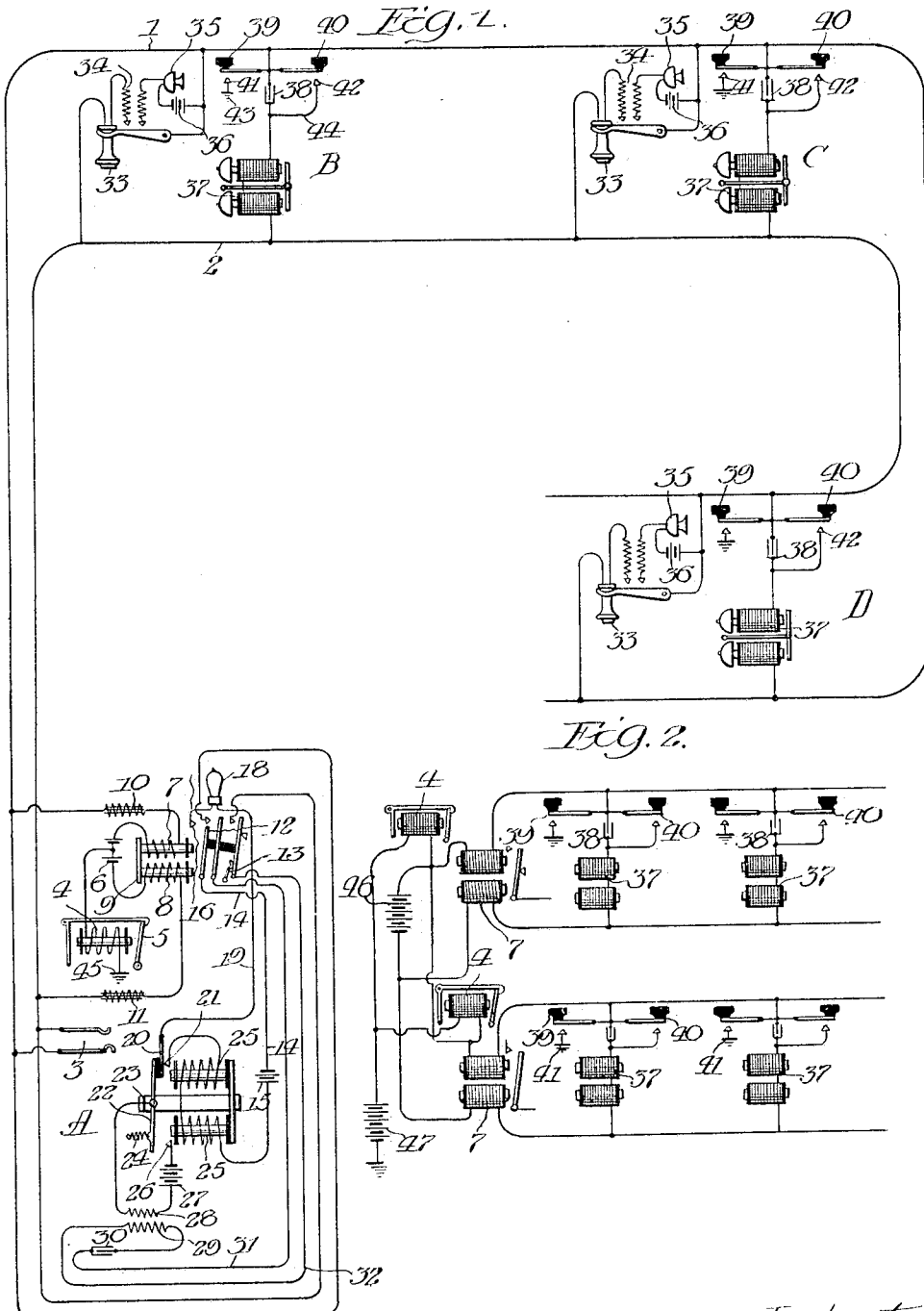


M. E. LAUNBRANCH.
 SIGNALING SYSTEM.
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1,117,864.

Patented Nov. 17, 1914.



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SIGNALING SYSTEM.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, MALCOLM E. LAUNBRANCH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Signaling Systems, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to signaling systems and has for its object the provision of an improved system in which a central station and a plurality of substations are used all on the same circuit.

It is an object of my invention to so arrange a system that the substations may signal among themselves by code ringing, and yet at the same time have means whereby they may call central without disturbing any of the other stations on the line. The arrangement is also such that when code ringing between themselves, the central station is not given a signal which indicates a call for the central station. In one of the forms of my invention, however, the central station may be provided with a signal so that the operator thereat may have supervision over the line, and which signal indicates when the line is being used for signaling purposes among the substations. This signal may also be of advantage in indicating to the operator at the central station any possible trouble on the line.

In the preferred form of the invention suitable appliances including a source of power are provided at the central station, and controlling devices are provided at each substation.

It is one of the objects of my invention when using this preferred form to eliminate the generating appliances at the substations.

My invention may of course be broadly applied and I do not limit it by the specific description herein, but I merely set forth a certain form of carrying out this invention. I will however describe specifically in the drawing two forms which my invention may take, in which drawing a circuit arrangement is set forth diagrammatically in Figure 1 and Fig. 2 shows a modification.

In this drawing I show a central station A, and substations B, C. Line wires 1 and 2 are utilized to unite all the stations. The line wires 1 and 2 preferably terminate at the central station in a jack 3, the ordinary

plug and cord connecting devices being omitted for the sake of clearness as they may be, for instance, any of the well known forms utilized for telephone central stations. At the central station I also have a drop 4 which is of the ordinary construction and by means of the shutter 5 indicates to the operator the desire of some subscriber on the line to have telephone connection through the exchange. A source of power preferably a battery 6 is provided at the central station and this is connected through coils 7 and 8 of a relay 9, the circuit thereafter extending through impedance coils 10 and 11 respectively to line wires 1 and 2. The impedance coils 10 and 11 are of such size as to prevent passage of voice currents therethrough. The relay 9 has an armature 12 under the control of a retractile spring 13. The relay is so arranged that when current flows through both of the coils 7 and 8 from the full battery 6, the armature 12 will be attracted. When, however, current flows through one coil only from a portion, say one-half of the cells of the battery, then the energization is not sufficient to actuate the armature 12. A wire 14 leads from the armature 12 to a battery 15.

The front contact 16 of the armature 12 is connected by means of a conductor 17 with a signal preferably a lamp 18. A conductor 19 extends from this signal to a contact 20 adapted for association with a second contact 21. These contacts 20 and 21 are under the control of an armature 22 of a current interrupter 23. A spring 24 normally holds the armature in such position as to maintain the circuit between springs 20 and 21 closed. The current interrupter has coils 25, 25 in series with the springs 20 and 21 and in series with the battery 15 so that the complete circuit through the device would be from conductor 19 to spring 20, spring 21, coils 25, battery 15, and conductor 14. Now, whenever the circuit is closed through the armature 12, and contact 16, armature 22 of the current interrupter vibrates. When this vibrating contact is periodically established between the armature 22 and a spring 26, this armature and contact spring are serially included in a circuit including a battery 27 and a primary winding 28 of a transformer. A secondary winding 29 is associated with the primary winding 28 and extends through a condenser 30 by means of the conductors 31 and 32 to the line wires 1 and 2.

It will thus be seen that when the armature 20 vibrates, the current from the battery 27 is periodically passed through the primary winding 28, which causes alternating current in the winding 29, and this alternating current is used for signaling purposes for the substations as will presently appear. At each substation, I may have the talking circuit comprising the receiver 33, induction coil 34, transmitter 35 and battery 36 in bridge of the line circuit. At each substation I also have a polarized ringer 37 bridged across the line preferably through the interposition of a condenser 38. I also have two controlling devices at each substation which may be push buttons consisting of the buttons 39 and 40 associated with contacts 41 and 42 respectively. Contact 41 is grounded at 43, and contact 42 extends by means of the conductor 44 to the line wire 2. Both contact buttons 39 and 40 are then connected with the line conductor 1.

The operation of the system will now be apparent. If the button 39 is actuated, then a circuit is established from ground 43 through contact 41, button 39, conductor 1, coil 10, coil 7, one-half of the battery 6, drop 4 to ground at 45. The circuit thus established will permit energization of the drop 4 to notify the central station operator that one of the substations desires communication through the exchange, and the ordinary appliances are brought into operation in association with the jack 3 to carry out the ordinary operations. The establishment of this circuit it will have been noted does not in any way signal the remaining substations. Now should it be desired at any substation to communicate with any other substation, it is unnecessary to disturb the central operator, and in such case the button 40 is used. Now whenever button 40 is manipulated, a circuit is established from contact 42 through conductor 44, signal 37, conductor 2, coil 11, coil 8, battery 6, coil 7, coil 10, conductor 1, to the button 40. This circuit does not cause energization of the drop 4, but causes energization of the relay 7 to thereby attract its armature 12. The attraction of the armature 12 causes operation of the current changing device 23 and alternating impulses are impressed on the line wires 1 and 2 to operate the substation signals 37. The impedance coils 10 and 11 prevent deflection of this alternating current through the relay 9. It will be seen that the substation signal receiving devices 37 thus operate during the time either one of the buttons 40 is depressed. Thus code signals may be sent between the stations as desired without affecting the drop 4 at the central station. The entire absence of generating equipment at the substations will

also be noted. The signal lamp 18 provided in view of the operator 18 has been referred to and this signal is designed to be illuminated whenever a button 40 is depressed, thus to indicate to the operator should she desire to exercise supervision over the line, whenever a call is being made. This signal likewise serves a second purpose in that should the lines become crossed or grounded, then this signal will be permanent to indicate this trouble so that it may be properly attended and removed.

In Fig. 2 I set forth a modification in which battery 46 may be a common battery for use with several lines and this battery 80 is employed in connection with the relays 7. I then provide a second common battery 47 which is used for operating the drops 4. In this manner it will be seen a separate battery for each line is not necessary as would be the case with the circuit shown in Fig. 1. The circuits established by means of the push buttons 39 and 40 and the operation in general are similar to the operation set forth in connection with Fig. 1.

The specific form of the invention thus set forth will indicate its nature, and while not limiting myself to the specific form set forth,

What I claim as new and desire to secure by Letters Patent is:

1. A signaling system having a plurality of stations all on the same circuit, a signal receiving device at each substation, a source of intermittent current supply adapted for association with said circuit, and means controlled at each substation to control the operation of said source and the association of said source with said circuit to operate said signal receiving devices in accordance with the operations of said means.
2. A signaling system having a plurality of stations all on the same circuit, a polarized signal receiving device at each substation, a source of intermittent current supply adapted for association with said circuit, and means controlled at each substation to control the operation of said source and the association of said source with said circuit to operate said signal receiving devices in accordance with the operations of said means.
3. A signaling system having a plurality of stations all on the same circuit, a signal receiving device at each substation, a source of alternating current supply adapted for association with said circuit, and means controlled at each substation to control the operation of said source and the association of said source with said circuit to operate said signal receiving devices in accordance with the operations of said means.
4. A signaling system having a plurality of stations all on the same circuit, a signal receiving device at each substation, bridged

across said circuit, means in said bridge to prevent operative passage of direct current therethrough, a source of current supply adapted for association with said circuit, and means controlled at each substation to control the association of said source with said circuit to operate said signal receiving devices in accordance with the operations of said means, said last aforesaid means including a switching device in a parallel circuit with said first aforesaid means.

5. A signaling system having a plurality of stations all on the same circuit, a signal receiving device at each substation bridged across said circuit, means in said bridge to prevent operative passage of direct current therethrough, a source of current supply adapted for association with said circuit, means controlled at each substation to control the association of said source with said circuit to operate said signal receiving devices in accordance with the operations of said means, said last aforesaid means including a switching device in a parallel circuit with said first aforesaid means, and a relay to control the association of said source of current with said circuit.

6. A system of the character described having a central station and a plurality of substations associated together by means of an electric circuit, a signal receiving device at the central station, signal receiving devices at each substation, current supplying means at the central station, and means controlled at a substation to operate the said signal at the central station to the exclusion of the substation signal receiving devices, and to operate the substation signal receiving devices to the exclusion of the central station signal receiving device.

7. A system of the character described having a central station and a plurality of substations associated together by means of an electric circuit, a signal receiving device at the central station, signal receiving devices at each substation, current supplying means at the central station, and means controlled at a substation to operate the said signal at the central station to the exclusion of the substation signal receiving devices and to operate the substation signal receiving devices to the exclusion of the central station signal receiving device through the agency of said current supplying means aforesaid.

8. A system of the character described having a central station and a plurality of substations associated together by means of an electric circuit, a signal receiving device at the central station, signal receiving devices at each substation, current supplying means at the central station, means controlled at a substation to operate the said signal at the central station to the exclusion

of the substation signal receiving devices and to operate the substation signal receiving devices to the exclusion of the central station signal receiving device through the agency of said current supplying means aforesaid, and an auxiliary signal at the central station, controlled by said current supplying means to indicate whenever said current supplying means are furnishing current to the circuit aforesaid.

9. A system of the character described having a central station and a plurality of substations united by means of an electric circuit, a signal receiving device at each substation, a signal receiving device at the central station, means at the central station for impressing currents onto the circuit to operate said substation signal receiving devices, a switching device at each substation to control said means, and a second switching device at each substation to control the signal receiving device at the central station independently of said means.

10. A system of the character described having a plurality of stations all on the same circuit, a signal receiving device at each substation, bridged across said circuit, a condenser in said bridge to prevent operative passage of direct current therethrough, a source of current supply adapted for association with said circuit, and means controlled at each substation to control the association of said source with said circuit to operate said signal receiving devices in accordance with the operations of said means, said last aforesaid means including a switching device in parallel circuit with said condenser.

11. A signaling system having a plurality of stations all on the same circuit, a signal receiving device at each substation bridged across said circuit, a condenser in said bridge to prevent operative passage of direct current therethrough, a source of current supply adapted for association with said circuit, and means controlled at each substation to control the association of said source with said circuit to operate said signal receiving devices in accordance with the operations of said means, said last aforesaid means including a switching device in a parallel circuit with said condenser and in series with its associated signal receiving device.

12. A signaling system having a plurality of stations all on the same circuit, a signal receiving device at each substation bridged across said circuit, a central station, a source of current thereat, a relay for associating said source with said circuit, and a line signal at the central station having a winding one terminal of which is connected with an intermediate portion of the winding of said relay.

13. A signaling system having a plurality

of stations all on the same circuit, a signal receiving device at each substation bridged across said circuit, a central station, a source of current thereat, a relay for associating
 5 said source with said circuit, a line signal at the central station having a winding one terminal of which is connected with an intermediate portion of the winding of said relay, and means at each substation to control the operations of said relay.

10 14. A signaling system having a plurality of stations all on the same circuit, a signal receiving device at each substation bridged across said circuit, a central station, a source
 15 of current thereat, a relay for associating said source with said circuit, a line signal at the central station having a winding one terminal of which is connected with an intermediate portion of the winding of said
 20 relay, and means at each substation to control the operations of said relay and said line signal.

15 15. A signaling system having a plurality of stations all on the same circuit, a signal receiving device at each such station bridged across said circuit, a central station, a current supply thereat, a relay connected in bridge of said circuit for associating said current supply with said circuit to operate said signals, a line signal
 30 at the central station having a winding one terminal of which is connected with an intermediate portion of the winding of said relay and the other terminal connected to
 35 said current supply, a switching device at

each substation for operating said relay by said current supply to the exclusion of the line signal, and a second switching device at each substation having a return path to said current supply for operating said line signal to the exclusion of said relay.

16. A signaling system having a plurality of stations all on the same line circuit, a signal receiving device at each such station bridged across said line, a central station, a relay, a source of current in circuit with said relay and the line, a line signal at the central station having a winding one terminal of which is connected with an intermediate portion of the winding of said relay, a grounded source of current having its ungrounded pole connected to the other terminal of said line signal, a switching device at each substation for closing a circuit including the first source of current
 50 and said relay for energizing said relay, circuit connections closed by said relay for causing the operation of said signal receiving devices, and a second switching device at each substation having a return path to
 60 the grounded pole of said second source for operating said line signal.

In testimony whereof, I hereunto subscribe my name this 16th day of October, A. D., 1911.

MALCOLM E. LAUNBRANCH.

Witnesses:

A. S. DENNISON,
 HAZEL JONES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."