

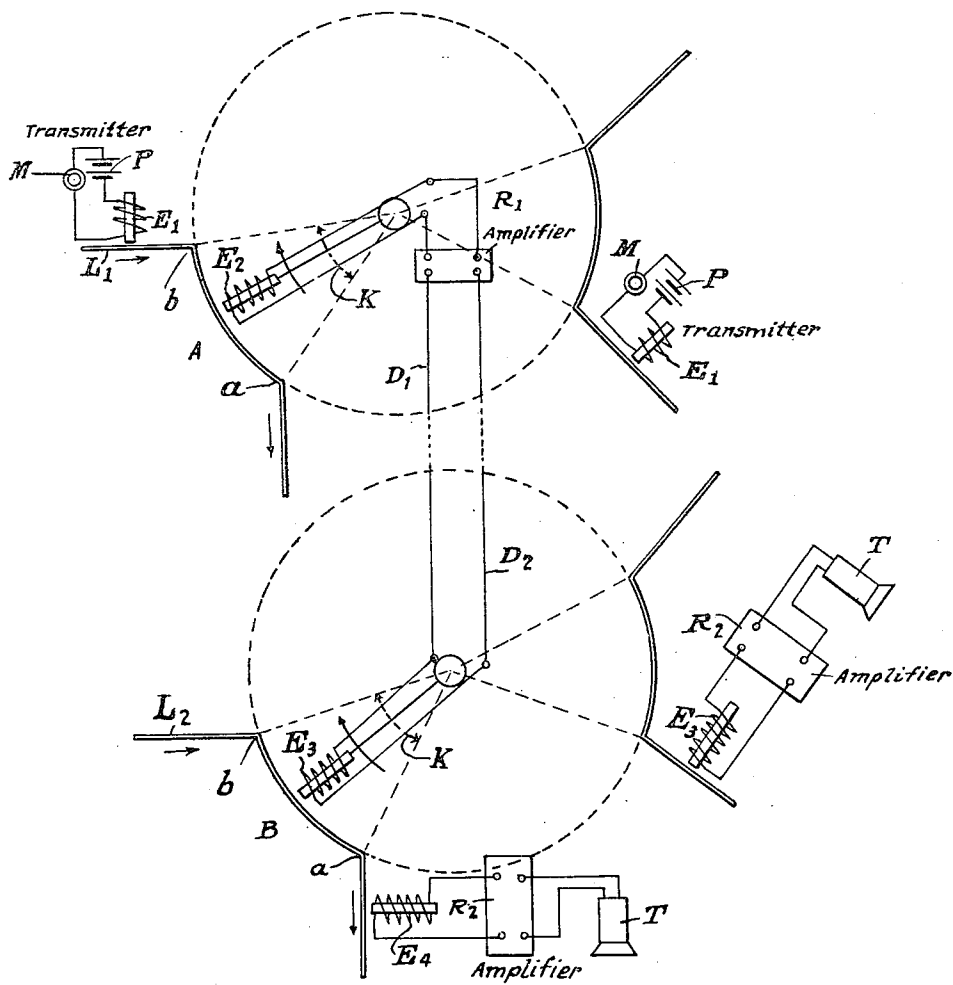
Jan. 2, 1934.

L. NEMIROVSKY

1,941,618

MULTIPLE SYSTEM

Filed Feb. 7, 1930



Inventor:

Leon Nemirovsky

UNITED STATES PATENT OFFICE

1,941,618

MULTIPLE SYSTEM

Leon Nemirovsky, Paris, France, assignor to
Antoine Belloy, Paris, FranceApplication February 7, 1930, Serial No. 426,662,
and in Germany February 11, 1929

1 Claim. (Cl. 179—15)

This invention relates to a method and to a device for transmitting telephonic and telegraphic messages, said method and device being calculated to increase considerably the efficiency of existing installations by permitting several conversations to be conducted simultaneously over ordinary telephone wires or by wireless. My device is very simple and, since the rapidity of transmissions is adjustable and can be made extremely great, I am enabled to cause messages to be sent in a manner that renders them unintelligible for unauthorized third parties thereby rendering futile any attempt at intercepting messages so sent over wires or by wireless.

This invention utilizes oscillations produced in the microphone by the action of sounds or talk so as to impart them to a mobile conductor. An electromagnetic device, moving in the direction opposite to the movement of said conductor, collects, on a predetermined portion of its travel, such oscillations and transmits them over wires or by wireless to another electromagnetic device which, during a predetermined portion of its travel, imparts the transmitted oscillations to a wire moving in the opposite direction. The latter wire transmits these oscillations to a receiver (telephone, telegraph, etc.) which transforms them into sounds or into signals.

In order to make my invention more clearly understood I have illustrated, as an example, an embodiment thereof in and by a drawing appended hereto which illustrates diagrammatically an installation set up in accordance therewith.

Each microphone circuit includes microphone M, battery P and electro-magnet E₁ together with the necessary wiring.

The sound waves that influence the microphone of set A, produce current oscillations in its circuit, whereby the magnetism of electro-magnet E₁ is modified. Such modifications are registered by the steel wire L₁ which is moving at a constant speed near the poles of electro-magnet E₁. Wire L₁ receives, therefore, magnetic currents variable and proportional to the magnetic changes of electro-magnet E₁. Farther on wire L₁ passes in front of the poles of a second electro-magnet E₂, inducing in the coils thereof currents which, amplified in amplifier R₁, take action on the electro-magnet E₃ of set or station B. Electro-magnet E₃ transmits the variable magnetic currents to wire L₂ which causes current oscillations in the coils of electro-magnet E₄. Those currents, amplified in amplifier R₂, take action on the telephone receiver T, which will produce the sound waves registered by microphone M.

According to the invention the electro-magnets E₂ and E₃ are constituted by mobile parts rotated at a constant speed which is adjustable. The steel wire L₁ of station A is moved, as above explained, at a constant speed in front of the poles of electro-magnet E₁ and continues to travel along an arc of a circle K° whereon, between fixed points a and b, takes place the influence between wire L₁ and rotary electro-magnet E₂. The latter is rotated in a direction reverse to the travel of wire L₁ and its speed is so adjusted that it will travel round the whole circumference of a circle in the same time as any one point of wire L₁ will travel round arc K°. Under such conditions, no point of wire L₁ will pass in front of the poles of electro-magnet E₂ without transmitting to the coils thereof currents corresponding to the variable magnetic currents of wire L₁.

The characteristic feature of the transmission consists of the fact that oscillations are transmitted in a condensed state and by impulses and not in a constant manner.

In order to reproduce at station B the sound waves registered by the microphone of station A, I use a receiving device analogous to the sending device but adapted to repeat the operation in reversed order. The current oscillations transmitted from A to B over wires D₁ and D₂ or on waves arrive into electro-magnet E₃ which is timed to rotate perfectly synchronous with electro-magnet E₂. Said oscillations will cause magnetic changes which, through wire L₂, will take action on electro-magnet E₄. The current oscillations, produced in the latter's coils and amplified in amplifier R₂, will take action on receiver T which will transform them into sounds. Obviously, at station B, electro-magnet E₃ and wire L₂ that cooperate must also be moving in opposite directions. Obviously too, the oscillations transmitted in a condensed state from station A to station B will be expanded at the latter by the reciprocal action of electro-magnet E₃ and of steel wire L₂ whereby their original frequency will be restored to acoustic oscillations or to signals.

The conduits that connect A with B contain current only during the period of time during which electro-magnets E₂ and E₃ travel round arc of circle $a-b=K^\circ$. Consequently, the free part of the circumference, which is equal to $360^\circ-K^\circ$, can be used for installing other analogous devices the number of which will be determined by

$$\frac{360^\circ - K^\circ}{K^\circ}$$

In this manner I am enabled, if, for instance,

angle K is of 36° , to install 10 wires mobile in front of electro-magnets E₂ or E₃, resulting, in the feature that my invention is applicable to multiplex telephony or telegraphy.

- 5 The above described devices are available, of course, for obtaining telephonic or telegraphic transmission in the reverse direction, that is to say from B to A. In this case I have but to add a return wire, when transmission is carried over
10 wires, so that, there is a set of three conductor wires.

- This invention is also available for secret telephony, and for this purpose, I have but to cause the rotary electro-magnets to be rotated at
15 such a speed that messages intercepted by unauthorized third parties will be utterly unintelligible for them.

- I can also transmit messages in opposite direction by changing the direction of rotation
20 either of the mobile wires or of electro-magnets E₂ and E₃, such a change having the effect of reproducing at the receiving station a telephone message or a telegraphic communication beginning by the end.

- 25 The same effect may be obtained by altering the speed of the moving parts of the devices according to a secret scale agreed upon by any two correspondents and unknown to anybody but themselves.

- 30 Synchronous timing of the rotary electro-magnets may be achieved in a variety of ways, as, for instance, by the use of the devices usual in multiplex telegraphy for maintaining synchro-

nous the distributors at two corresponding stations (sonorous wheel, etc.).

If required, any number of amplifiers of any type may be intercalated at suitable places in the installation.

In order to transmit Morse or Baudot telegrams, I have but to substitute for the microphone of station A a Morse key or a mechanical apparatus and to substitute for the telephone
80 of station B a telegraphic relay, whereby my device is rendered available for the simultaneous transmission of telegraphic signals and of telephone messages.

I claim:

A device for transmitting simultaneously a
90 plurality of telephonic and telegraphic messages, comprising for each message a pair of synchronously moving steel wires arranged one at the sending and the other at the receiving station, said wires at each station being arranged in a circle, the wires at each station being moved through
95 an arc of the circle at said station, means at the sending station for recording electric impulses magnetically on the different wires therein, an electro magnet rotating about the centre of each
100 of said circles and operative to pick up and record electric impulses on the different wires, a transmitting circuit including the two electro magnets and an amplifier, and receivers at the receiving station including means for picking up electric
105 impulses from the different wires.

LEON NEMIROVSKY.

35

110

40

115

45

120

50

125

55

130

60

135

65

140

70

145

75

150