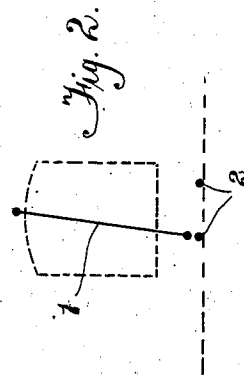
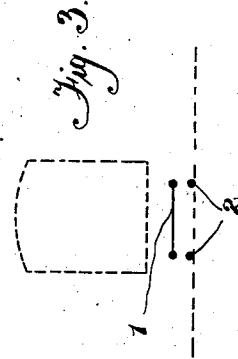
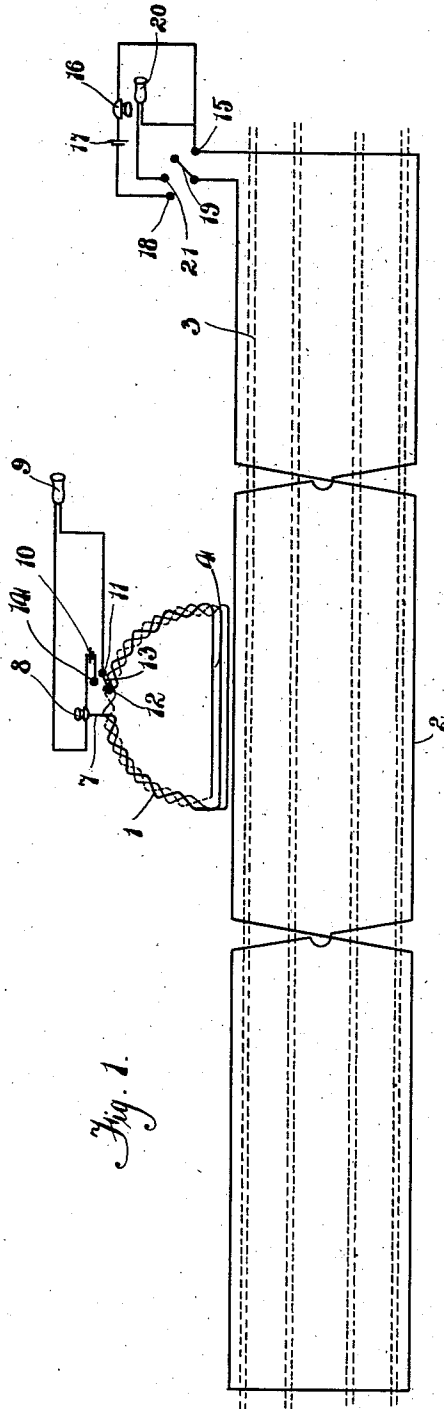


H. VON KRAMER.
INDUCTIVE TELEPHONE INSTALLATION.
APPLICATION FILED MAY 7, 1912.

1,189,317.

Patented July 4, 1916.



Witnesses
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UNITED STATES PATENT OFFICE.

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INDUCTIVE TELEPHONE INSTALLATION.

1,189,317.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HANS VON KRAMER, subject of the King of Great Britain, residing at 21 Wood End road, Erdington, Birmingham, in the county of Warwick, England, have invented a new and useful Inductive Telephone Installation; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention comprises improvements in inductive telephone installations and refers to that class of such in which the speaking connection to or from a circuit is obtained by means of a coil or frame having a number of wires in parallel relation and in proximity to a conductor, such coil creating an induced current in said conductor, the object of my said invention being to provide a means of telephony whereby a speaking connection may be established from a moving train to a line station or stations, or vice versa from a line station to a train, or for establishing a similar speaking connection between a movable circuit and a fixed circuit, such as on cars, boats, airships, lifts or the like hand or power propelled vehicles while they are in motion or temporarily at standstill, either between or among themselves, or between them and railway stations, roads, harbors, river banks, quays, buildings, or other stationary places, or between any of the above named vehicles and any stationary or portable telephone station or stations.

In the construction of a telephone installation for transmitting speech to or from a train or other movable vehicle it is essential that the conductors shall be absolutely free of all inductive connection with neighboring telegraph wires, earth currents or the like; for otherwise the induction of the railway telephone will pick up signals from other wires which will interrupt or prevent speech to or from the train.

Prior to my invention it has been proposed to employ an inductive system for signaling to and from a moving vehicle including a line wire laid parallel to the direction in which the train travels, said line wire being in circuit with telegraphic instruments, while a frame of coiled wires is carried on the vehicle having one limb in inductive relation with the line wire, said frame being also in circuit with telegraphic instruments whereby telegraphic signals may be transmitted to and from the moving vehicle. It has also

been proposed to provide an inductive telephonic apparatus for transmitting speech to and from a moving vehicle, such apparatus including a large coil with a plurality of turns of wire forming the fixed circuit, and a smaller coil carried by the vehicle, but each of these apparatus was liable to disturbance from neighboring telegraph, telephone or other circuits in the vicinity making speech impossible under circumstances now prevalent in civilized countries.

The object of the present invention is to overcome these defects and to provide an inductive telephone apparatus which may be used without disturbance under present conditions.

Referring to the drawings:—Figure 1. is a diagrammatic view illustrating the fixed and movable circuits arranged in accordance with my invention. Fig. 2. is a diagrammatic sectional view showing one manner in which the movable circuit might be arranged. Fig. 3. is a similar view to Fig. 2 showing a modified way of arranging the movable circuit.

In carrying my invention into practice as diagrammatically illustrated upon the accompanying drawings the movable circuit 1 is carried by the vehicle, as beneath the frame of a railway carriage or engine, while the circuit 2 is fixed. When applied to a railway train this circuit 2 is in the form of a separate conductor carried on the track with one limb between, or adjacent to the rails 3, indicated by dotted lines in Fig. 1.

The circuit 1 includes a rectangular or other insulated frame formed from a length or lengths of coiled wire, there being any suitable number of turns or wires, say twenty in the coil. One limb 4 of the coil is formed with its wires parallel to 2, the combined effect of these wires being to create a substantial induced current in the fixed circuit. The return parts of wires I have shown relatively coiled as I have found such to be very successful in practice. The limb 4 is laid as near to the line wire as possible as by suspending same beneath the carriage frame at a distance of about 18 inches above the line wire, the return part being as far as possible from the frame as for instance by mounting it on the top of the carriage, as illustrated at Fig. 2. Or the movable frame may be disposed in a horizontal position as illustrated in Fig. 3. As shown in Fig. 1 one

end 7 of the movable frame is connected to the telephone transmitter 8 which is connected to the telephone receiver 9 and to the battery 10, the receiver 9 being also connected to a contact 11. The other end 12 of the frame is connected to a switch 13 which is adapted to engage either the contact 11 or the contact 14 at will, said contact 14 being connected to the battery 10. When the switch engages the contact 11 the receiver 9 is in circuit with the frame, while when the switch engages the contact 14 the battery 10 and the transmitter 8 are in circuit with the frame.

Obviously when the switch engages the contact 11 the frame is in a condition for listening or receiving messages, while when it engages the contact 14 speech may be transmitted, it being only necessary to operate the switch to change over from speaking to listening.

The fixed circuit or line wire 2 may be many miles long providing it is of a nature not affected by earth currents, ordinary telegraph or telephone circuits, and may be connected to one or more line stations.

In order that the line circuit may be rendered non-inductive to neighboring telegraph wires and the like I cross the out and return portions at such intervals that the area inclosed between the two wires and the crossing is small enough to obviate inductive disturbance from telegraph wires.

One terminal 15 of the line wire is connected to a transmitter 16 connected to a bat-

tery 17, in turn connected to a contact 18 and obviously when the switch 19 engages the contact 18 the fixed circuit is in a condition for transmitting messages telephonically. The terminal 15 is also connected to the receiver 20 which is connected to a contact 21, and when the switch 19 engages the contact 21 the receiver is put into circuit for listening while the transmitting circuit is broken.

Obviously if two trains are equipped with my frames it will be possible to speak from one to the other even if widely separated.

What I claim then is:—

In an inductive telephone installation, the combination of a pair of parallel railroad tracks; vehicles therefor, a stationary circuit comprising a pair of conductors in series relationship mutually crossed at intervals and each having alternate parts laid near and parallel to the rails of said tracks; a movable circuit carried by each vehicle and comprising a plurality of long straight parallel wires in series relationship and disposed longitudinally beneath the vehicle in close proximity to said parts; and a telephone transmitter, a telephone receiver and a source of current in each of said circuits.

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

H. v. KRAMER.

Witnesses:

HAROLD J. HONERTON,
NORMAN S. BARLOW.