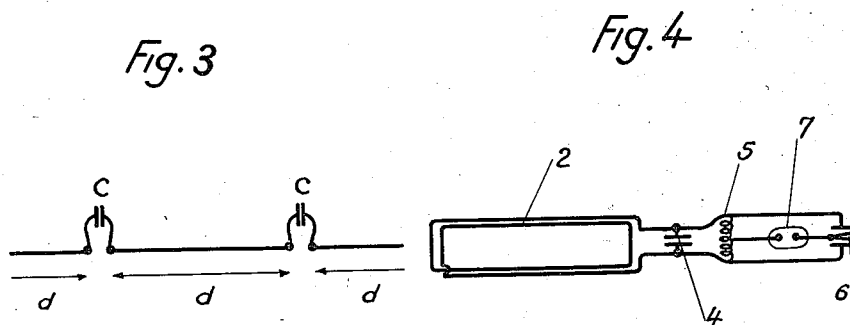
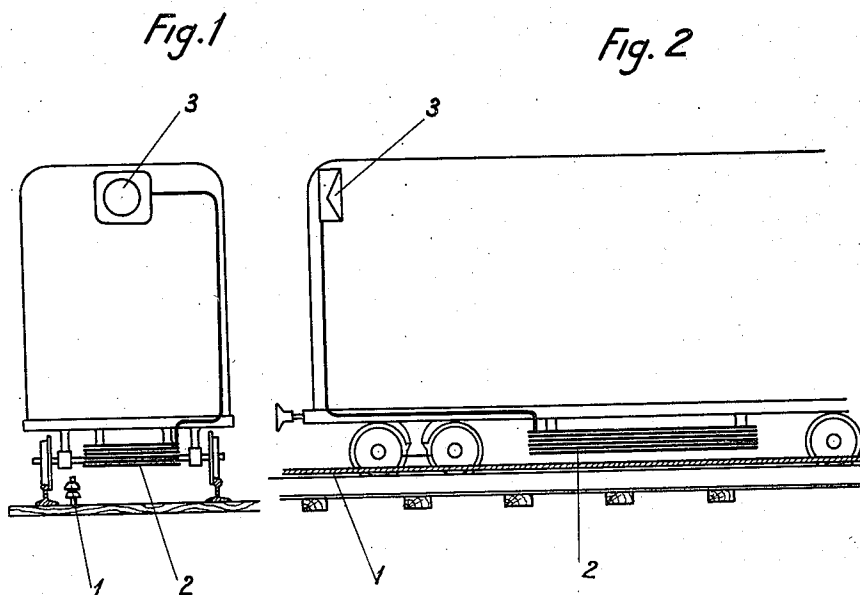


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H. CHIREIX

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PROCESS FOR COMMUNICATING WITH TRAINS IN MOTION
BY A HIGH FREQUENCY CURRENT AND APPLICATIONS
Filed May 4, 1934



INVENTOR
HENRI CHIREIX
BY *Haseltine, Lake & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE

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PROCESS FOR COMMUNICATING WITH
TRAINS IN MOTION BY A HIGH FRE-
QUENCY CURRENT AND APPLICATIONSHenri Chireix, Paris, France, assignor to Societe
Francaise Radio-Electrique, a corporation of
FranceApplication May 4, 1934, Serial No. 723,810
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4 Claims. (Cl. 246—8)

The present invention relates to a method of communicating with trains when they are in motion. The invention is applicable in particular to the distribution of public notices, of music and to the transmission of orders, signals, or the like.

The object of the invention is to effect the transmission of these notices or the like from stationary positions and to receive them by means of loudspeakers in the carriages while they are in motion or at rest, by employing simple apparatus taking up little space and requiring no appreciable upkeep. A further object is to effect with the train communication which is not interfered with by electric fluctuations arising from the power lines, motors, switches, sparking at the trolleys, etc.

It is known that the installation of wireless receivers in trains meets with numerous difficulties of this nature. It is also known that with such installations almost complete fading occurs in tunnels or stations. For this latter reason, wireless installations cannot under any circumstances be employed in underground railway systems.

The present invention overcomes these difficulties by the use alongside the track of a special line transmitting a modulated carrier current. According to a preferred embodiment of the invention, this carrier current is of high frequency and the line is composed of a series of elements tuned to this frequency in order to offer a minimum impedance. This arrangement permits the line to be easily charged and sufficient energy to be obtained, by induction in a frame located on the carriage, to supply directly a loudspeaker by imple rectification of the potential collected without intermediate amplification being necessary.

It will be appreciated that this process presents the double advantage of reducing to a minimum the apparatus which must be installed in the carriages and of permitting a transmission of greater power than the interferences which are caused by the electric equipment of the carriages, the adjacent transmission lines and the like.

The invention will be better understood by referring to the annexed figures and to the following description which describes by way of example only, one embodiment of the invention.

Figures 1 and 2 represent two vertical sections of a railway carriage equipped in accordance with the invention.

Figures 3 and 4 are diagrammatic views of the supply line and the receiver.

Referring to Figures 1 and 2, 1 is the high frequency line carrying the modulated carrier cur-

rent, 2 is the receiving frame and 3 is the receiver.

The frequency employed may be selected from the same order of values as the normal frequencies employed in radio-telephony, for example 10^5 to 10^6 cycles per second ($\lambda=300$ to 3,000 metres).

The line (Figure 3) is compensated for the selected frequency by means of condensers c arranged at intervals along the length thereof. The distance d between these condensers will be made much less than the wave length. d will, for example be made equal to

$$\frac{\lambda}{10}$$

If l is the self inductance of a section of line and ω the frequency, the capacity c will be determined so as to fulfill the resonance condition $\omega^2 lc = 1$. The impedance of the line will then be a minimum.

The frame which is carried on the railway carriage, will be arranged in such a manner that one of the larger sides thereof is as close as possible to the conductor. For reasons of convenience, the frame will preferably be given an elongated shape and furthermore it will be arranged horizontally or vertically.

Figure 4 shows a diagrammatic view of the receiver. The frame 2 is tuned to the frequency of the line by means of a condenser 4.

The modulated high frequency potential induced in this circuit will be sufficient to supply directly a loudspeaker 7 simply by detection and without intermediate amplification.

There is shown in Figure 4 a self inductance 5 with a central tapping and a double anode valve 6. It will of course be understood that this valve may be replaced in practice by a dry rectifier so that the receiver does not include a valve or any source of current.

The invention has been described assuming that the current to be transmitted is a telephone current and that the receiver is to operate a loudspeaker. It will be understood that the same installation can be employed in the transmission of orders or of telegraphic signals to a carriage while it is in motion. It will be sufficient in this case to transmit the signals to the high frequency line and to replace the loudspeaker by any suitable indicating or registering apparatus.

What I claim and desire to secure by Letters Patent of the United States is:—

1. System of communication between a signal transmitter and a mobile receiver installed in

a railway carriage running upon a railway track comprising in combination a communication line disposed along the railway track, means for feeding the said communication line with
 5 a modulated carrier current supplied by the transmitter, the communication line being composed of a series of elements tuned to the frequency of the carrier current, and a close inductive coupling between the communication line
 10 and the receiver, said receiver being provided upon said railway carriage with a rectifier immediately followed by a final signal output device in order to directly indicate a fully developed signal independently of any interposed amplifying
 15 means.

2. In a system of communication between a signal transmitter and a mobile loop receiver installed as part of the equipment of a railway carriage running upon a railway track and a communication line extending along said track, said
 20 loop feeding said receiver, the combination of means disposing the loop of said receiver in immediate proximity to said communication line, means for feeding a modulated high-frequency
 25 carrier wave to the communication line and means for tuning the loop and the communication line to said high-frequency carrier wave, said receiver being provided upon said railway carriage with a rectifier immediately followed by
 30 a final signal output device in order to directly indicate a fully developed signal independently of any interposed amplifying means.

3. In a system of communication between a

signal transmitter and a mobile loop receiver installed as part of the equipment of a railway carriage running upon a railway track and a communication line extending along said track, said loop feeding said receiver, the combination of
 5 means disposing the loop of said receiver in immediate proximity to said communication line, means for feeding a modulated high-frequency carrier wave to the communication line and
 10 means for tuning the loop and the communication line to said high-frequency carrier wave comprising series condensers interposed in said line, said receiver being provided upon said railway carriage with a rectifier immediately followed by a final signal output device in order to
 15 directly indicate a fully developed signal independently of any interposed amplifying means.

4. In a system of communication between a signal transmitter and a mobile loop receiver installed as part of the equipment of a railway carriage running upon a railway track and a communication line extending along said track, said
 20 loop feeding said receiver, the combination of means disposing the loop of said receiver in immediate proximity to said communication line, means for feeding a modulated high-frequency
 25 carrier wave to the communication line and means for tuning the loop and the communication line to said high-frequency carrier wave comprising a plurality of spaced series condensers interposed in said communication line and disposed at
 30 small distances in comparison with the carrier wave length used.

HENRI CHIREIX.