SingingWires
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Francois Van Rysselberghe (1846-1893)

a pioneer of long-distance telephone networks

by Jan Verhelst

Introduction: his early life

Fig. 1 - François Van Rysselberghe

François Van Rysselberghe (1846-1893) was born in Ghent, Belgium as the oldest son of a humble carpenter and became a self-made engineer and scientist (Fig. 1). He was appointed professor at the Navigation School in Ostend, Belgium, when he was still a teenager.

In the 1870s he became meteorologist at the Royal Observatory of Brussels, and designed several automatic meteorological instruments, such as the "téléméthéorographe." This instrument was capable of doing meteorological measurements at the Belgian coast in Ostend and sending the data to the Royal Observatory in Brussels over telegraph lines. A major achievement in the 1870s!

Mixing telephony with telegraphy

As telephony came up, he tried to carry telephone signals over the existing telegraph network for a long distance connection between Brussels and Ostend, Belgium (Fig. 2).

The first telephone lines were, for convenience, usually strung right alongside existing telegraph lines. But the strong electrical pulses in the telegraph wires induced currents in the phone lines and interfered with the transmission. The noise was very annoying for the telephone user. Van Rysselberghe came up with the idea of running both signals (telephony and telegraphy) on the same line. He turned the problem into one of signal retrieval.

He invented circuits to separate telephone and telegraph signals on the same wire. Using a coil of wire, an inductor was formed that could filter *the lower Morse frequency* from *the much higher voice frequency*. The **inductor** blocked the *higher voice frequency* but allowed the *low Morse frequency* to pass. Similarly but opposite to the effect of the inductor, a **condenser** (capacitor) was installed that passed the *higher voice frequency* but blocked *the low Morse frequency.*

After some local experiments, a successful test was performed between Brussels, Belgium and Paris, France *(distance of 340 km or 212 miles).*

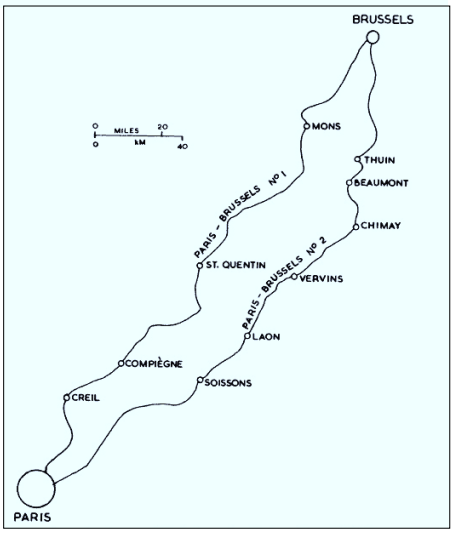

Fig. 2 - Test setup of the Van Rysselberghe system between Brussels and Paris (1882)

Together with a business associate, he sold licenses and apparatus for what was called **"the Van Rysselberghe system"** all over the world, especially Europe and South America. Around 1890, 17,000 km (about 10,600 miles) of telegraph lines were equipped with their ingenious system.

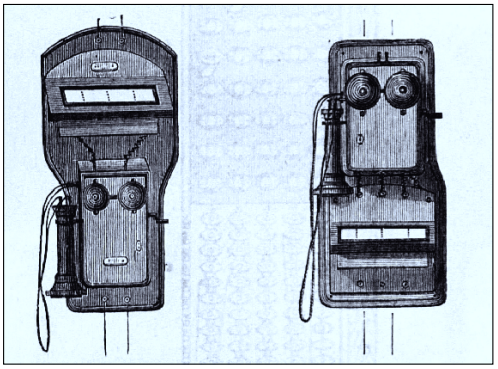

Fig. 3 - Commercial phones from Ader, adapted for long distance by Van Rysselberghe. Used by the Belgian telegraph services

On longer distances an enhanced microphone (higher level of transmission) in the telephone, and a battery with a low resistance

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Francois Van Rysselberghe...

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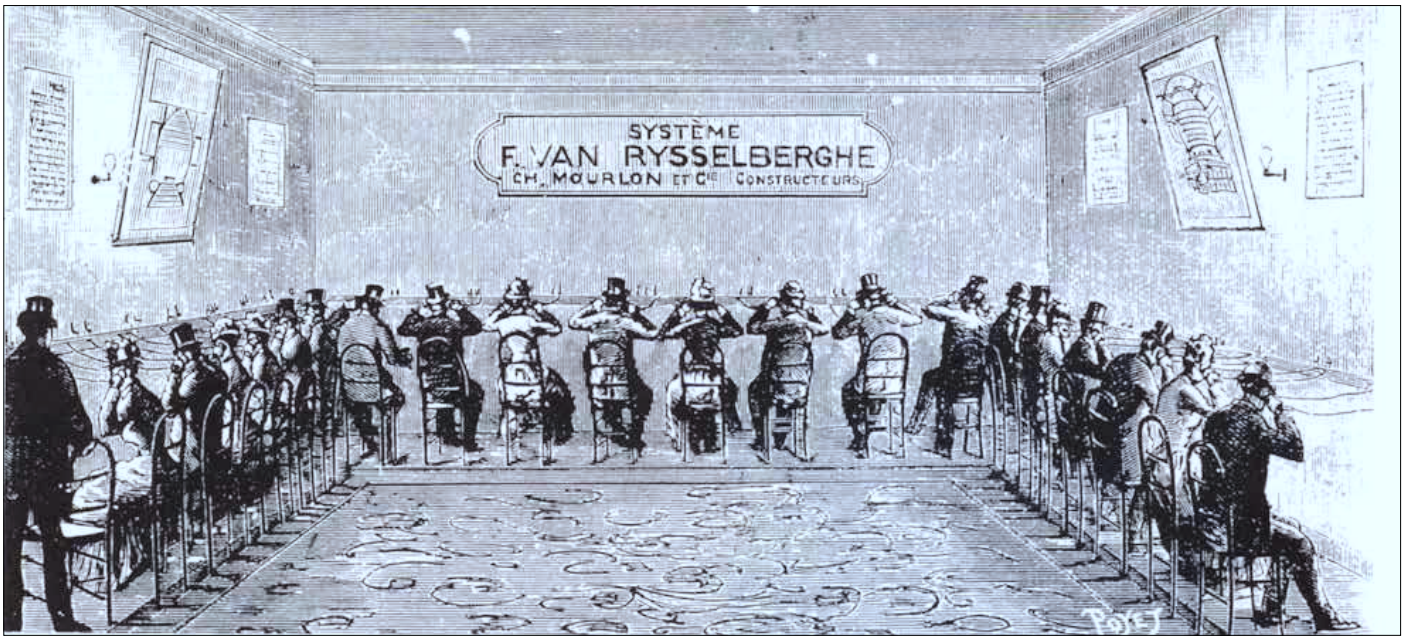

Fig. 4 - People at the World's Fair in Antwerp listen to a concert from Brussels (1885)

were recommended. Adapted Van Rysselberghe phones were sold when necessary (Fig. 3).

The real importance of van-Rysselberghe's system of simultaneous telephony and telegraphy was that it enabled a long-distance telephone service to be provided at a time the demand for such service was not really established. It was not therefore thought economic to provide the separate and isolated telephone routes that would otherwise have been needed.

At the World's Fair in Antwerp in 1885 there was a demonstration of long distance telephony over Van Rysselberghe circuits sent from a concert hall in Brussels to a hall at the World's Fair in Antwerp. 35 people could simultaneously listen to the concert: 1885 "streaming" technology (Fig. 4)!

Tests performed in the USA

Van Rysselberghe went to the US in the winter of 1885-86 and performed some successful tests on telegraphic links between Chicago and New York, a distance of 1000 miles (Fig. 5)! The separation of telephony and telegraphy under the Bell system and Western Union Telegraph made exploitation of simultaneous telephony and telegraphy difficult.

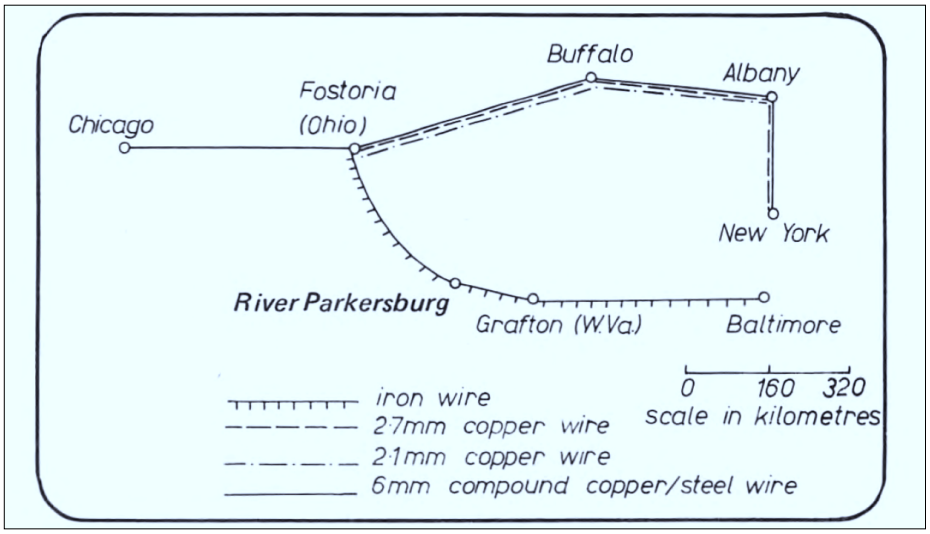

Fig. 5 - Route diagram of Van Rysselberghe's American experiments (1885-86)

It was not until Pupin's invention of the loading coil many years later that Bell was able to provide true long-distance calls, and by then the Van Rysselberghe's work had been forgotten.

The decline of the system later on

The Van Rysselberghe system worked pretty good at a time the demand for long-distance telephony was rather small. When the traffic grew large and pole routes carried a high density of lines, cross talk between telephone circuits would become intolerable, and other solutions had to be found. The Van Rysselberghe system served its purpose: it accelerated long-distance telephony for a small period of time, but it was successful in that timeframe.

Van Rysselberghe passed away much too early at the age of 46 in 1893. ☎ *More is the Bonus Pages.*

Bonus Pages

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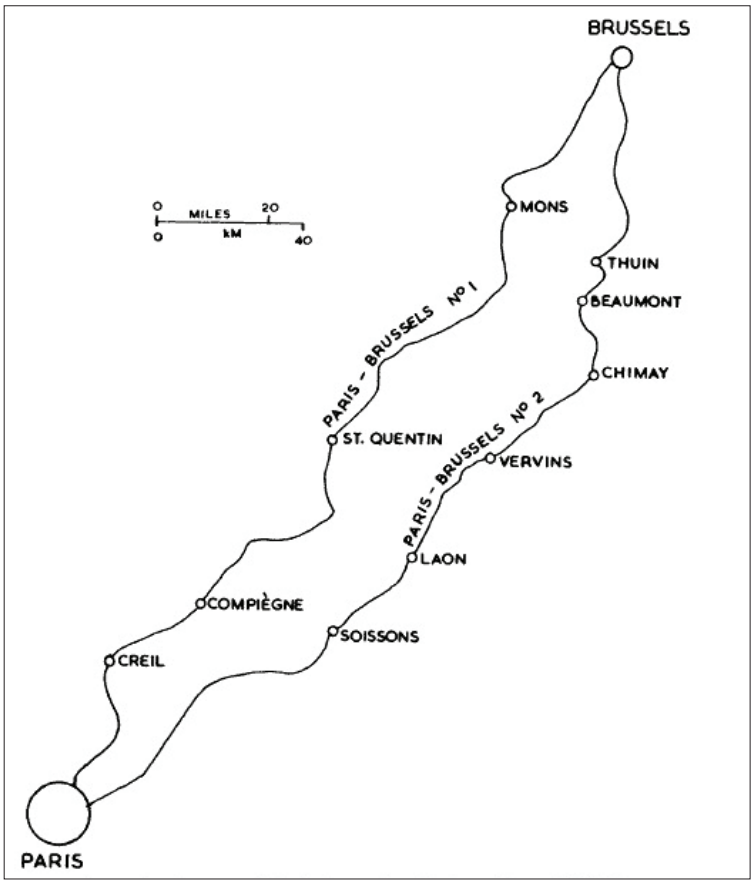

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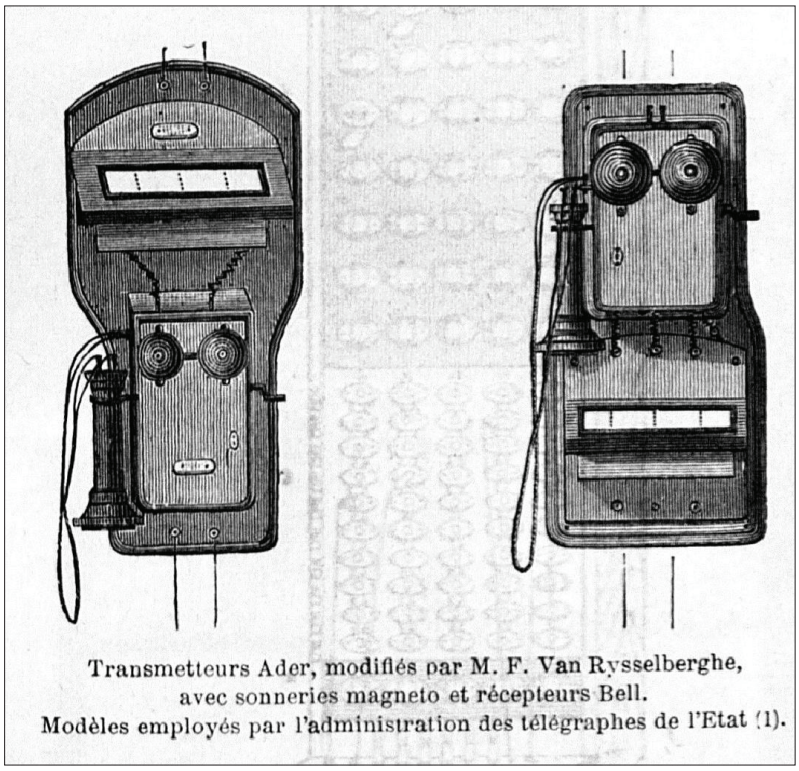

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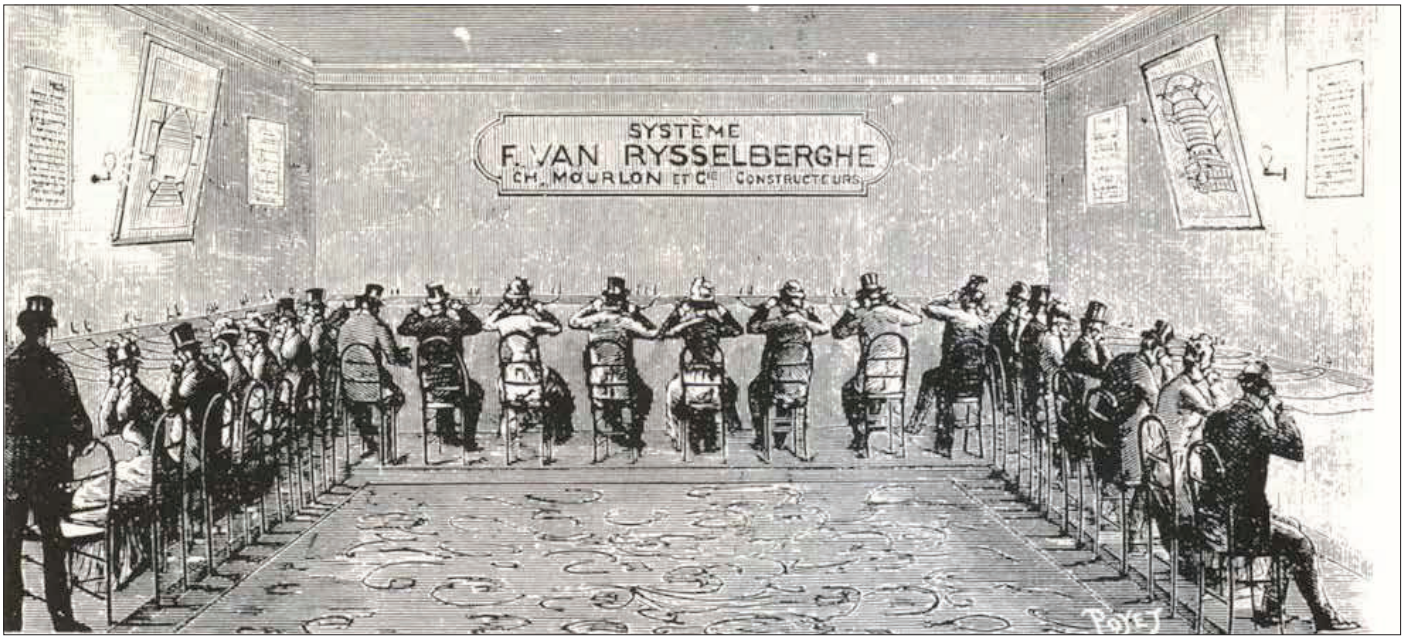
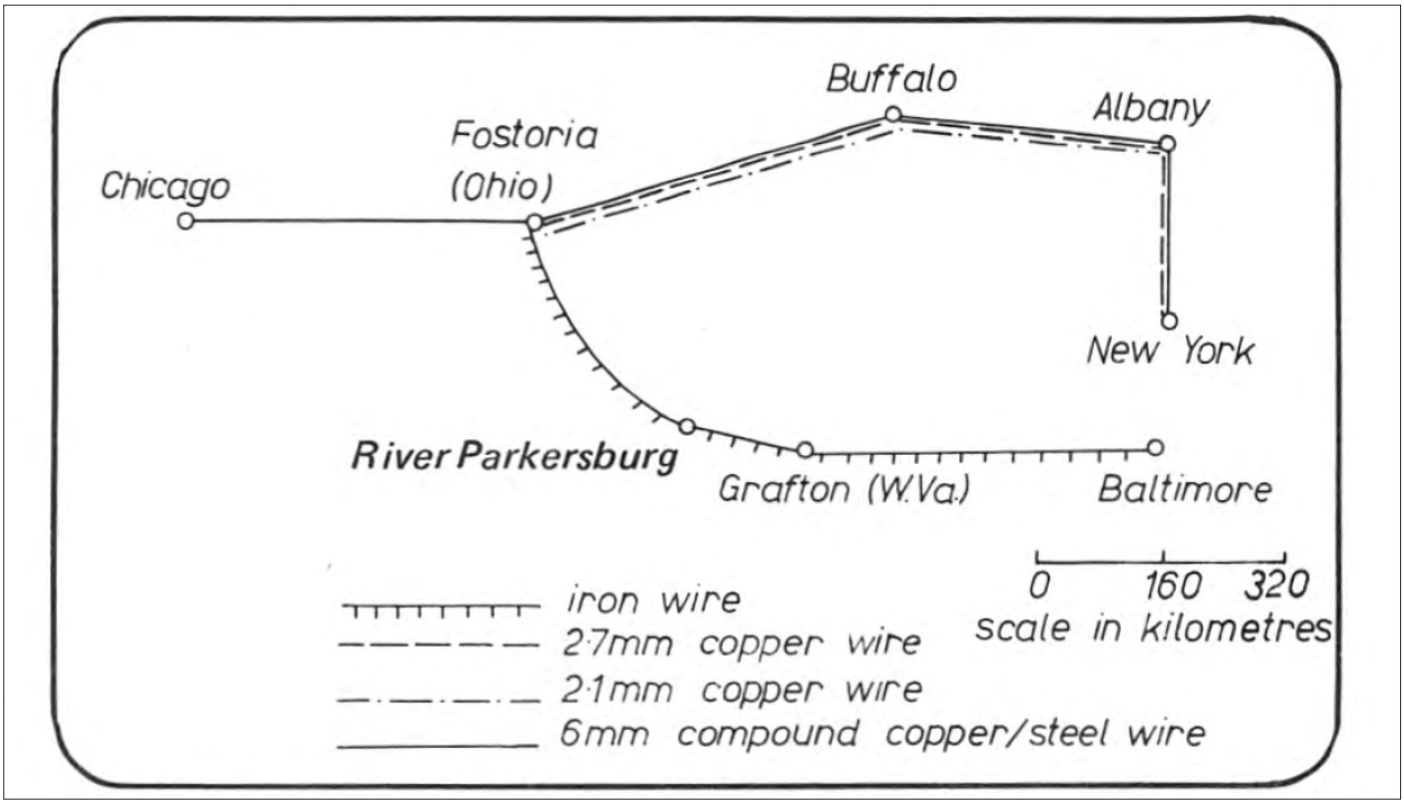


Fig. 4 - People at the World's Fair in Antwerp listen to a concert from Brussels (1885)



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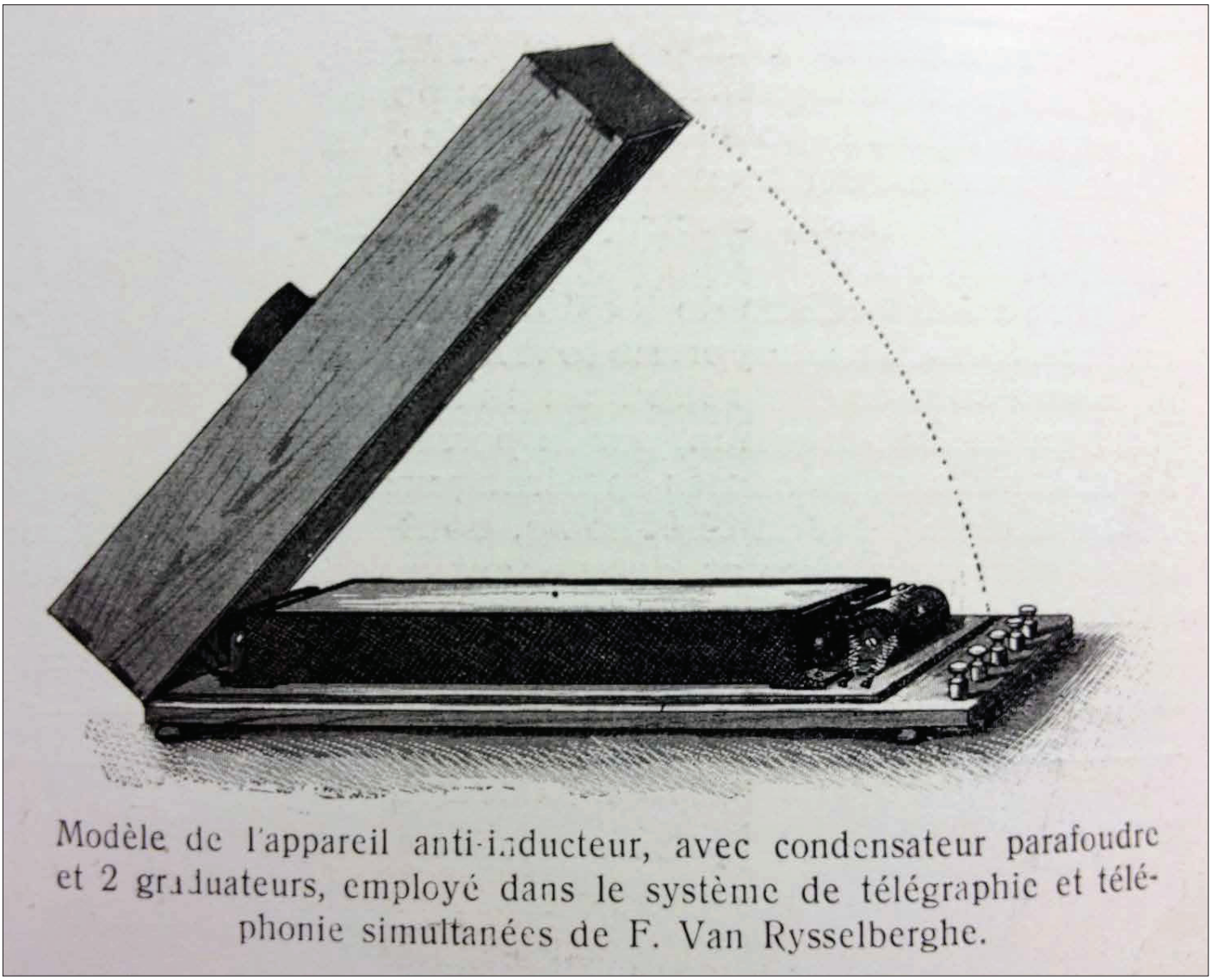

Fig. 6 - Package of filters designed by Van Rysselberghe to separate telegraph and telephone signals

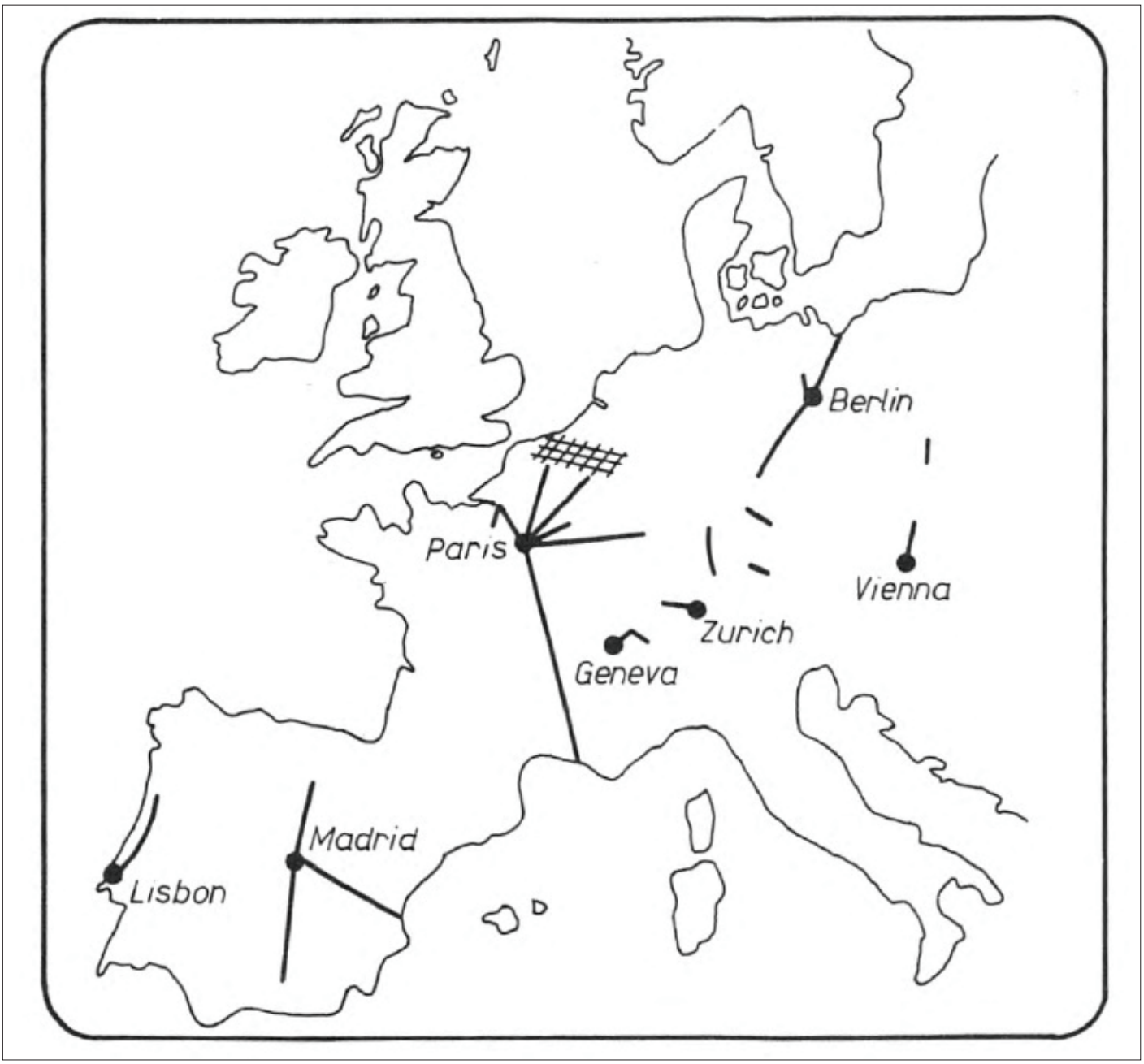

Fig. 7 - Map of Europe showing the use of the Van Rysselberghe system for long distance telephony System used in Belgium, France, Germany, Switzerland, Austria, Spain and Portugal in the 1880s.

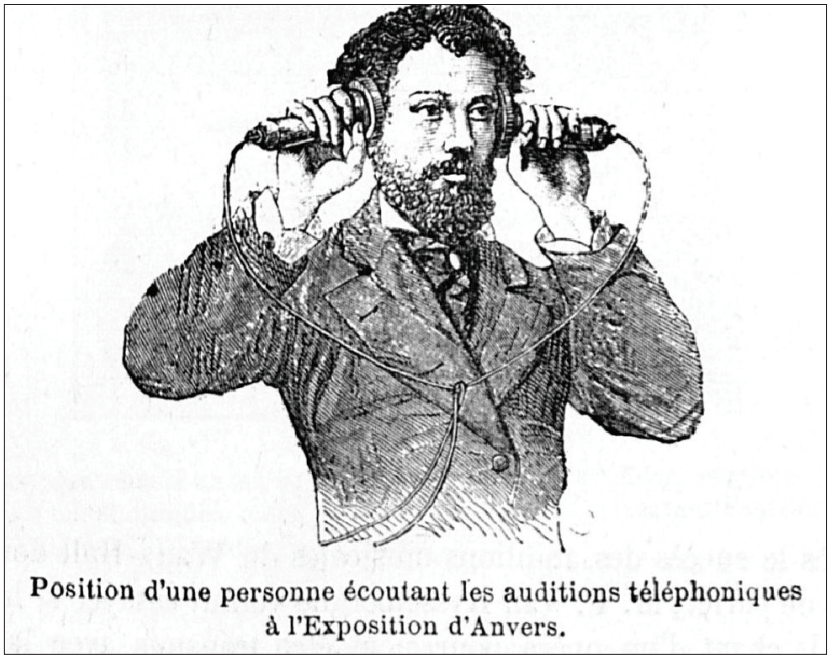

Fig. 8 - Man listening in Antwerp to a concert in Brussels over a long distance telephone connection (1885)

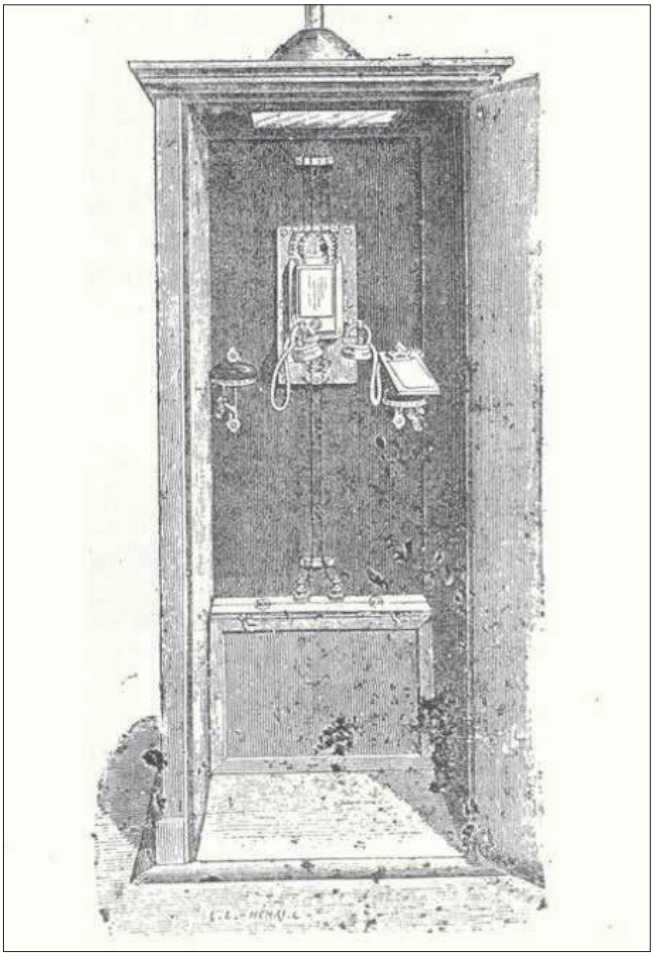

Fig. 9 - Phone booth at the Paris Stock Exchange (1887)
One of the first customers to use the link Brussels-Paris also for telephony was the Paris Stock exchange. Seven phone booth were installed at the Paris Stock exchange. The customer had a small desk to make notes during their conversation with people i.e. at the Brussels Stock exchange.

UNITED STATES PATENT OFFICE.

FRANÇOIS VAN RYSSELBERGHE, OF SCHAERBEEK, BELGIUM.

MEANS FOR PREVENTING INTERFERENCE IN COMBINED TELEGRAPHIC AND TELEPHONIC SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 322,333, dated July 14, 1885.

Application filed June 6, 1885. (No model.) Patented in Germany June 9, 1882, No. 22,633; in Belgium November 16, 1883; in France November 16, 1883; in England November 23, 1883; in Luxemburg December 8, 1883; in Italy December 31, 1883; in Portugal January 18, 1884; in Canada January 24, 1884; in India January 29, 1884; in Sweden February 12, 1884; in Spain April 23, 1884; in Denmark June 18, 1884; in Brazil July 5, 1884; in Argentine Republic July 19, 1884; in Austria September 13, 1884, and in Uruguay December 12, 1884.

To all whom it may concern:

Be it known that I, FRANÇOIS VAN RYSSELBERGHE, a Belgian subject, residing at Schaerbeek, Belgium, have invented new and useful Improvements in Telegraphic and Telephonic Apparatus, (for which I have obtained the following Letters Patent, viz: Germany, June 9, 1882, No. 22,633; Belgium, November 16, 1883; France, November 16, 1883; Great Britain, November 23, 1883; Italy, December 31, 1883; Austria, September 13, 1884; Canada, January 24, 1884; Portugal, January 18, 1884; India, January 29, 1884; Spain, April 23, 1884; Sweden, February 12, 1884; Denmark, June 18, 1884; Luxemburg, December 8, 1883; Brazil, July 5, 1884; Argentine Republic, July 19, 1884, and Uruguay, December 12, 1884,) of which the following is a specification.

This invention relates to an improved system or arrangement of devices for producing the gradual telegraphic currents required in carrying out my method of simultaneous telegraphy and telephony, which forms the subject-matter of prior patents, and depends upon the removal of the effects of induction between telegraph and telephone lines by retarding the rise and fall of the prime telegraphic currents, whereby the same line wire or wires or the same net work or system of wires can be used for the transmission of telephonic and telegraphic messages, and the effects of such telegraphic currents are not perceptible in the telephone-instrument, telegraphic sounds being no longer audible in such telephone.

The invention consists in introducing permanently into the circuit of a telegraph system a pair of magnets and a condenser, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a diagram view of a telegraph system provided with my improved means of retarding the rise and fall of the telegraphic current, and showing a telephone-wire arranged in the vicinity of the telegraph-wire. Fig. 2 is a similar view showing the use of the same line-wire for the transmission of telegraphic and telephonic messages.

The reference-numeral 1 designates the manipulator or transmitting-key for opening and closing the circuit of the battery 2, and sending to the line 3, each time the key is closed, a current of the same polarity, and interrupting it when opened. The numeral 4 represents a telegraphic receiving-instrument, the electro-magnet of which must have a resistance of not less than five hundred ohms.

The above parts constitute the ordinary Morse telegraphic system, and require no special description.

For the purpose of graduating the emission and extinction of the currents, or reducing the sudden rise and fall of such currents, I place an electro-magnet, 6, of about five hundred ohms resistance, between the battery and the manipulator, and I introduce a second electro-magnet, 7, between the manipulator and the main line, said magnet 7 offering the same degree of resistance as the magnet 6. I also place a condenser, 8, of two micro-farads, between the two electro-magnets 6 7, one of the faces of said condenser being connected with a wire, 9, in derivation of the main line, and the other face being connected with the earth by the wire 10.

It is evident that when the key of the transmitting-instrument is depressed the current from the battery passes into the two magnets and the condenser introduced between them in derivation of the main line. In this manner the current is caused to pass to the main line in a gradual manner, or is retarded in its passage to the main line, since it is evident that the magnets and condenser are first charged and that the initial strength of the current emitted upon manipulating the key is never carried to the main line. When the manipulating-key is raised, the connection with the battery is broken and the charge of the condenser and the magnet introduced into the main line passes to the latter in the form of a current, whose extinction is as gradual as was its emission upon the original depression of the transmitting-key.

I have found by experience that the best arrangement of devices for producing gradual telegraphic currents is the two electro-magnets and condenser arranged between the same,

Fig. 10 - US patent 322,333 as of July 14, 1885 – first page only
US patent of the Van Rysselberghe system- first page only