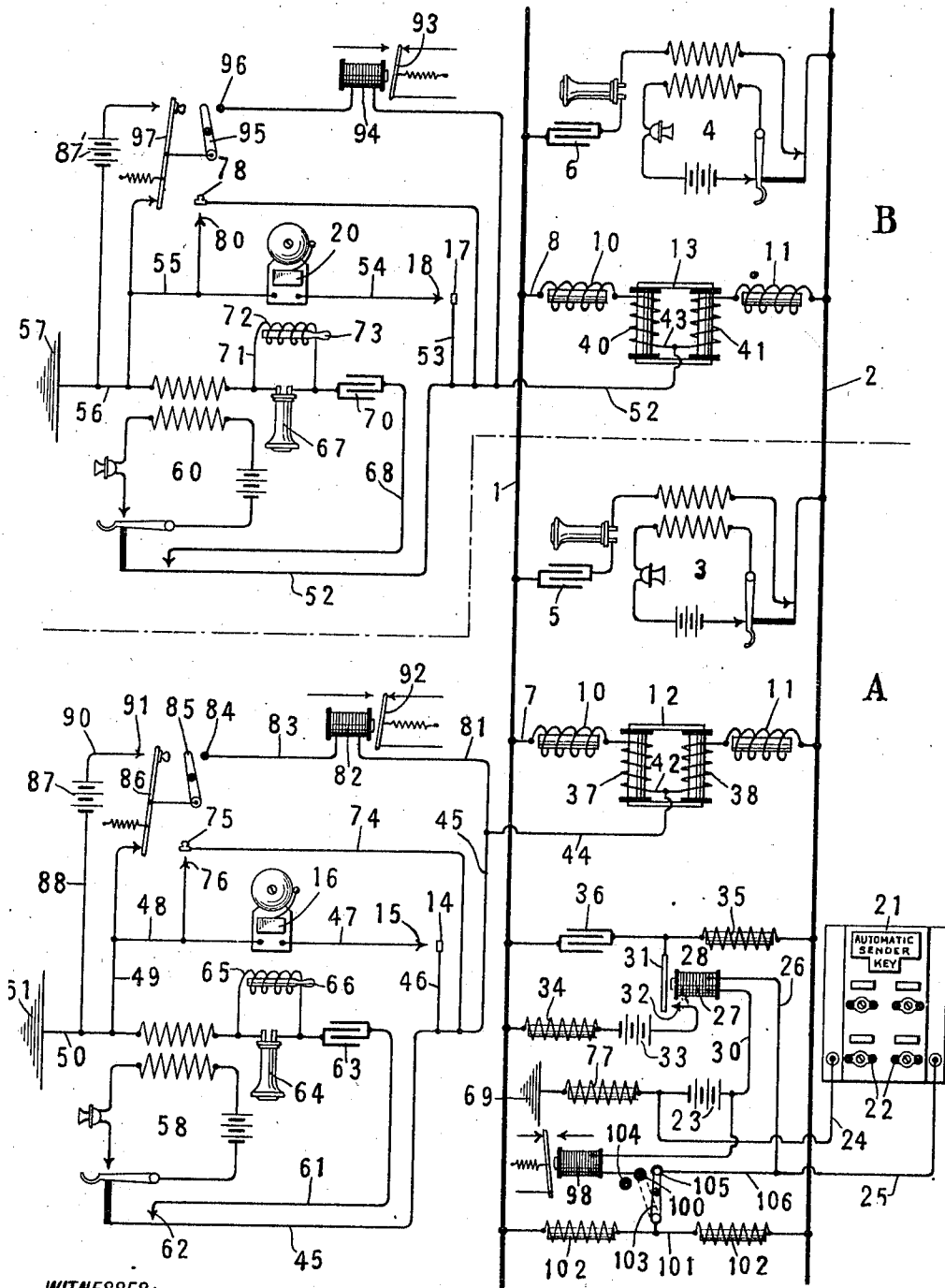


E. R. GILL.
SELECTIVE SIGNALING SYSTEM.
APPLICATION FILED MAR. 28, 1910.

1,004,567.

Patented Oct. 3, 1911.



WITNESSES:

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SELECTIVE SIGNALING SYSTEM.

1,004,567.

Specification of Letters Patent.

Patented Oct. 3, 1911.

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To all whom it may concern:

Be it known that I, EDWIN R. GILL, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Selective Signaling Systems, of which the following is a specification.

This invention relates broadly to signaling systems, and specifically to such systems as are particularly adapted for telephonic train despatching work.

One of the important objects of the invention is to increase and vary the character of service which may be had in connection with a pair of metallic conductors which form the opposite sides of the telephone line.

Another object is to so construct and connect a pair of conductors forming opposite sides of a line with a third conductor which may be ground, that selective signaling, telephone and telegraph apparatus may be operated simultaneously and independently between distant stations without interference.

A further object is to so arrange telephone apparatus and various auxiliary devices that extraneous sounds produced by the operation of the various electrical apparatus and transmitted over the conducting mediums will be prevented from interfering with the normal operation of the telephones.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts hereinafter described and the scope of the application of which will be indicated in the appended claims.

The accompanying drawing illustrates diagrammatically preferred embodiment of my present invention.

Referring now to this drawing, A denotes a calling station and B one of various called stations which may be arranged along a telephone line, the opposite sides of which are indicated at 1 and 2. Located, in the present instance, in bridge of this telephone line in each of the stations A and B is a telephone apparatus denoted generally by the numerals 3 and 4 respectively, each ap-

paratus comprising the usual transmitter, receiver, primary, secondary and receiver hook, the latter making and breaking the usual connections whereby the local batteries are applied. Condensers as at 5 and 6 are interposed in the bridge of the telephone apparatus 3 and 4. Located in bridges 7 and 8 of the telephone line and flanked on either side by inductance or choke coils 10 and 11 are selectors 12 and 13 respectively. Although any approved type of selective apparatus may be employed in this relation, the type preferred is that disclosed in Letters Patent of the United States No. 906,523, issued to me December 15th, 1908.

It will be understood that when a selective apparatus of this type is operated by a proper series of codal impulses, a circuit will be closed to effect the operation of a local call signal or to perform some other similar signaling function. In the present instance, selector 12 is adapted when operated to cause contact member 14 to engage with the contact 15, thereby to close a circuit through an ordinary electric call bell 16, which circuit will hereinafter be more fully described. The selector 13, in this instance, causes the contact member 17 to engage with the contact 18 whereby a similar circuit hereinafter to be described is closed and the electric call bell 20 operated.

21 indicates an automatic sender key of the type illustrated in my prior application Serial No. 451,663, filed September 4th, 1908, to which reference is made for more detailed description. It is sufficient for the purposes of the present specification to state that this sender key apparatus is provided with a plurality of keys such as is shown at 22, each of which when operated is adapted through apparatus presently to be described to cause a particular series of codal impulses impressed upon the main line, and it will be further understood that there is a key provided for each of the various stations along the line and that selective apparatus at each station is responsive to a particular series of codal impulses which are caused to be impressed upon the line by the key provided for that station in the calling station.

As shown herein, the various keys in the apparatus 21 are adapted to close a circuit including the battery 23, wires 24, 25, 26, coil 27 of the relay, denoted generally at 28, and wire 30 which leads to the opposite side of the battery 23. When the circuit just described is closed by one of the keys the battery 23 is applied thereto, relay 28 operated and the armature 31 thereof caused to engage the contact 32 whereby the battery 33 is applied to the main line through the inductance coil 34. A similar inductance coil 35 is provided between side 2 of the line and the armature 31 of the relay 28 and a condenser 36 is interposed between the side 1 and said armature.

Each of the selectors 12 and 13 is provided with a pair of coils 37, 38, and 40, 41 respectively, said coils being connected by wires 42 and 43.

Referring now to the part of the system provided in the station A, a wire 44 leads from the wire 42 which is located in the center or balanced part or bridge of the selector, said wire 44 leading to the wire 45 which in turn leads to the wire 46. Wire 46 leads to contact member 14, whence the circuit extends through contact 15, wire 47, electric call bell 16, wire 48, wire 49 and wire 50 to the ground 51. Thus it will be understood that when the selector 12 closes the circuit at 14 and 15, the call bell 16 will be operated by the current supplied from battery 23 which is taken off intermediate the coils 37, 38 by the wire 44. The circuit then extends through wire 45, wire 46, contacts 14, 15, wire 47 to the call bell 16; then through wires 48, 49 and 50 to ground 51, then to ground 69, inductance coil 77, battery 23, thence through wire 30, coil 27, wire 26, contact 105, switch arm 103, thence through the bridging wire 101 to the opposite side of the line, thence through the inductance coils 10 and 11 and coils 27 and 28. If the switch arm 103 is swung into engagement with the contact 100 another current will pass through the coil 98, contact 100, switch arm 103, and the bridging wire 101 to the opposite side of the line, instead of by way of the coil 27 as has been above described. In a similar manner call bell 20 is actuated by current taken off from wire 43 intermediate coils 40 and 41 by wires 52, 53, contact member 17, contact member 18, wires 54, 55, 56 and ground 57.

58 denotes generally a telephone apparatus which may be located in the calling station A, and 60 similarly denotes another telephone apparatus which may be located in the called station B. Leading to the secondary of the telephone apparatus 58 is a wire 61 provided with the contact 62, which when the receiver is off the hook contacts with the wire 45. Wire 61 is provided with a condenser 63 and after passing through the

receiver 64 and secondary is grounded to the wire 50. Connected in shunt about the telephone receiver 64 is a choke coil 65 provided with an adjustable core 66, the function of this coil being to allow currents other than the high tension speaking currents to pass about the receiver, thus protecting the same against noises.

Leading to the telephone receiver 67 of the apparatus 60 is a wire 68 which makes electrical connection with the wire 52 when the receiver is off the hook, wire 68 passing through the condenser 70 the receiver 67 and secondary to ground. Shunted about the receiver 67 is a wire 71 which includes an inductance coil 72 which is provided with an adjustable core 73, the function of which is similar to the coil 65 which has been heretofore described.

Leading from the wire 45 is a wire 74 provided with contact member 75 which co-operates with the contact 76 to close the circuit leading from the wire 42 intermediate the coils 37, 38 to ground. Contacts 75 and 76, when in engagement, will close a circuit through ground 69 and inductance coil 77 to actuate the relay 28 whereby the battery 33 is applied to the line and the selectors operated thereby in accordance with the particular series of codal impulses produced by the contacts 75 and 76. It will be understood that for the contact 75 and 76 might be substituted an automatic sender key apparatus such as is illustrated at 21. Similarly, contacts 78 and 80 in the station B may be actuated to close a circuit through ground which will actuate the relay 28 to apply the battery 33 to the line whereby the selective apparatus will be operated.

Referring to the apparatus located in the station A, 81 is a wire which leads to a relay coil 82 and leading from this coil is a wire 83 which terminates in a contact member 84, and with which contact member co-operates a switch arm 85 connected with the telegraphic sender key 86.

87 represents the local battery for the telegraphic apparatus and leading from this battery to the wire 50 is a wire 88, the wire 90 which leads to the battery being provided with the contact 91 which when the sender key 86 is engaged therewith, the switch arm 85 having been engaged with the contact 84, closes a circuit through ground which will actuate the armature 92 of the relay 82 and also the armature 93 of the telegraphic relay 94 in station B assuming, of course, that the telegraphic switch arm 95 has been engaged with the contact 96.

In order that the telegraph operator at either of the keys 86 or 97 may communicate telegraphically with the train despatcher in the station a relay is provided at 98, one terminal of the coil of which is connected with the wire 30, and the other terminal

with a contact point 100. Located in a bridge 101 of the main line and provided with the inductance coils 102 is a switch arm 103 which is adapted to cooperate with any of the contacts 100, 104 or 105. Contact 104 is a dead contact, and contact 105 is connected with a wire 106 which, in turn, is connected with the wire 26.

Having thus described the construction, arrangement and relation of the various instrumentalities which comprise this embodiment of my invention, the operation thereof may now be understood: When the operator in the calling station is desirous of calling one of the distant stations he simply operates one of the sender keys 22 thereby closing the circuit which operates the relay 28, as has been hereinbefore described, the armature 31 engaging the contact 32 whereby the line battery 33 is applied thereto as will be understood. A particular series of codal impulses having been impressed upon the line the selective apparatus responsive thereto is actuated, say for instance, that located in the station B. Contact 17 is thereby caused to engage with contact 18 whereby the call bell 20 will be operated. This will inform the operator in station B that the operator at the main line station wishes to communicate with him and telephonic communication will then be had by means of the telephone apparatus 3 and 4, the metallic circuit being utilized for this purpose.

When an operator in any of the stations desires to use the telephones denoted at 58 or 60, either of the buttons 75 or 78 may be caused to engage with its cooperating contact, whereby a circuit will be closed through ground to operate the relay 28 and apply the battery 33 to the line whereby the sending of the proper series of impulses will operate the selective apparatus at the station called to close the circuit through the calling signal. Telephone communication, may then be had, say between the telephone apparatus 58 and 60, the sides 1 and 2 of the line acting as a common conductor and cooperating with ground to establish the telephonic circuit.

When it is desired to utilize the system for telegraphic purposes, the station desired is called in the usual manner as by operating the contacts 75 and 76 whereby the local call signal at station B will be operated. The switch arms 85 and 95 are then operated to engage respectively with the contacts 84 and 96 whereby the telegraphic sender key 86 will be caused to operate the relay 92. The relay 94 will thereby be operated by means of the circuit comprising sides 1 and 2 of the line as a common conductor and ground. When key 97 is operated, switches 85 and 95 having been closed, relays 82 and 94 will be operated by the following current: Beginning with the battery 87' through

key 97, switch arm 95, contact 96, relay 94, wires 52 and 43, coils 40 and 41, coils 10 and 11, to the sides 1 and 2 of the line; thence through coils 10 and 11 of the selector in the station A, coils 37, 38, wires 42, 44, wire 81, relay 82, wire 83, contact 84, switch arm 85, key 86, wires 49 and 50 to ground; then through ground 57 and wire 56 back to battery 87'. When either of the operators with the train despatcher, a signal may be transmitted selectively which will notify the train despatcher who will then move switch arm 103 to contact 100. This will permit relay 98 to be operated without effecting an operation of relay 28.

By the arrangement of the various instrumentalities as above described the telephone apparatus at two or more of the bridging stations may be in use at the same time that two or more grounded telephones are being used without interfering with each other. Or two or more of the bridging stations may be in use and at the same time local grounded stations may be in telegraphic communication with each other without interfering. So also may bridging telephones be in use while calling is going on for either of the grounded or bridging stations without interference. It will also be noted that when the local grounded stations are not in use the line is free from any disturbance which might arise through such grounded conditions. Any difficulty which might be encountered by using such grounded circuits such as noises produced by induction in neighboring circuits may be substantially eliminated by providing the choke coils around the receivers 64 and 67 as heretofore described.

The train despatcher at the central office, when he wishes to control the calling, independent of the local, grounded or bridging stations, may move the switch arm 103 to contact 104, and thereby break the circuit of the battery through the central relay to ground thereby, making it inoperative to ground at local stations. The various retard coils across the metallic pair or telephone line are for preventing the telephone sound waves from crossing. Retard coils 102 are employed for reducing the noises reaching the telephone line through the grounded contacts and the coils 34 and 35 together with the condenser 36 are used for applying the battery pulsations to the line silently.

The use of selectors for calling enables the operators to call each other or be called selectively and only when the grounded circuits are in use are those circuits operative or connected with the line. In other words the line, when grounded stations are not in use, is always clear for testing or other purposes.

It will be noted that the coils of the selectors perform a double function in that they operate as inductance coils for the grounded circuits and reduce the noises in the telephone therein. And it should be further noted that since the grounded circuits are taken off the bridge or balanced part of the selector the operation of the latter are in no wise affected.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which as a matter of language, might be said to fall therebetween.

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

1. In a system of the class described, in combination, a line comprising a metallic pair, telephones connected therewith, means connected with said line for selectively calling said telephones, ground connections common to said pair, and telephones in said ground connections.

2. In a system of the class described, in combination, a line comprising a metallic pair, telephones connected therewith, means connected with said line for selectively calling said telephones, ground connections common to said pair, telephones in said ground connection, and means in said ground connection for operating said selective calling means.

3. In a system of the class described, in combination, a line comprising a metallic pair, a set of telephones connected therewith, ground connections common to both sides, a set of telephones in said ground connections, selective calling means for the telephones in the ground set, and means in said ground connections for determining the operation of the selective calling means.

4. In a system of the class described, in combination, a line comprising a pair of metallic sides, a set of telephones connected therewith, ground connections common to both sides of the line, a set of telephones in said ground connections, a common means for calling the telephones of said sets, and means cooperating with said line and with said ground connections to operate said selective means independently.

5. In a system of the class described, in combination, a line comprising a pair of

metallic sides, a set of telephones connected with said line, means for selectively calling said telephones, ground connections for said line, telephones in said ground connections, and means whereby said last mentioned telephones and said selective calling means may be simultaneously independently operated.

6. In a system of the class described, in combination, a line comprising a pair of metallic sides, a set of telephones connected with said line, ground connections for said line, means whereby the telephones of said respective sets may be independently intercommunicative, and means for selectively calling the telephones of each set.

7. In a system of the class described, in combination, a line comprising a pair of metallic sides, a set of telephones connected with said line, ground connections for said line, means whereby the telephones of said respective sets may be independently intercommunicative, means for selectively calling the telephones of each set, and means cooperating with said line and said ground connections for determining the operation of said selective calling means.

8. In a system of the class described, in combination, a line comprising a pair of metallic sides, telephone apparatus connected with said line, a plurality of ground connections common to the opposite sides of said line, telephones in each of said ground connections, selective calling means for said telephones connected to the opposite sides of said line, and independent means cooperating with said line and with said ground connection for determining the operation of said selective calling means.

9. In a system of the class described, in combination a line comprising a pair of metallic sides, a set of telephones connected with said line, ground connections for said line, telephonic and telegraphic apparatus in said ground connections and operable thereover for one side of the circuit, and means whereby telephone apparatus connected with said line, with said ground connections and said telegraphic apparatus may be independently operated.

10. In a system of the class described, in combination, a line comprising a pair of metallic sides, telephone apparatus connected with said line, a plurality of ground connections, telegraphic apparatus in said ground connections and operable thereover for one side of the circuit, and means whereby said telephones and said telegraphic apparatus may be independently operated.

11. In a system of the class described, in combination, a line comprising a pair of metallic sides, telephone apparatus connected with said line, a plurality of ground connections, telegraphic apparatus in said ground connections and operable thereover for one side of the circuit, and means where-

by said telephones and said telegraphic apparatus may be independently simultaneously operated.

12. In an apparatus of the class described, in combination, a line comprising a pair of metallic sides, telephone apparatus connected with said line, selective calling apparatus connected with said line, means coöperating with said line for determining the operation of said selective calling apparatus, ground connections from the sides of said line, telegraphic apparatus in said ground connections, and means in said ground connections for determining the operation of said selective calling means.

13. In a system of the class described, in combination, a line comprising a pair of metallic sides, a set of telephones in bridge of said line, a set of selective calling devices in bridge of said line, a connection forming a bridge between the opposite sides of said line and ground, and a set of telephones in said last named bridge connections.

14. In a system of the class described, in combination, a line comprising a pair of metallic sides, a set of telephones in bridge of said line, a set of selective calling devices in bridge of said line, a connection forming a bridge between the opposite sides of said line and ground, a set of telephones in said last named bridge connection, and means in said bridge connections for determining the operation of said selective calling apparatus.

15. In a system of the class described, in combination, a line comprising a pair of opposed metallic sides, a set of telephones connected with said line, ground connections for said line common to the opposite sides thereof, telegraphic apparatus located in said ground connections and operable thereover for one side of the circuit, and means whereby said telephonic and telegraphic apparatus may be independently simultaneously operated.

16. In a system of the class described, in combination, a line comprising a pair of metallic sides, selective calling apparatus connected with the opposite sides of said line, connections between the opposite sides of said line and the ground, telegraphic apparatus in said ground connections, telephones connected with said line, and means

whereby said telegraphic apparatus and said selective calling apparatus may be independently simultaneously operated.

17. In a system of the class described, in combination, a line comprising a pair of metallic sides, telephonic apparatus connected with said line, selective signaling means connected with said line, a plurality of normally open connections between said line and ground including telephonic and telegraphic apparatus, said selective apparatus being adapted to effect a closure of said connections.

18. In a system of the class described, in combination, a line comprising a pair of metallic sides, a plurality of telephones connected with said line, a plurality of normally open connections between said line and ground, telephonic apparatus in said connections, and selecting means for closing said connections.

19. In a system of the class described, in combination, a line comprising a pair of metallic sides, a plurality of telephones connected with said line, a plurality of normally open connections between said line and ground, telephonic apparatus in said connections, and means for selectively closing said connections.

20. In a system of the class described, in combination, a line comprising a pair of metallic sides, a selector comprising a pair of coils connected in a normally closed bridge of said line, a wire connecting said coils, a connection leading from said wire to ground, and telephones in said connection.

21. In a system of the class described, in combination, a line comprising a pair of metallic sides, a selector comprising a pair of coils, a wire connecting said coils, a normally open connection between said wire and ground, and telephones and a local call signal in said connection, said connection being adapted to be closed by the operation of said selector.

In testimony whereof I affix my signature in the presence of two witnesses.

EDWIN R. GILL.

Witnesses:

CHARLES N. SIGISON,
ESTHER A. HENNESEY.