

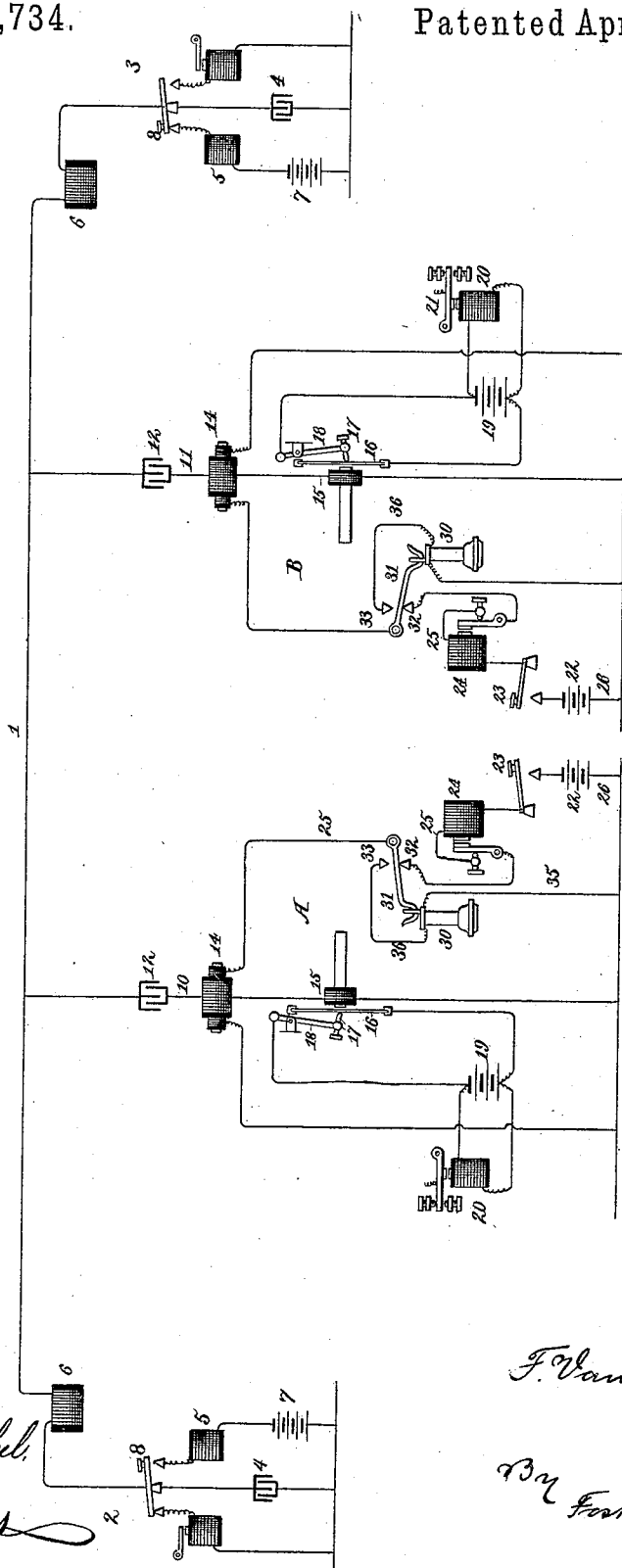
(No Model.)

F. VAN RYSELBERGHE.

TELEGRAPHY.

No. 361,734.

Patented Apr. 26, 1887.



Attest:
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UNITED STATES PATENT OFFICE.

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TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 361,734, dated April 26, 1887.

Application filed May 28, 1886. Serial No. 203,551. (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
5 certain new and useful Improvements in Telegraphy, of which the following is a specification.

My invention relates to multiplex telegraphy, and has for its object to increase the number of separate and distinct messages that can
10 be simultaneously transmitted over a single line-wire without interference; and to this end my invention consists in the combination and arrangements of parts, substantially as hereinafter pointed out.

It is now well known that a single telegraph-line may be provided with suitable instruments for the simultaneous transmission of several messages without interference, and
20 it is also known, having been demonstrated by me and set forth in my previous patents, that a telephone-circuit may be superposed upon such a telegraph-line by the use of suitable separators connecting the telephone-instruments to the line in derivation, and that
25 the telephone-currents will not interfere with the telegraph-signals, and that by rendering the admission and extinction of the telegraph-signals gradual they will not affect the telephone-instruments in a way to produce
30 sounds or to interfere with the telegraph-messages. It is thus possible to use the same line-wire for the simultaneous transmission of several telegraphic messages and to superpose telephonic currents upon the same line without
35 interference with each other, as is fully set forth in my previous patents.

I have discovered that not only can ordinary telephonic messages be superposed upon a
40 telegraph-wire, but that other telegraphic messages may be also so superposed, and my present application relates more particularly to this last invention.

This invention is based upon the principle
45 that rapid intermittent electric currents not capable of producing speech, but capable of operating to produce telegraphic signals upon proper instruments, may be superposed upon an ordinary galvanic line using any of the
50 well-known systems of telegraphy in which the currents are graduated without interference

therewith; and my invention may be stated as broadly consisting in superposing upon any ordinary telegraph-line employing gradual
55 currents rapid intermittent currents, and in providing the necessary means for utilizing said currents for the transmission of signals.

In the accompanying drawing I have illustrated diagrammatically one way of carrying out my invention, and I will now proceed to
60 describe my invention more specifically by reference to said diagram.

The reference-numeral 1 designates the main line, and 2 and 3 are terminal telegraphic stations of the Morse, Hughes, or other types of
65 either single, duplex, or multiplex telegraphs. The instruments shown at these stations are arranged in accordance with the system heretofore patented to me—that is, they are provided with means for sending gradual currents
70 to line in order to avoid telegraphic induction in neighboring wires, and produce currents that will not affect ordinary telephones introduced into the telegraphic circuit in derivation
75 by means of separators, so as to vibrate the diaphragms to produce sound in the telephone. The means for producing gradual telegraphic currents consist in this instance of
80 the condenser 4, in derivation, and the electro-magnets 5 and 6, arranged in the line including the battery 7 and key 8, in a manner fully set forth in my prior patents.

The reference-letters A B designate telephone-stations arranged between the terminal telegraph-stations. These intermediate stations are connected with the main line 1 by
85 branch lines 10 11, and the latter contain condensers 12, of small capacity, which separate the telephone-stations from the main line and prevent the passage of the telegraphic current
90 through the same, it being understood that the currents are not of sufficient tension to act inductively through the condensers to affect the telephone. These branch lines include the secondary circuit of an induction-coil, 14, in
95 the primary of which is included the telephone-transmitter instruments, as set forth in my aforesaid patents, while the receiving-telephone is placed directly in the secondary branch of the induction-coil. These branch
100 lines include the secondary circuit of the induction-coil 14, in the primary of which is in-

cluded the telephone-transmitter instruments. So far the arrangement is substantially such as I have described in my previous patents.

I have found that rapid intermittent currents may be sent over the line, which, passing through the magnet 15, will cause the diaphragm 16 to vibrate very rapidly, and if a suitable pendulous arm or vibrator, 18, which normally rests in contact with the diaphragm, is provided, the said arm will be rapidly vibrated, and, striking against the diaphragm, will produce a signal made up of rapidly-succeeding sounds, continuing as long as the intermittent currents pass through the coil of the telephone. Such signals may be readily understood by some prearranged code—a dot consisting of a short series of sounds and a dash of a longer series of rapidly-succeeding sounds. The character of these sounds may be varied by adjusting the contact-screws 17 in the end of the pendulous arm 18, so that they may be perfectly understood; but in order to render them more susceptible I may include the diaphragm and pendulous arm in a branch circuit of a local battery, 19, in another branch of which is placed a sounder-magnet, 20, having an armature, 21; or a printing-magnet or other well-known form of receiving-instrument may be used. If desired, the magnet 20 may be comparatively sluggish in its action, so that it will not be magnetized and demagnetized at each interruption of the local circuit by the rapid vibration of the diaphragm and arm, but will only respond to the signals represented by dots and dashes. The means for sending these quick intermittent currents to line for working the diaphragm-receiver at the distant station may be various, that shown in the accompanying drawing being simple and well adapted for the purpose, and it consists of the battery 22, the manipulating-key 23, the rheotome 24, and the wires 25 and 26, connected in the primary circuit 14 of the induction-coil placed in the branch line. It is evident that the closing or opening of the circuit of the battery 22 will bring the rheotome into or out of action, and that the latter is capable of sending rapid intermittent currents through the primary circuit of the induction-coil. Here these currents are transformed into secondary or induced currents, which pass through the condenser 12 to the main line, and from thence go to the similar condenser at the distant station into the electro-magnet for operating the diaphragm-sounder at this station. The rapid intermittent induced currents are superposed upon the gradual Morse or other telegraphic currents passing simultaneously over the same line-wire; but, as is well known, these currents do not interfere with each other, and hence the respective instruments which respond to the same are operated in a perfect and satisfactory manner, and the carrying capacity of the line is increased.

Other means may be used to produce the rapid intermittent currents, which need not be described herein.

In connection with the line 25, I have shown a switch-arm, 31, upon which the telephone 30 is supported, and contacts 32 33 are provided, so that when the telephone is at rest on the switch the circuit is through the rheotome 24; but when it is removed the circuit is through the telephone.

The rapid intermittent-current apparatus, besides being used as a telegraph proper, may also be used as a calling apparatus for the telephone, as will be readily understood, and the pendulous arm 18 may be arranged to be thrown out of operative connection with the diaphragm 16, and said diaphragm be used as the receiving-instrument of the telephone system; or another independent receiving-telephone may be used.

It will thus be seen that in the arrangement shown there is a telegraph system making use of gradual currents, a telephone system using undulatory currents, and a call or telegraph system using rapid intermittent currents, all superposed upon a single line-wire.

It is evident that various modifications of the devices shown may be made without departing from the spirit of my invention.

What I claim is—

1. In a telegraph system, the combination, with two or more sets of Morse or other telegraph-instruments having graduating devices for sending gradual currents to line and receivers responding to such gradual currents, of two or more other sets of signaling-instruments sending rapid intermittent currents to the line, over which the gradual currents are passing, and diaphragm sounders or receivers responding only to such rapid intermittent currents, substantially as described.

2. The combination, with a telegraph line and instruments working with gradual currents, of a diaphragm-sounder responding to rapid intermittent induced currents, a local-battery circuit including a receiver, and an arm with contact-point bearing on the diaphragm-sounder, substantially as described.

3. In a telegraph system, the combination, with the same line wire or circuit, of transmitters and gradators for transmitting messages by gradual Morse currents, other transmitting-instruments for sending messages or signals by rapid intermittent currents, and telephone-instruments for sending articulate speech by undulatory currents, substantially as described.

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

FRANÇOIS VAN RYSELBERGHE.

Witnesses:

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