

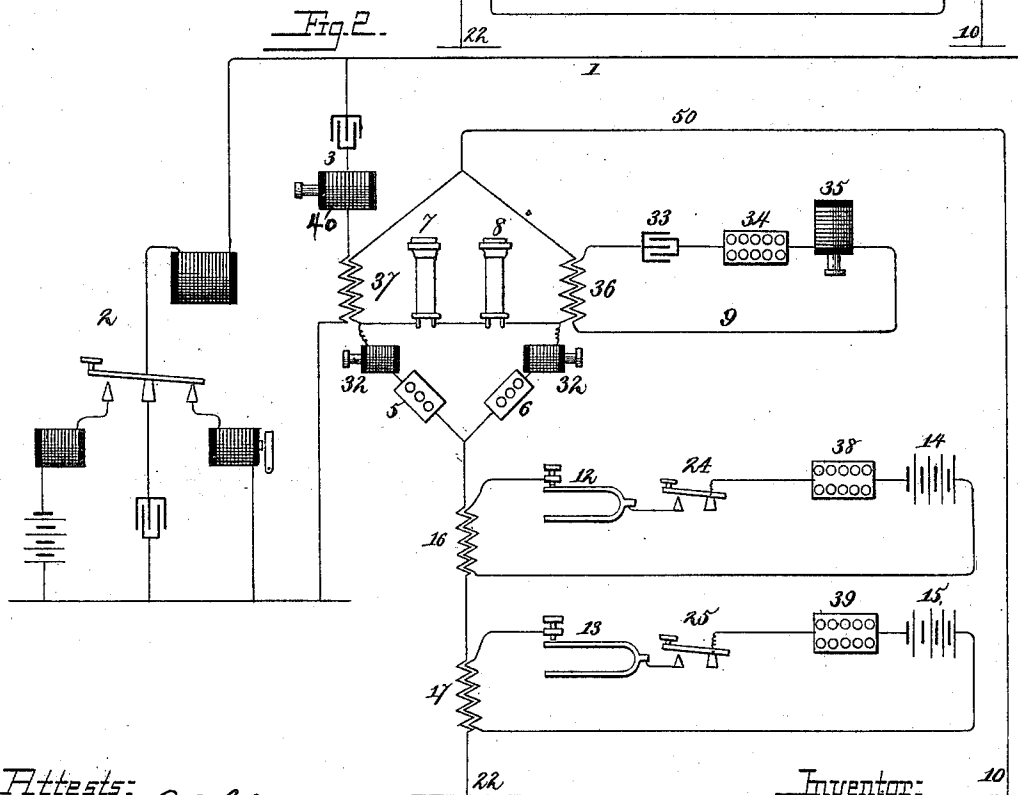
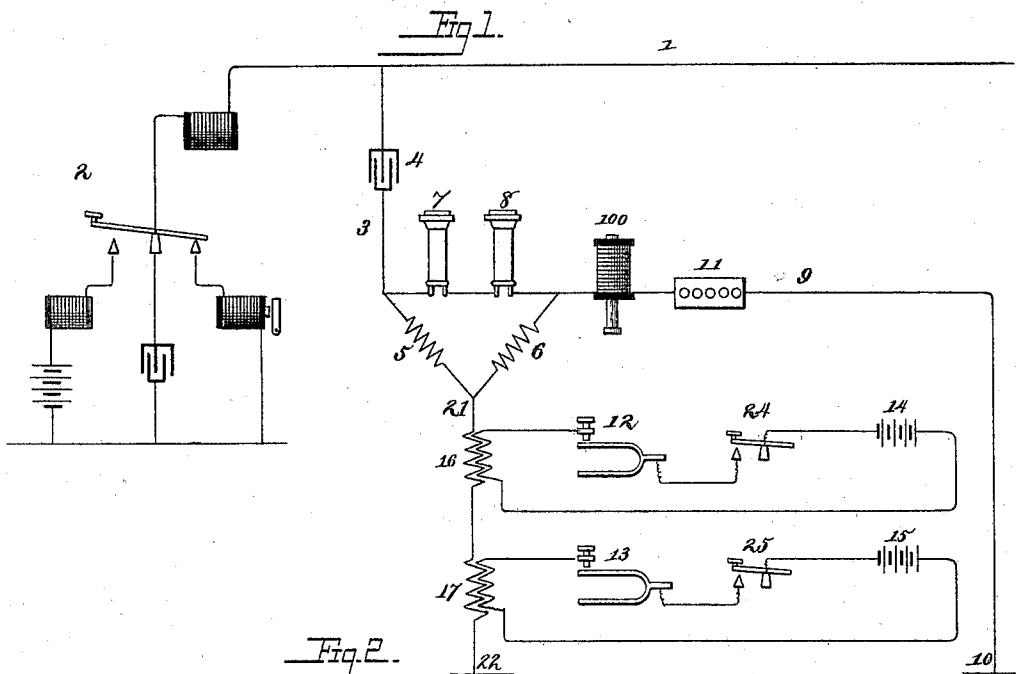
(No Model.)

F. VAN RYSELBERGHE.

TELEGRAPHY.

No. 363,188.

Patented May 17, 1887.



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UNITED STATES PATENT OFFICE.

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TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 363,188, dated May 17, 1887.

Application filed June 5, 1886. Serial No. 304,246. (No model.)

To all whom it may concern:

Be it known that I, FRANÇOIS VAN RYSSELBERGHE, a citizen of the Kingdom of Belgium, residing at Brussels, Belgium, have invented certain new and useful Improvements in Telegraphy, of which the following is a specification.

In patents heretofore granted to me I have fully described and claimed a method and apparatus for simultaneously transmitting telegraphic and telephonic signals on the same line without interference, the essential features of which consist in connecting the telephonic apparatus in derivation from the line by means of "separators," and in rendering the telegraphic signals "gradual" in their rise and fall to such a degree that the deflections produced in the diaphragm of the telephone by the variations in the potential of the telegraphic signals are not sufficient to produce audible sounds.

The object of my present invention is to increase the number of telegraphic signals that may be sent over a single line; and it consists in the method of and apparatus for combining what may be termed a "tone" or "harmonic" telegraph with an ordinary Morse or other telegraph, and for the simultaneous transmission of messages by both systems without interference; and in carrying out my invention I make use of my improved method, heretofore referred to, of graduating the currents of the ordinary telegraph-line to such an extent that they will not materially interfere with the tone-telegraph signals, and I arrange the tone-telegraph apparatus in derivation to the line and connect it to the line by means of separators.

In producing the tone-telegraph various means may be used, and I have selected for the illustration of my present invention a form in which the tones for the transmission of signals are produced by tuning-forks and the tone-signals are received in telephones.

In using the tuning-forks for the simultaneous transmission of several messages I have found it preferable to have the forks tuned an octave apart, as there is less liability of the interference of the sounds in the receiver where the signals are received by any predetermined code, preferably using a prolonged sound for a dash and a shorter sound for a dot. The tuning-forks control the electric current

and produce undulations or pulsations directly or through a secondary coil or condenser, which are transmitted onto the main line and to the receiving-telephones, where the tones are reproduced. If two or more tones are simultaneously transmitted in the same direction, two or more receiving-telephones are preferably used, and although the tones are reproduced in both receivers they can easily be distinguished one from another, and the signals transmitted by any particular tuning-fork may be understood, the difference in tone being easily recognized.

The tone-telegraph may be arranged for single, double, or multiplex transmission, and while it may be used alone or in combination with other systems, I prefer to use it in connection with a telegraph line or circuit provided with my devices for rendering gradual the emission and extinction of the currents used in such system.

Referring to the accompanying drawings for a more particular description of one embodiment of my invention, I have shown in Figure 1 a diagrammatic arrangement of a quadruplex tone or harmonic telegraph system and a simple Morse system working with gradual currents, and in Fig. 2 a similar arrangement with some variations.

In the drawings, the reference-numeral 1 designates the main line, and 2 a telegraph station at one terminal thereof, comprising in the present instance a battery, receiving-instrument, a condenser in derivation, a key, and a resistance-coil at each side of the key, which is one of the arrangements heretofore patented by me for sending gradual currents to line.

A branch line, 3, is separated from the main line by a condenser, 4, of small capacity—say about one-half of a microfarad—and the tone-telegraph instruments are connected to this branch. The tone system is represented as connected with the well-known Wheatstone balance or bridge, 5 6 being the resistances in the branches; 7 8, the telephone-receivers in the bridge-wire; 9, the artificial line containing the rheostat 11 and electro-magnet 100, with an adjustable core; and 21, the ground line, including the secondaries of the induction-coils 16 and 17.

The tuning-forks 12 and 13 are preferably

adjusted to produce tones an octave apart, or some multiple thereof, and they may be maintained in operation by any of the usual local arrangements for that purpose. The forks are each included in a local circuit of the batteries 14 and 15, having keys 24 and 25, and each local forming the primary of one of the induction-coils 16 and 17.

It is apparent that when either or both keys are closed the tuning-forks will produce variations in the local circuits which will induce currents in the line 21, and by properly adjusting the artificial-line devices a balance will be obtained in a well-known way, so that the home receivers 7 8 will not be affected by the outgoing currents, but will respond to the incoming currents.

In Fig. 2 the system shown involves the same principles, though the arrangement and combination of the devices is somewhat different. The tuning-forks are preferably arranged one or more octaves apart, and resistances 38 39 are introduced into the local circuits for controlling the strength of the currents therein, and consequently the strength of the induced currents sent to line by each fork.

In order to get a more perfect balance in the bridge, I have shown the electro-magnets 32, having adjustable cores arranged in the branch lines of the bridge. The bridge is separated from the line 3 by an induction-coil, 37, the primary of which is connected to the bridge-wire and the secondary of which is in the line. The opposite end of the bridge is arranged in a similar manner in the induction-coil 36, the secondary of which includes an artificial line, 9, consisting of a circuit provided with a condenser, 33, rheostat 34, and electro-magnet, 35, with adjustable core. The two ends of the primaries in the bridge are joined to the line 50 and connected to ground. The electro-magnet 40 is placed in the line 3, and is also provided with an adjustable core. It will thus be seen that I am enabled to get a very perfect balance in the bridge-wire, as the artificial line more nearly corresponds to the actual line than the arrangement shown in Fig. 1, and even the delicate telephone-receiv-

ers may be used and not be subject to disturbances from outgoing currents.

As before intimated, the forms shown in the accompanying drawings are merely illustrative of my present invention, and it will be understood that I do not limit myself to the precise arrangement shown.

What I claim is—

1. The herein-described method of combined telegraphy, consisting in transmitting graduated Morse signal-currents and tone or harmonic signals simultaneously over the same line-wire.

2. The combination, with a single line-circuit, of means for sending graduated Morse signal-currents and means for sending tone or harmonic signal-currents simultaneously over said line.

3. A tone-telegraph consisting of a line, two or more tuning-forks arranged to vibrate at rates producing different tones, and telephone receiving-instruments, each responding to all the tones, substantially as described.

4. The combination, with a main line and means for sending graduated Morse signal-currents, of a tone-telegraph arranged in derivation to said line, and having tuning-forks vibrating at different octaves, and telephone receiving-instruments arranged in a bridge-wire, substantially as described.

5. The combination, with tone-producing instruments in a local circuit, receiving-instruments in a local induced circuit, a main-line induced circuit, and an artificial induced circuit, substantially as described.

6. The combination, with the local primary circuit having tone-producing instruments, a secondary bridge-circuit having receivers, and a main and artificial induced-current line and adjusting devices, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANÇOIS VAN RYSSELBERGHE.

Witnesses:

THOS. KELL BRADFORD,
A. W. BRADFORD, Jr.