paying anything therefor, because, in brief, he thought he was compelled so to do; he acted under a mistake of law, the yoke of which error was not lifted from his neck until 1918-20, when light broke on the Department of Justice in the manner and to the extent above noted.

We have assumed for argument's sake that there was a mistake of law made by the Judge Advocate General of 1910 when he construed the act of 1883; but it does not at all follow that this plaintiff acted on or was guided by the same mistake in openly and spontaneously dedicating his work to the public, as he plainly did. In brief, if we assume though not find the law to be as plaintiff asserts, plaintiff's own acts and words still prevent his recovery.

It is first observable that nothing compelled Major Squier to take out a patent of any sort; any patent seeking was voluntary. Next it is undisputed that he could have sought an ordinary patent at his own expense; he had done so before repeatedly, and nothing but his own preference or a sense of duty wholly uninfluenced by the act of 1883 would or could lead to proceeding under the statute.

Further had he taken out an ordinary patent his rights thereunder in respect of the United States were clear enough under *Salomons v. United States* (137 U. S. 342) and *Gill v. United States* (160 U. S. 426), both well-known rulings before 1910.

But there were special reasons why a man trained from youth to Government service, would in his better moments at all events be more than willing, would indeed ardently desire to devote what he had discovered to public service, and indignantly decline to make money therefrom.

Such an invention as is here asserted, was conceivably possible from a genius' brain, but for most even first rate men, an investigation of existing plants, and trial of existing apparatus was to say the least desirable, and Major Squier had those advantages at public expense; again the whole appropriation was evidently a chance to advertise and aggrandize the Signal Corps, and that both plaintiff and his military superiors intended throughout to exploit this departmental pride is perfectly plain.

Thus after proclaiming an intent to give the invention to the public in the application itself, the patentee approved published statements by the Chief Signal Officer; he personally communicated to the daily press, and himself addressed a technical association, and all in words that can only mean that a sense of duty imposed by the appropriation that gave him the chance—of pride in the Army and his own corps, and of a very human liking for the "lime light," all combined to produce in Major Squier a desire quite sincere at the time, to do exactly what the subtitle on his patent indicated and have it "Dedicated to the public."

Of course the very existence of this suit, shows that the fit of public spirit has passed; but what controls the interpretation of this patent is the intent of the patentee when he received it, not his present opinion that he would have thought differently, about what he wished to do, had he been better instructed as to what he might have done. We are satisfied that plaintiff wished and was proud to be generous in 1911; that he now regrets that generous emotion is immaterial.

Decree affirmed with costs.

MAY 18, 1925.



