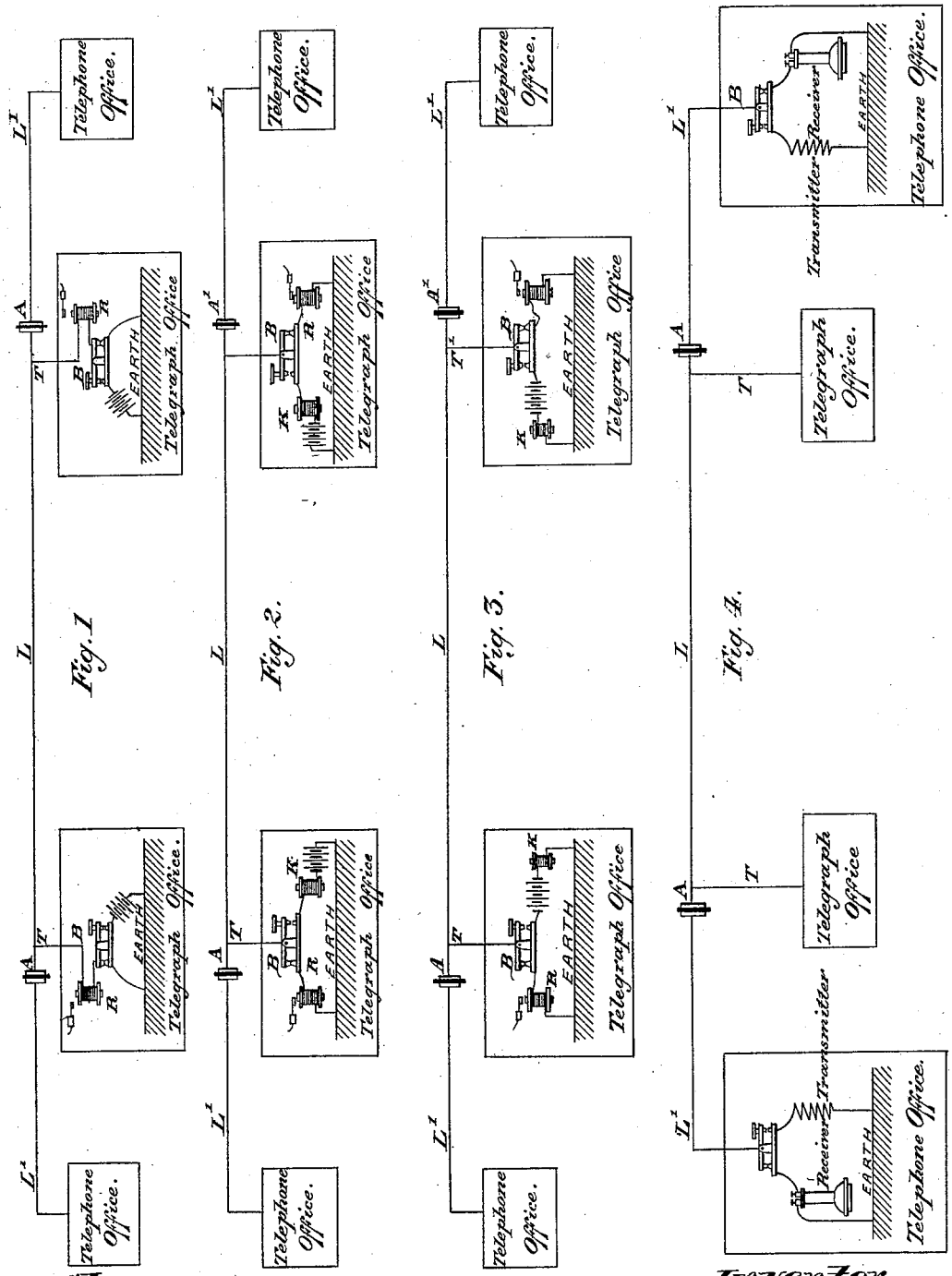
(No Model.)

F. VAN RYSSELBERGHE.

COMBINED TELEGRAPHIC AND TELEPHONIC APPARATUS.

No. 306,665. Patented Oct. 14, 1884.



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UNITED STATES PATENT OFFICE.

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COMBINED TELEGRAPHIC AND TELEPHONIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 306,665, dated October 14, 1884.

Application filed June 21, 1882. (No model.) Patented in Belgium May 17, 1882, No. 57,947; in France May 19, 1882, No. 149,043; in England May 24, 1882, No. 2,466, and July 6, 1883, No. 3,621; in Germany June 9, 1882, No. 22,633; in Italy June 16, 1882, No. 321; in Austria July 13, 1882, No. 1,029, and September 27, 1882, No. 25,451, and in Canada August 30, 1882, No. 15,363.

To all whom it may concern:

Be it known that I, FRANÇOIS VAN RYSSELBERGHE, a subject of the King of Belgium, and residing at Schaerbeek, Belgium, have invented certain new and useful Improvements in Combined Telegraphic and Telephonic Apparatus, (for which I have obtained Letters Patent in Great Britain No. 2,466, dated May 24, 1882; Belgium No. 57,947, dated May 17, 1882; France No. 149,043, dated May 19, 1882; Italy No. 321, dated June 16, 1882; Austria No. 1,029, dated July 13, 1882; Canada No. 15,363, dated August 30, 1882; Germany No. 22,633, dated June 9, 1882, and Austria No. 25,451, dated September 27, 1882,) of which the following is a specification.

This invention relates to a combination of telegraphic and telephonic apparatus in which ordinary telegrams by the Morse, Hughes, Wheatstone, or other apparatus and telephonic conversations can simultaneously pass on the same line-wire; and the invention admits of the ordinary telegraph office being kept entirely independent of and distinct from the telephone office, because, as hereinafter explained, the separation of the currents of ordinary telegraphy from the undulatory currents of telephony is effected by means of electrical induction produced by condensers or induction-coils without putting the telephonic circuit in metallic or conductive contact with the ordinary telegraphic circuit, the two circuits being so far independent of one another. It is essential that the telegraphic currents should be gradually produced and extinguished, and should not be the instantaneous currents which result from the ordinary opening and closing of a battery-circuit without precaution. Currents which are sudden in their rise and fall, such as the currents heretofore used for telegraphic purposes, cause, in the telephone, a well-known sharp rattle; but it is possible to render telegraphic currents gradual in their rise and fall, so that they shall not produce sounds in a receiving-telephone. I have already applied for a patent for the employment of gradual currents in telegraphy, the same forming the subject of an application filed by me the 29th of April, 1882, Serial No. 59,905. It is essential for the successful operation of my present invention of simultaneous telephony and telegraphy that the telegraph should only be actuated by gradual currents, such as may be obtained by the combinations of electro-magnets, condensers, or other graduators, above referred to; and it is also essential that the telegraph line-wire should not be connected with the earth otherwise than through a somewhat high resistance. The appliance by which I effect the separation of the currents of ordinary telegraphy from the undulatory currents of telephony I term an "inductor." The appliance by which I render gradual the production and the extinction of the telegraphic currents I term a "graduator." The appliance by which I prevent a too free connection between the line-wire and the earth I term a "resistance." These appliances may take various forms. I shall describe them as they may be advantageously employed. The same appliance may sometimes serve as graduator and resistance.

Figures 1, 2, and 3 show three arrangements, all in accordance with my invention, differing slightly in detail the one from the other.

In these figures the instruments in the telegraph office are indicated separately; but it is not so in the case of the telephone office. In Fig. 4, on the other hand, the instruments in the telephone office are shown separately and the telegraph office is generally indicated. In all cases the telegraph offices are supposed to send only currents which are rendered gradual by the means indicated above, (or in my application for a patent above referred to.)

In Fig. 1, L is the telegraph line-wire, the arrangements being the same at both ends of the line, as the figure indicates. A is the inductor, which may be a condenser having a capacity of one unciofarad; or, as is evident, any known equivalent of such condenser for its purposes in this connection may be used. The condenser has one of its faces connected to the line L, while the other face is connected to the terminal branch line L′, which leads to the telephone office, (where the apparatus may be arranged in the ordinary manner.)

The telegraph office is put in direct communication with the line by the terminal branch line T B. At the telegraph office the branch line T B must never be put directly in communication with the earth. The branch should always contain a resistance. The electro-magnet R in the figure is this resistance. The electro-magnet should offer a resistance of five hundred ohms or more. The best arrangement of the telegraphic apparatus is that indicated in Fig. 1, in which R is also the receiver, and the resistance of the electro-magnet of the receiver is always interposed between the line and the earth. In this case it is the electro-magnet R, which, also, is the graduator. It graduates the telegraphic currents entering the line-wire, rendering them comparatively slow in their rise and fall, so that they may produce no sound in the telephone. The electro-magnet R absorbs the first part of the current when the circuit is closed by the key. This portion of the current is spent in magnetizing the core of the magnet, and again, when the circuit is opened, the core becoming demagnetized, continues for a time the current in the line-wire. It is in this way that an electro-magnet operates as a graduator. If it is desired to retain the usual connections of the telegraphic apparatus, an electro-magnet, K, Figs. 2 and 3, of not less than five hundred ohms resistance, is to be interposed between the battery and the manipulator or between the battery and the earth. R and K are here the resistances necessary to the due propagation of the telephonic waves through the condenser and also the receiver. Although in the telephone office the apparatus may be arranged in the usual manner, it is nevertheless preferred, especially for long distances, to adopt the arrangement indicated by Fig. 4 and characterized by a commutator, B, (worked by the hand, foot, or finger,) having the same construction as the manipulating-key of the Morse apparatus. The object of this is to put out of circuit during reception the transmitter, and during transmission the receiver.

What I claim is—

1. The combination, with one-line circuit, of telegraphic and telephonic apparatus, a condenser acting as an inductor, an electro-magnet acting as a graduator, as hereinbefore explained, and a resistance, whereby the telegraphic and telephonic apparatus may be used upon the said one line without interference with each other, all arranged relatively to each other, substantially as described.

2. The combination of a line-circuit consisting of a main portion having ordinary telegraphic apparatus and terminal sections connected thereto by condensers, an electro-magnet or graduator, as described, and resistance, all arranged relatively to each other, as shown and described, whereby the two classes or kinds of apparatus may be worked over the same line and without interference with each other, substantially as set forth.

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