

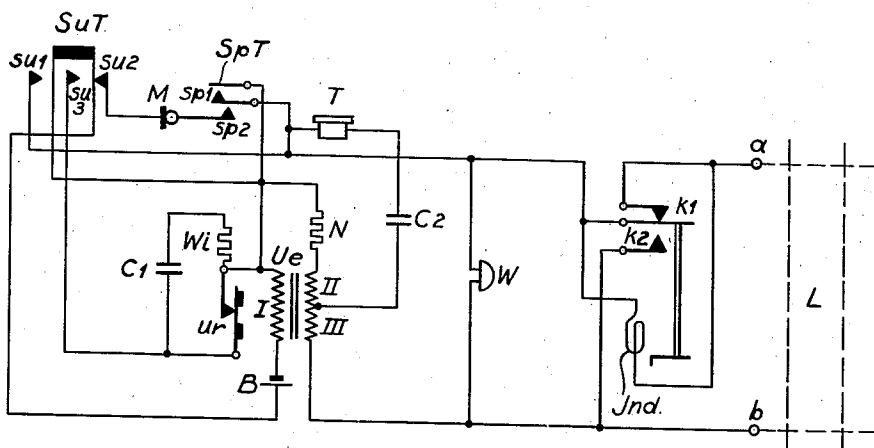
July 29, 1941.

M. KIESER

2,250,769

SIGNALING CIRCUIT

Filed Dec. 9, 1938



INVENTOR:
MAX KIESER

BY

Chas. H. Candy
ATTORNEY.

UNITED STATES PATENT OFFICE

2,250,769

SIGNALING CIRCUIT

Max Kieser, Zurich, Switzerland, assignor to
Albiswerk Zurich Aktiengesellschaft, Zurich-
Albisrieden, Switzerland

Application December 9, 1938, Serial No. 244,785
In Switzerland December 11, 1937

12 Claims. (Cl. 179—81)

This invention relates to circuit arrangements for telephone stations more especially field telephones. Such apparatus besides meeting the usual conditions have special requirements such as the prevention of the outgoing speech currents passing through the receiver and also the facility for buzzer signaling. The fulfilling of these requirements complicates the circuit and the object of the present invention is to simplify this which is attained by employing the induction coil as a transformer for the buzzer signals and providing the coil with several windings so arranged that the alternating currents produced by the buzzer or the microphone do not produce any audible effect on the telephone receiver of the home station.

The drawing shows, as an example, one way of carrying the invention into effect as applied to a so-called field telephone.

This is arranged for calling other stations provided with the usual ringer by means of a magneto. To call stations not furnished with ringers, the field telephone is equipped with a buzzer arrangement which, by means of the buzzer key *SuT* connects all the necessary contacts which consist of interrupter contact *ur* with a parallel spark-quenching circuit and the primary winding I of the induction coil *Ue* in series with the battery B.

If the magneto inductor is provided to call another station, then by turning the handle in known manner contact *k1* is opened and contact *k2* closed. The opening of *k1* cuts out the home ringer *W* from the lines *a—b*. Calling current to the distant station flows over the following path: magneto, line *a*, contact *k1* at the distant station, ringer *W* at this station, line *b*, contact *k2* of the calling station, magneto.

If the calling subscriber now presses the speaking key *SpT*, then the following current feed circuit for the microphone is closed: battery B, primary winding I of the induction coil *Ue*, contacts *Sp1*, *Sp2*, of the speaking key *SpT*, microphone *M*, contact *Su2* of the buzzer key *SuT*, battery B. When the microphone is spoken on to alternating voltages appear at the winding I of *Ue* and these are inductively transmitted via windings II and III of *Ue*.

The outgoing speaking currents flow over windings III, II of *Ue*, the line balancing network N, contact *sp1*, contact *k1*, line *a*, distant station, line *b*, winding III or *Ue*.

The telephone receiver *T* of the home station is not influenced by the speech currents since it is connected by condenser *c2* between the wind-

ings III and II of the induction coil and the upper line wire and windings II and III, the network N and the line L form a Wheatstone bridge arrangement one diagonal of which consists of the telephone receiver *T* with the condenser *C2* while across the other diagonal the induced microphone alternating voltage from the primary winding I of *Ue* is impressed. By suitably determining the balancing network N no potential difference exists at the terminals of the telephone receiver *T*. The line balancing network is, as a rule, embodied in the winding II by suitably dimensioning this or it is a special resistance winding wound on the induction coil.

The received speech currents flow as follows: line *a*, contact *k1*, telephone receiver *T*, condenser *C2*, winding III of the induction coil, line *b*.

If a subscriber wishes to send buzzer signals, he operates the buzzer key *SuT*. The speaking key is in the released position and the current feeding circuit to the microphone is thereby interrupted. Simultaneously a circuit is closed for the buzzer signals over contact *Su3*, as follows: battery B, winding I of induction coil *Ue*, interrupter contact *ur*, contact *Su3*, battery B. The contact *ur* is opened by energization of the winding I of the induction coil *Ue*, and the buzzer direct current is therefore interrupted; thus the winding I of *Ue* is without current and contact *ur* closes again. The winding I of the induction coil is again excited and contact *ur* opens once more. Winding I of the induction coil *Ue* operates with contact *ur* as a self-interrupter. To prevent sparking a resistance *Wi* and condenser *C1* is placed in parallel with *ur* thus forming a spark quenching circuit.

The current variations in the winding I of the induction coil *Ue* induce the windings II and III alternating currents which are transmitted to the line over the following circuit: windings II and III of the induction coil, line balancing network N, *Su1*, *k1*, line *a*, distant station, line *b*, windings III and II of the induction coil. As a result of the bridge arrangement the buzzer currents do not enter the telephone receiver.

What is claimed is:

1. In a telephone system, a substation having thereat instrumentalities for the transmission and reception of speech, a line outgoing from said substation, an induction coil for connecting said instrumentalities to said line, a normally closed contact on said coil adapted to be opened responsive to energization of one winding of said coil, a source of direct current, and means for

connecting said source, said contact and said one winding in series to operate as a buzzer.

2. In a telephone system, a substation having thereat instrumentalities for the transmission and reception of speech, a line outgoing from said substation, an induction coil for connecting said instrumentalities to said line, a normally closed contact on said coil adapted to be opened responsive to energization of one winding of said coil, a source of direct current, and for connecting said source, said contact and said one winding in series, said contact effective in said series circuit to repeatedly interrupt the current flow from said source through said one winding, thereby to generate an alternating current in another winding of said induction coil.

3. A telephone system as claimed in claim 2, wherein said instrumentalities include a receiver, and wherein said receiver is connected to said induction coil so that it is not energized by said alternating current.

4. In a telephone system, a substation having thereat instrumentalities for the transmission and reception of speech, a line outgoing from said substation, an induction coil for connecting said instrumentalities to said line, a manually operable device, and means controlled by said device for operating said induction coil to generate and transmit over said line a plurality of complete cycles of alternating current responsive to a single operation of said device.

5. In a telephone system, a substation having thereat instrumentalities for the transmission and reception of speech, a line outgoing from said substation, an induction coil for connecting said instrumentalities to said line, a circuit for one winding of said coil, a source of direct current, means for connecting said source to said circuit, said circuit containing a contact operated magnetically by said coil to cause the value of the current flowing through said one winding of said coil from said source to oscillate continuously during the time that said source is connected to said circuit.

6. In a telephone substation, an outgoing line, instrumentalities for the transmission and reception of speech, an induction coil, means for connecting said instrumentalities to said line through said coil, a local source of direct current, means for connecting said source to said coil to energize one of its windings, a contact operated responsive to the energization of said winding and cooperating with said winding to cause direct current from said source to traverse said winding pulsatingly, thereby to induce an alternating current in said line.

7. In a telephone system, a substation having thereat instrumentalities for the transmission and reception of speech, a line outgoing from said substation, an induction coil for connecting said instrumentalities to said line, a source of direct current for said coil, and self-interrupting means for said coil comprising a contact operated magnetically by said coil upon energization of

same by said source, said contact effective upon operation to cause the deenergization of said coil.

8. In a telephone substation, an outgoing line, an induction coil having a primary and two secondary windings, a receiver and one of said secondary windings connected in series across said line, a resistor and the other secondary winding connected in series and bridging said receiver to prevent actuation thereof by currents generated in said primary winding, a local source of direct current, and means controlled by said coil to cause pulsating current from said source to be generated in said primary winding.

9. In a telephone substation, an outgoing line, an induction coil having a primary and two secondary windings, a receiver and one of said secondary windings connected in series across said line, a resistor and the other secondary winding connected in series and bridging said receiver to prevent actuation thereof by currents generated in said primary winding, a local source of direct current, and means cooperating with said primary winding and said source to operate as a buzzer, thereby to transmit a signal over said line.

10. In a telephone substation, an outgoing line, an induction coil having a primary and two secondary windings, a receiver and one of said secondary windings connected in series across said line, a resistor and the other secondary winding connected in series and bridging said receiver to prevent actuation thereof by currents generated in said primary winding, a local source of direct current, a microphone, a contact controlled by said primary winding, means for connecting either said microphone or said contact in a series circuit including said source and said primary winding, said microphone when connected responding to sounds to generate undulating waves in said primary winding for transmission over said line, and said contact when connected cooperating with said primary winding to cause said primary winding to be traversed by current impulses from said source.

11. In combination, an induction coil, a source of direct current, means including said source for at times impressing an undulating current upon one of the windings of said coil thereby to induce a similar current in another winding thereof, and means operated by said coil at times to cause current from said source to flow pulsatingly through one of the windings of said coil.

12. In combination, an induction coil, a line connected thereto, a source of direct current, means including said source for at times impressing an undulating current upon one of the windings of said coil thereby to induce a corresponding current in said line, and means operated magnetically by said coil at times to cause current from said source to flow pulsatingly through said one winding thereby to induce an alternating current in said line.

MAX KIESER.