(No Model.)

F. VAN RYSSELBERGHE.

METHOD OF PREVENTING INTERFERENCE IN COMBINED TELEGRAPHIC AND TELEPHONIC SYSTEMS.

No. 320,987. Patented June 30, 1885.

Fig. 1.

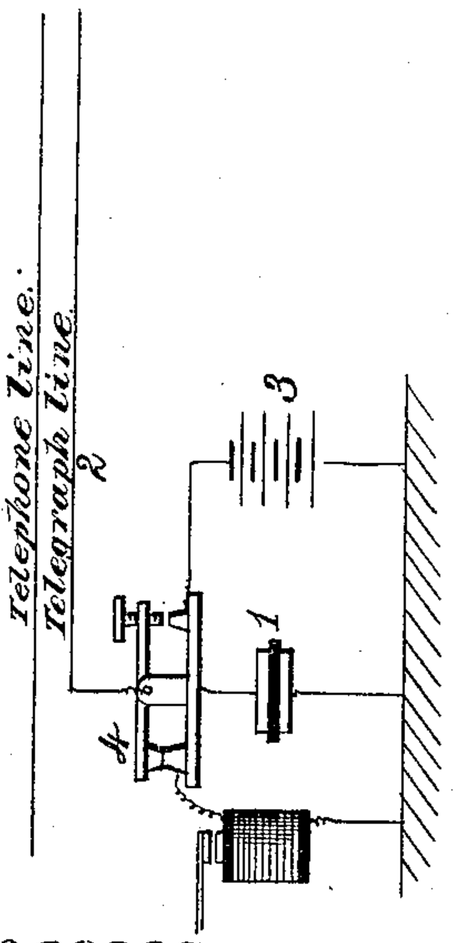


Fig. 2.

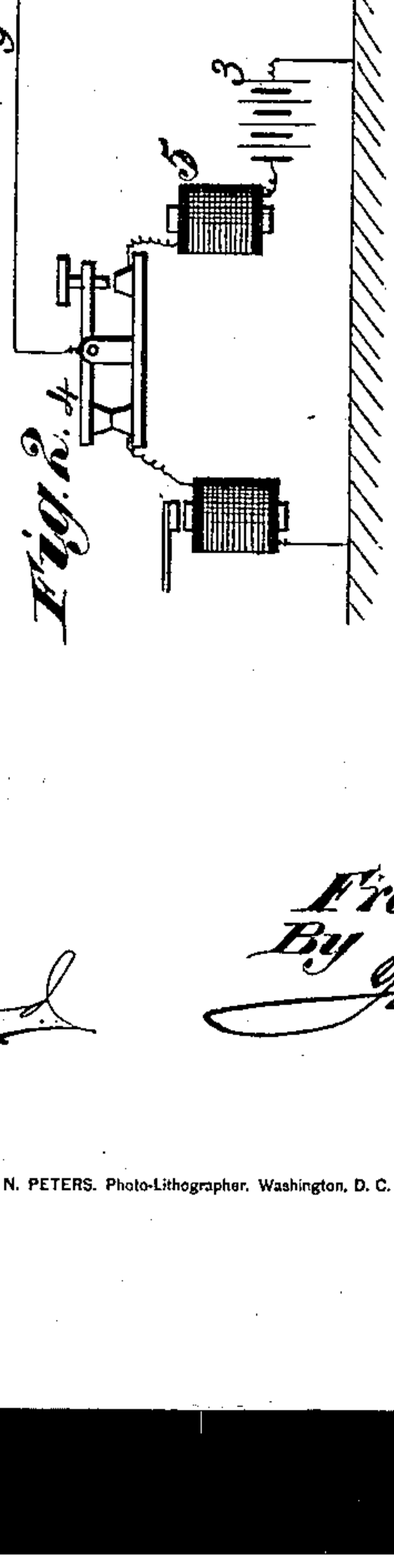


Fig. 3.

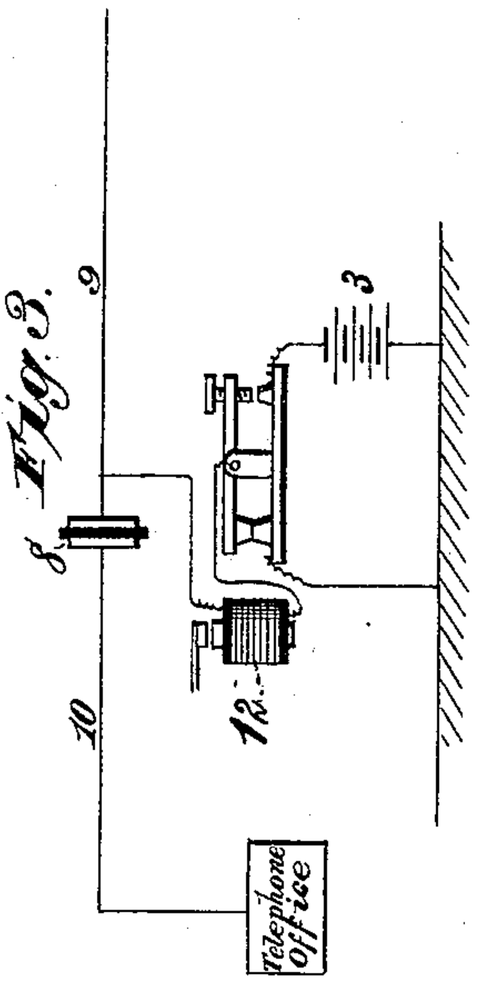


Fig. 4.

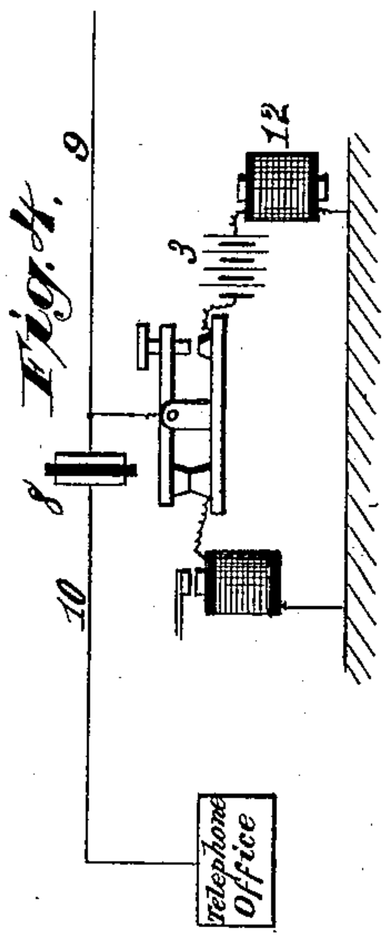
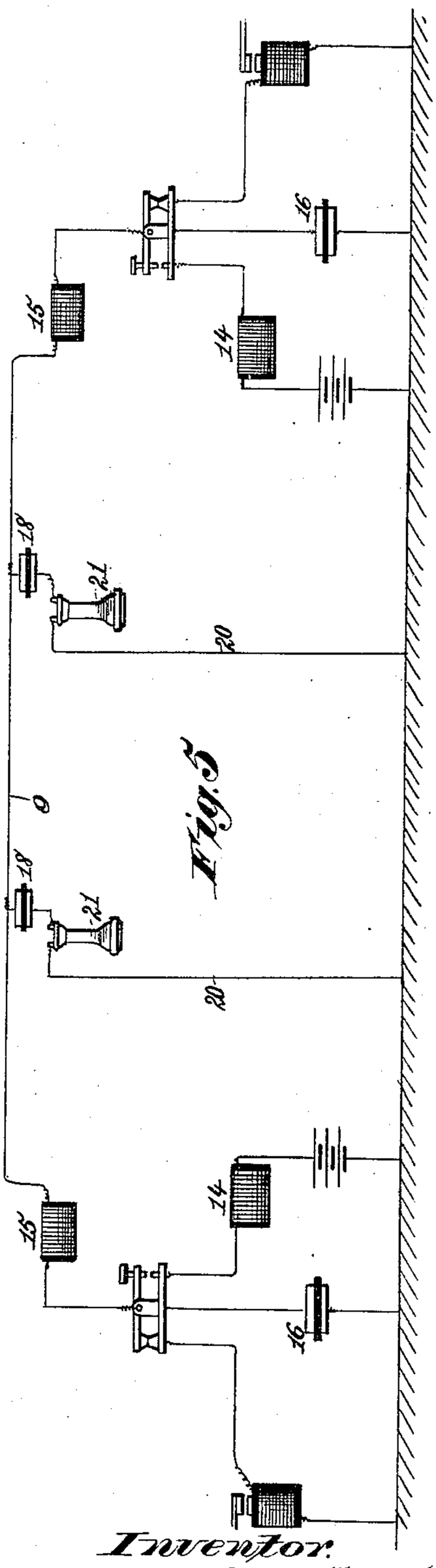


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANÇOIS VAN RYSSELBERGHE, OF SCHAERBEEK, BELGIUM.

METHOD OF PREVENTING INTERFERENCE IN COMBINED TELEGRAPHIC AND TELEPHONIC SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 320,987, dated June 30, 1885.

Application filed May 27, 1885. (No model.) Patented in Belgium February 20, 1882, No. 57,121, May 15, 1882, No. 57,836, and May 17, 1882, No. 57,947; in France February 26, 1882, No. 147,515, and May 19, 1882, No. 149,042; in England March 17, 1882, No. 1,303, and May 24, 1882, No. 2,466; in Italy March 29, 1882, No. 1,029, and July 13, 1882; in Germany June 9, 1882, No. 22,633, and June 17, 1882, No. 21,451; in Canada August 17, 1882, No. 15,333, and August 30, 1882, No. 15,363; in Luxemburg December 8, 1883; in Portugal January 18, 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, and in Uruguay December 12, 1884.

To all whom it may concern:

Be it known that I, FRANÇOIS VAN RYSSELBERGHE, a subject of the King of Belgium, residing at Schaerbeek, Belgium, have invented new and useful Improvements in Method of Telegrapho-Telephonic Transmission of Messages, (for which I have obtained Letters Patent in Belgium February 20, 1882, No. 57,121, May 15, 1882, No. 57,836, and May 17, 1882, No. 57,947; France, February 26, 1882, No. 147,515, and May 19, 1882, No. 149,042; Germany, June 9, 1882, No. 22,633, and June 17, 1882, No. 21,451; Great Britain, March 17, 1882, No. 1,303, and May 24, 1882, No. 2,466; Italy, March 29, 1882, No. 1,029, and July 13, 1882; Canada, August 17, 1882, No. 15,333, and August 30, 1882, No. 15,363; 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.

It is known that one of the principal difficulties met with up to the present in telephonic transmissions to a great distance results from the powerful inductive effects produced in telephonic conductors by adjacent telegraph-wires, and which have appropriately been compared to the sound of frying. These inductive effects are caused each time the transmitting-key of an ordinary telegraph system effects an emission of current along the line, and charges the same almost instantaneously, thus having for its effect the transmission of a powerful induction-current of short duration through all neighboring or adjacent wires, the same phenomenon occurring, but in an opposite direction, when the circuit is broken. Many plans have been proposed for overcoming these effects and permit telegraphic and telephonic conductors to be included in the same net-work of wires; but until now all effects have been confined to the telephonic circuit or the seat of disturbances. My invention, on the contrary, differs from all plans heretofore proposed, since it concerns the telegraphic circuit or the cause of the disturbances, and it involves, broadly, the suppression of the inductive effects of telegraphic currents on telephonic circuits, and rendering all telegraphic currents inaudible in telephones; also, in the simultaneous transmission of a telegraphic dispatch in Morse, Hughes, or other signals, and a telephonic message by one and the same wire, or by two wires employed for each telephonic communication. I accomplish such results by resorting to a gradual telegraphic current, which only attains its intensity by degrees; or, in other words, I make use of a current the emission and extinction of which is made gradual by suitable means provided for such purpose. By using such a gradual current the induced currents developed in the telephonic circuits will continue for a longer time than with the ordinary currents heretofore employed for telegraphic purposes; but the action upon the diaphragm of the telephonic instrument will be only a bending one without vibration, so that no sound will be produced. In order to deaden the electric wave of induction, and suppress the hissing which this wave would otherwise produce in the telephone, various methods may be employed.

Some of the mechanical devices or instruments and the arrangement thereof employed in carrying out my method have heretofore been fully described in my application for patent, filed April 29, 1882, No. 59,905, and in my United States Patent No. 306,665, dated October 14, 1884, and I may state that what is intended to be embraced in the present case is, broadly, the method of using gradual currents for telegraphic purposes, so that the injurious effects of induction in neighboring wires used for telephonic purposes are prevented, and the effects of derivation also are obviated, for rendering the primary currents inaudible in telephones; and, secondly, the adaptation of a single-line wire for simultaneously transmitting telegraphic signals produced by gradual currents and the undulatory or pulsating cur-

rents required to transmit and reproduce articulate sounds.

For the sake of illustrating how my method may be carried out, I have shown in the accompanying drawings several means for rendering gradual the emission and extinction of the telegraphic current, and have also shown the relative arrangement of the telegraph and telephone stations.

In Figure 1 is shown a condenser, 1, one terminal of which is connected with the line-wire 2 and the other terminal is put to earth. When a current is sent to the line by operating the Morse instrument 4, the condenser becomes charged by the battery 3, and a portion of the current which would otherwise pass into the line is detained. The current in the line only reaches a maximum when the charging of the condenser is complete, and when the current of the battery is cut off the condenser delivers its charge into the line and lessens the abruptness of the extinction of the main-line current. A like result may be attained by including an electro-magnet, 5, in the circuit at the departure-point; or, if desired, the magnet of the receiving-instrument may take the place of a separate magnet. It is to be assumed that Figs. 1 and 2 show an arrangement of parts capable of transmitting telegraphic messages over wires included in a net-work of wires containing some that are used solely for telephonic purposes.

In Fig. 3 I show an arrangement of parts where the ordinary telegraph-office is kept entirely independent of and distinct from the telephonic office, a single-line wire being in this instance used for the transmission of the currents of ordinary telegraphy and the undulatory currents of telephony without interference with each other. In Fig. 3 I have shown a condenser, 8, one of the faces of which is connected to the main line 9, while the other face is connected to the terminal branch line 10, which leads to the telephonic office, (where the apparatus may be arranged in the ordinary manner.) A good arrangement of the telegraphic apparatus is shown in Fig. 3, in which 12 is the receiver, and the resistance of the electro-magnet of the receiver is always interposed between the line and the earth, the resistance of said magnet, however, being increased, so as to be never less than five hundred ohms. In this case it is the electro-magnet which graduates the telegraphic currents entering the line-wire, and which also provides the resistance necessary to the due propagation of the telephonic waves through the condenser 8.

If it is desired to retain the usual connections of the telegraphic apparatus, an electro-magnet, 12, (shown in Fig. 4,) of not less than five hundred ohms resistance, is to be interposed between the battery and manipulator or between the battery and the earth.

Instead of employing devices as above set forth, I may resort to manipulators furnished with adjustable rheostats, (shown in my application No. 59,905, filed April 29, 1882,) arranged in such a manner that by pressing down the lever of the manipulator resistances varying progressively from infinity to zero are introduced into the circuit between the battery and the line. These rheostats are formed of bodies of moderate conductivity, on which rubs a brush fixed to the lever of the manipulator. The line therefore becomes charged gradually and comparatively slowly, since the intensity of the current varies with the resistance introduced during the pressing down of the key of the manipulator, and the inductive effects are no longer sufficiently powerful to trouble the telephonic transmission.

In Fig. 5 I have shown a telegrapho-telephonic system making use of the same line-wire, and in which an electro-magnet, 14, of about five hundred ohms, is placed between the battery and the manipulator, a second similar magnet, 15, being located between the manipulator and the line, while a condenser, 16, of about two microfarads, has one side connected with the axis of the manipulator and the other side with the earth. This forms the subject-matter of an application about to be filed.

A condenser, 18, of about one-half microfarad, is also arranged in a branch line, 20, between the line-wire and telephone 21.

What I claim is—

1. The method of rendering telegraphic or other electric currents, whether direct, (primary,) induced, or derived, inaudible in telephones, consisting in rendering gradual the emission and extinction of the telegraphic or other electric current, substantially as described.

2. The method of transmitting telegraphic and telephonic messages over the same line wire or wires, consisting in rendering gradual the emission and extinction of the telegraphic current, substantially as herein set forth.

In testimony whereof I affix my signature in presence of two witnesses.

FRANÇOIS VAN RYSSELBERGHE.

Witnesses:
RICHARD T. GIVEN,
EDWD. H. CLOUD.