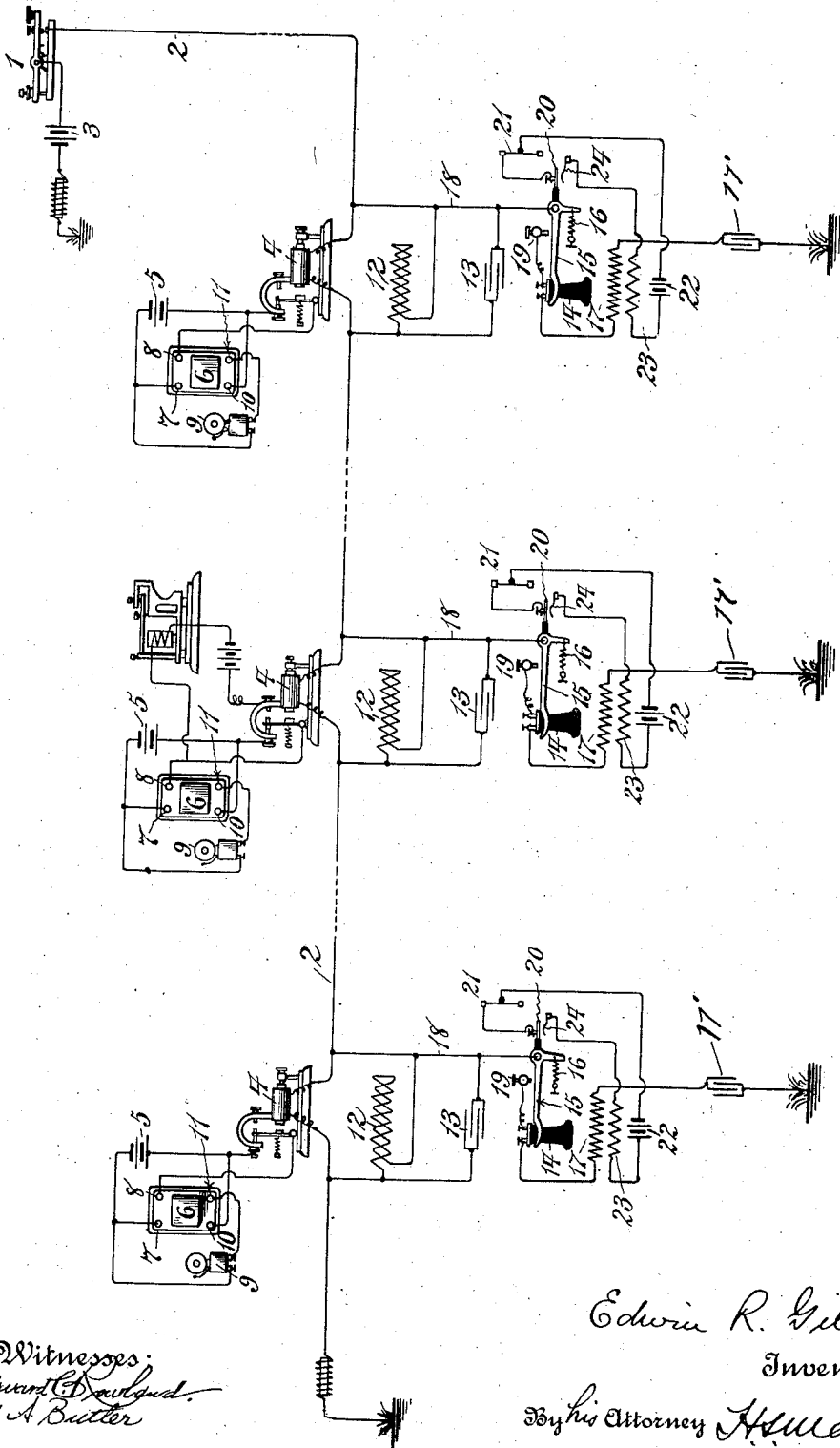


E. R. GILL.
 COMBINED TELEPHONIC AND TELEGRAPHIC SYSTEM.
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Patented Mar. 26, 1912



Witnesses:
 Edward C. Paulson.
 M. A. Butler

Edwin R. Gill
 Inventor
 By his Attorney H. Mackay

UNITED STATES PATENT OFFICE.

EDWIN R. GILL, OF YONKERS, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
HOWARD E. MERRELL, OF NEW YORK, N. Y., AND ORLO J. HAMLIN, OF SMETHPORT,
PENNSYLVANIA.

COMBINED TELEPHONIC AND TELEGRAPHIC SYSTEM.

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To all whom it may concern:

Be it known that I, EDWIN R. GILL, a citizen of the United States, residing in the city of Yonkers, county of Westchester, and State of New York, have invented a certain new and useful Improvement in Combined Telephonic and Telegraphic Systems, of which the following is a specification.

This invention has especial relation to an improved system whereby any number of points along a telegraph line of indefinite length can be brought rapidly into telephonic communication with any other, and in such a manner as to cause no disturbance or annoyance to stations along the line not intended to be reached at the moment.

In railway practice particularly it often becomes important for a train despatcher, for instance, to be able to reach some employee upon the line and converse with him, so that conditions at or near the point where the employee is located may be ascertained and orders given accordingly. Again many occasions arise when it becomes important for an employee somewhere along the line to communicate at once with headquarters under circumstances permitting rapid conversation. To accomplish this purpose it has been sought to establish a telephonic system extending parallel to the railway lines and terminating in the despatcher's office, but the mode of construction and arrangement of such systems has hitherto been such as to involve such a serious dissipation of electric energy, that, in practice, it has not been found possible to use more than a very limited number of instruments and the scope of usefulness of telephones so used is therefore very restricted.

By the use of my present invention the number of instruments which may be used is without limit and at the same time conversation is perfectly clear. I accomplish this by providing at intervals along a telegraph line a separate telephonic outfit at each station intended to be reached, and arranging each outfit so that it is in circuit with the telegraph line only when conversation is going on. At the same time, the relays at these stations, which are as usual in series on the telegraph line, are provided with suitable bridging means, such as condensers and high non-inductive resistances, which, while

affording a path around said relays for the undulatory telephonic currents, do not divert the telegraphing current from said relays. Each station is moreover supplied with a selective calling apparatus operated preferably by the relays, whereby any one station may be called without disturbing any other. This arrangement of apparatus does not involve dispersion of energy by condensers grounded on one side, which, when used afford such a serious obstacle to extended use of telephones.

An illustrative embodiment of my invention is shown in diagram in the accompanying drawing which represents the equipment of a train despatcher's office and two distant stations united by a single telegraph line provided with my invention.

The despatcher's telegraphing and calling key is shown at 1, and near it is indicated the telephonic apparatus at the despatcher's office. The main telegraphic line is indicated at 2 and the main line battery at 3. Wherever desired along the line are placed relays 4, in series with the main line and with each other and each relay 4 through an insulated back stop controls circuit through a local battery 5 and the operative parts of a selective circuit closer 6, whose terminals are at 7 and 8. These devices act in any well known manner to close the circuit of a call bell 9 or equivalent device through terminals 10 and 11.

As shown, the selective circuit closers are operated by circuits closed on the backward movement of their respective relays, and they are so constructed in a well known manner that the normal use of the main telegraph wire 2 for ordinary telegraphing is not interfered with by and does not itself interfere with operation of the selective devices.

At each station is placed a telephonic outfit, the various outfits being in multiple arc; and, in the form shown this arrangement is produced by grounding each telephone on one side, while its other side is connected with the telegraph wire 2.

It is to be understood that, although only three selective circuit closers are shown with their associated apparatus, any desired number may be used on the same circuit.

In the preferred arrangement shown each

relay 4 is bridged by non-inductive coils of high resistance 12, in multiple arc with condensers 13.

The telephone outfit comprises a receiver 14 hung upon a pivoted lever 15 which is lifted by the spring 16 when the receiver is removed. In series with the receiver is the secondary coil 17 of the usual transformer, and the free terminal of said coil is grounded through a condenser 17' as shown. During conversation circuit is closed from the telegraph wire through the branch wire 18 of each telephone in circuit, by each lever 15 to the conducting terminal 19, through the receiver 14, coil 17 and by the ground back to the line.

Near the grounded ends of the main line choke coils are introduced to properly confine the telephonic currents.

I prefer to keep the telephone batteries normally out of circuit and to bring them into circuit automatically when the receiver is lifted. For this purpose I provide an insulated metal blade 20 on the rear of the lever 15, which blade is electrically connected as shown with the transmitter 21. The opposite side of this transmitter is connected to one pole of the local battery 22, the other pole of which is connected to the primary coil 23 of the telephone transformer. The remaining terminal of said primary coil is connected to the conducting spring contact 24 whereby circuit is closed through the battery, transmitter and transformer primary when the lever 15 is tilted by the spring 16 on removal of the receiver.

In using the apparatus described, the key 1 is employed in the usual manner to operate the particular selective circuit closer 6 at the station to be called. This causes the proper bell 9 or equivalent device to ring so as to attract the attention of the person called, who thereupon lifts the receiver at his station, thus connecting his telephonic outfit with the telegraphic line. The person calling, having in the meantime raised his own receiver, conversation can be carried on between the two. As soon as the conversation terminates, both receivers are hung up and both telephonic outfits are once more out of connection with the line.

It is to be understood that my invention covers any arrangement, whereby electrical connection between the telegraphic line and each telephonic outfit is normally broken and whereby this connection is produced at will when it is desired to use the telephone in

conversation. The arrangement above described has a decided advantage over multiple arc telephonic systems which include calling means in each telephonic branch, in that the dispersion of energy caused by the presence of these calling devices is avoided and it is therefore possible to greatly increase the number of telephones which can be used along a single telegraphic line.

What I claim is—

1. A telegraphic line in combination with a number of selectively operated signaling devices at intervals along said line, a telephonic outfit adjacent to each signaling device normally disconnected from the telegraphic line, means for operatively connecting each telephonic outfit to the telegraphic line so that when two or more of said outfits are so connected they will be in multiple arc, and means for controlling said selectively operated signaling devices over said telegraphic line, said last named means including a circuit independent of all of said telephonic outfits, substantially as described.

2. A telegraphic line in combination with a number of selectively operated signaling devices at intervals along said line, a telephone receiver and transformer secondary in series grounded on one side through a condenser, a telephone transmitter, a local battery and transformer primary on a normally open circuit, a normally open switch for simultaneously connecting said receiver and transformer secondary to said telegraphic line and closing the local transmitter circuit, and means for operating said selectively operated signaling devices over said telegraphic line, said last named means including a circuit independent of all of said telephonic circuits, substantially as described.

3. A telegraphic line, a number of selectively operated signaling devices at intervals along said line, relays in series along said line for controlling said selectively operated signals, condensers in shunt around each of said relays, a complete local telephonic outfit adjacent to each signaling device and normally disconnected from the telegraphic line and means for operatively connecting each telephonic outfit to the telegraphic line so that when two or more of said outfits are so connected they will be in multiple arc, substantially as described.

EDWIN R. GILL.

Witnesses:

H. S. MacKAYE,
M. A. BUTLER.