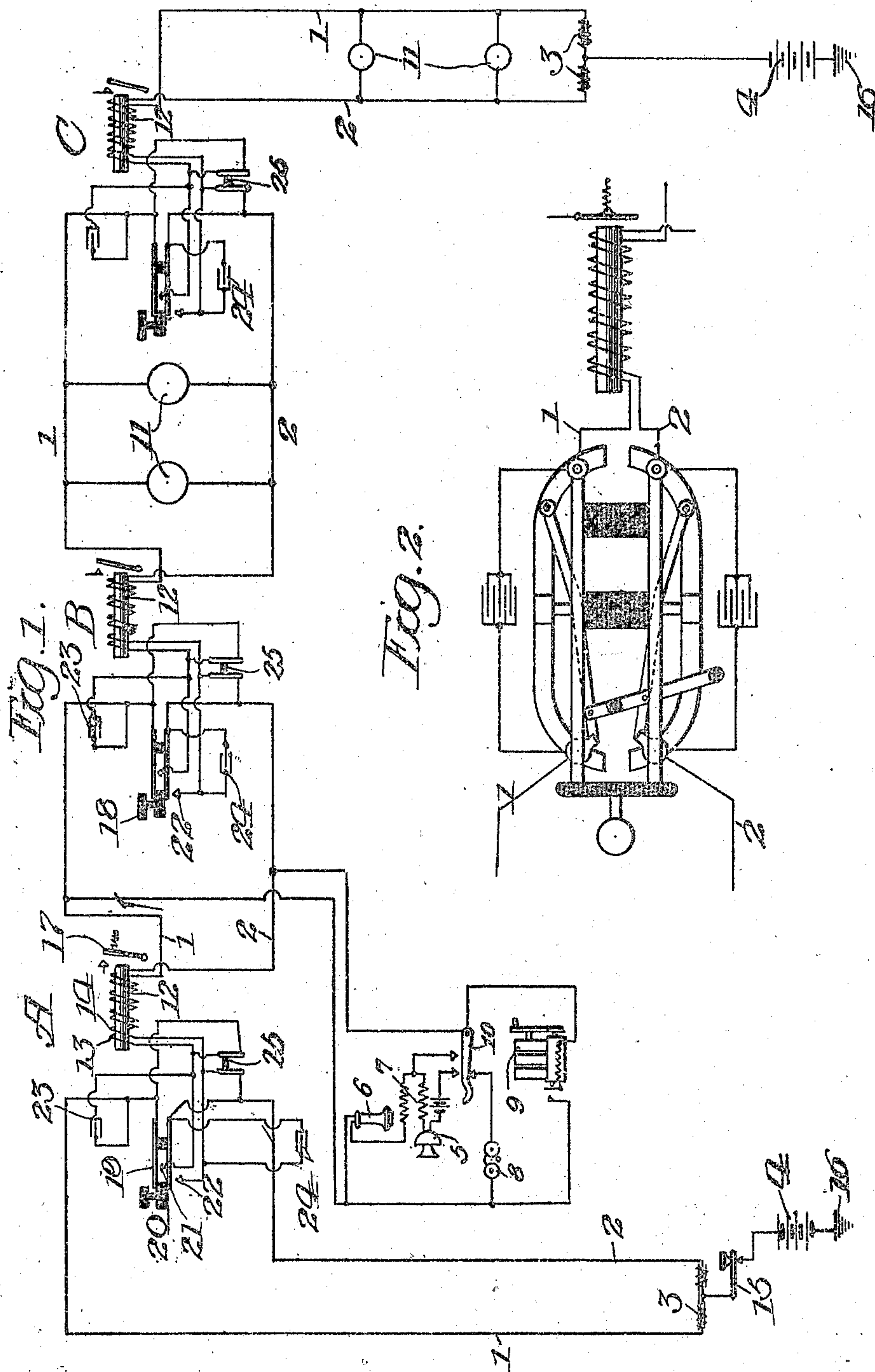


O. T. LADEMAN.
 SIGNALING SYSTEM.
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957,973.

Patented May 17, 1910.



Witnesses
 Chas. W. Wiggins
 John Elliott

Inventor
 Otto T. Lademan
 by Max W. Zabel
 Atty.

UNITED STATES PATENT OFFICE.

OTTO T. LADEMAN, OF MILWAUKEE, WISCONSIN.

SIGNALING SYSTEM.

957,973.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, OTTO T. LADEMAN, citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, 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 is of particular utility in providing service between a plurality of stations on the same line circuit.

Generally speaking, my invention contemplates a metallic line circuit with telephones adapted for conversation metallically over said line circuit, and the interposition of relays at various points in said metallic circuit, which relays are so wound as to be perfectly non-inductive with respect to the metallic circuit, and which relays can be operated over the two metallic conductors in parallel and a suitable return circuit. These relays, of course, can be used for a multitude of different selective signaling services, and I have here shown in this application merely a telegraphic relay equipment to indicate the manner of operation of said relays.

I will now describe my invention more in detail by reference to the accompanying drawing, illustrating the accompanying embodiment thereof, in which—

Figure 1 represents diagrammatically a line circuit embodying the features of my invention; and Fig. 2 represents a telegraph calling key and the relay associated therewith.

Like characters of reference indicate like parts throughout the different figures.

I have shown two line wires, 1 and 2, which connect various stations A, B and C, which are united by these line conductors, and which terminate in impedance coils 3, 3, that are connected at their central points to batteries 4, 4, to ground. These impedance coils 3 are of such high impedance that telephone conversation can be satisfactorily carried on over said metallic circuit, and I have shown associated with station A, a substation telephone set consisting of the transmitter 5, receiver 6, induction coil 7, signal 8, generator 9, and switch-hook 10, which telephone set is metallically connected to the line conductors 1 and 2, and of which telephone sets I have diagram-

matically indicated a plurality, throughout such telephone circuit, by a circle, which circle has been given the reference numeral 11.

In addition to the telephone instruments referred to, which are connected to the line wires, I also arrange these line wires to permit of additional facilities, which I will now describe more in detail, and which signaling facilities consist primarily of relays 12, 12, which relays are provided with two windings, 13 and 14, which windings are in parallel, one winding being each included in the line conductors 1 and 2. These windings are so arranged that when currents traverse over said conductors 1 and 2 in a metallic circuit, their magnetic effects neutralize each other in the core of the relay 12, and do not influence its armature, but if, on the other hand, currents, for instance, from the battery 4, be impressed on the line by the key 15, using the line wires 1 and 2, in parallel and the earth as a return circuit, as shown at 16, then the currents will travel the two windings 13 and 14 cumulatively, and thus actuate the armature 17. This armature 17 can, of course, be used to operate any desired signal or signal-controlling means, as is well understood. For simplicity of illustration, however, I will assume that the relay 12 acts likewise in the capacity of sounder, in order to assign it some specific purpose in this application. Thus, it will be seen that telegraphic signals from the key 15 can be received at all stations, A, B and C, without influencing the telephone circuit, and the telephoning can be carried on without influencing the relays, the relays included in the line circuit being non-inductive as respects the voice currents which traverse the circuits 1 and 2 in metallic circuit.

Now, at each of the stations, A, B and C, of course, it is of advantage to supply operating means which permit the said station to operate the relays 12 from each said station, and to this end, I employ double break keys 18, which have contact springs 19 and 20, one of which is included in each line conductor, and which are associated with contact points 21 and 22, respectively. Thus, when the key is depressed, battery current flows over both line conductors 1 and 2 to actuate the relay 12, it being preferable, in this instance, that the battery current flow equally over both wires, in order not to influence the telephone stations. From this, it will be seen, that the relay 12 can be oper-

ated from either station without interfering or influencing the metallic telephone conversations going on over line wires 1 and 2. Condensers 23 and 24 are bridged around the contacts of the key, so that the telephone circuit suffers no interruption when the key is being operated short-circuiting switches 25 are provided which are to be opened whenever a key 18 is actuated.

While I have herein shown and particularly described the preferred embodiment of my invention, I do not limit myself to the precise construction and arrangement herein set forth, but

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A signaling system comprising a plurality of stations united by a metallic circuit, telephones metallically connected to said circuit, signal-controlling relays interposed at intervals in said metallic circuit, arranged non-inductively with respect to said metallic circuit, means for sending currents over the two line conductors of said metallic circuit in parallel to operate said relays, and a return circuit over which said relays are operative.

2. A signaling system comprising a plurality of stations united by a metallic circuit, telephones associated with said circuit, signal-controlling relays interposed at intervals in said metallic circuit, arranged non-inductively with respect to said metallic circuit, means for sending currents over the two line conductors of said metallic circuit in parallel to operate said relays, and a return circuit over which said relays are operative.

3. A signaling system comprising a plurality of stations united by a metallic circuit, telephones associated with said circuit, signal-controlling relays interposed at intervals in said metallic circuit, arranged non-inductively with respect to said metallic circuit, a return circuit over which said relays are operative, means for sending currents over the two line conductors of said metallic circuit in parallel to operate said relays, and switching devices for operating said relays.

4. A signaling system comprising a plurality of stations united by a metallic circuit, telephones associated with said circuit, signal-controlling relays interposed at intervals in said metallic circuit, arranged non-inductively with respect to said metallic circuit, a return circuit over which said relays are operative, means for sending currents over the two line conductors of said metallic circuit in parallel to operate said relays, and switching devices at each of a plurality of stations for operating said relays.

5. A signaling system comprising a plurality of stations united by a metallic circuit,

telephones associated with said circuit, signal-controlling relays interposed at intervals in said metallic circuit, each having two windings differentially arranged with respect to said metallic circuit, means for sending currents over the two line conductors of said metallic circuit in parallel to operate said relays, and a return circuit over which said relays are operative.

6. A signaling system comprising a plurality of stations united by a metallic circuit, telephones associated with said circuit, signal-controlling relays interposed at intervals in said metallic circuit, each having two windings differentially arranged with respect to said metallic circuit, a return circuit over which said relays are operative, means for sending currents over the two line conductors of said metallic circuit in parallel to operate said relays, and switching devices for operating said relays.

7. A signaling system comprising a plurality of stations united by a metallic circuit, telephones associated with said circuit, signal-controlling relays interposed at intervals in said metallic circuit, each having two windings differentially arranged with respect to said metallic circuit, a return circuit over which said relays are operative, means for sending currents over the two line conductors of said metallic circuit in parallel to operate said relays, and switching devices at each of a plurality of stations for operating said relays.

8. A signaling system comprising a plurality of stations united by a metallic circuit, telephones associated with said circuit, signal-controlling relays interposed at intervals in said metallic circuit, each having two windings differentially arranged with respect to said metallic circuit, one winding being included in each line conductor, means for sending currents over the two line conductors of said metallic circuit in parallel to operate said relays, and a return circuit over which said relays are operative.

9. A signaling system comprising a plurality of stations united by a metallic circuit, telephones associated with said circuit, signal-controlling relays interposed at intervals in said metallic circuit, each having two windings differentially arranged with respect to said metallic circuit, one winding being included in each line conductor, a return circuit over which said relays are operative, means for sending currents over the two line conductors of said metallic circuit in parallel to operate said relays, and switching devices for operating said relays.

10. A signaling system comprising a plurality of stations united by a metallic circuit, telephones associated with said circuit, signal-controlling relays interposed at intervals in said metallic circuit, each having two windings differentially arranged with respect

to said metallic circuit, one winding being
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cuit over which said relays are operative,
means for sending currents over the two line
5 conductors of said metallic circuit in parallel
to operate said relays, and switching devices
at each of a plurality of stations for oper-
ating said relays.

In witness whereof, I hereunto subscribe
my name this 23rd day of February A. D., 10
1909.

OTTO T. LADEMAN.

Witnesses:

MAX W. ZABEL,
JEAN ELLIOTT.