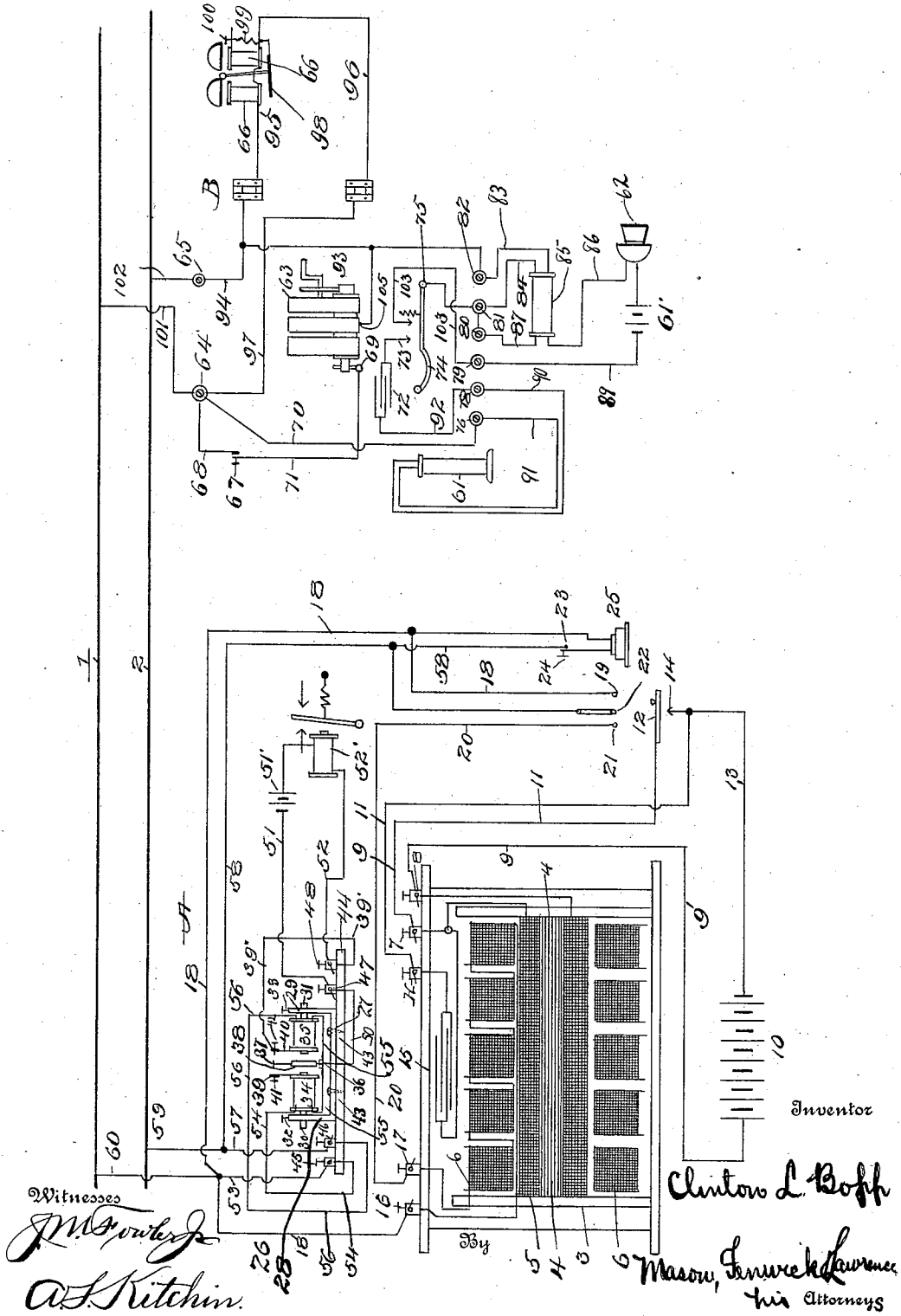


C. L. BOPP.
 TELEPHONE AND TELEGRAPH COMBINATION SYSTEM.
 APPLICATION FILED MAR. 23, 1907.

1,016,202.

Patented Jan. 30, 1912.



UNITED STATES PATENT OFFICE.

CLINTON L. BOPP, OF HAWKEYE, IOWA, ASSIGNOR OF ONE-FOURTH TO FREDERICK STRAATE AND ONE-EIGHTH TO JOHN MORAN, OF WAUKON, IOWA.

TELEPHONE AND TELEGRAPH COMBINATION SYSTEM.

1,016,202.

Specification of Letters Patent.

Patented Jan. 30, 1912.

Application filed March 23, 1907. Serial No. 364,030.

To all whom it may concern:

Be it known that I, CLINTON L. BOPP, a citizen of the United States, residing at Hawkeye, in the county of Fayette and State of Iowa, have invented certain new and useful Improvements in Telephone and Telegraph Combination Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in means for using the same line wires for telephonic and telegraphic messages, and means for sending messages over the line wires.

The invention comprises the production of an improved telephone set and an improved telegraph set, comprising means for sending messages at the same time over the same wire or at different times over the same wire as may be desired.

In the accompanying drawing:—The figure represents a diagrammatic view of a pair of line wires, a telegraph set connected thereto, and a telephone set connected thereto.

In providing a device formed according to the present invention, either one or two line wires may be used as desirable, two being preferable, as the same forms a complete metallic circuit both for the telegraph instrument as well as the telephone. If desirable one wire may be used and the return permitted to pass through the earth.

In the drawings I have shown one embodiment of my invention in which are seen line wires 1 and 2. Connected to the line wires is a telegraph set A and a telephone set B. In the drawings I have shown one telegraph set A and one telephone set B, but it will be evident that the telephone and telegraph sets must be duplicated in order to send messages, that is another set similar to the telegraph set A is provided somewhere along the lines 1 and 2 to receive any message that may be transmitted from set A, and another telephone set positioned at any desired point along lines 1 and 2 for receiving or transmitting message to or from set B.

In referring more particularly to the telegraph set A, 3 indicates a transforming induction coil of any desired type, but I pref-

erably use a coil of the same construction as fully explained and described in my co-pending application Serial No. 283,818, filed Oct. 21, 1905. Coil 3 is provided with a soft iron core 4, a winding of comparatively large wire 5, and a secondary winding of comparatively small wire 6. Winding 5 is connected to binding posts 7 and 8 in any desired manner. A wire 9 connects binding post 8 to one side of the source of current of any description, and a wire 11 connects binding post 7 to an operator's key 12. A wire 13 connects the contact point 14 of the operator's key 12 to the source of current 10. In order to lessen or entirely kill the sparking at point 14 a suitable condenser 15 bridges the same by being connected to binding posts 7 and 8. From this it will be seen that whenever the circuit is closed by operating the operator's key 12, a pulsation of current will pass through the comparatively large winding 5 of the induction coil 3, and will generate a current in winding 6. When contact is again broken at the operator's key 12, current will cease to flow from the winding 5 which will cause a reverse current to be generated in winding 6 and thus giving at each closing and opening of the operator's key 12 a complete cycle or induced current in winding 6.

Winding 6 is connected in any desired way to binding posts 16 and 17. From binding post 16 a wire 18 extends to a contact member 19, and a wire 20 extends from binding post 17 to a contact point 21 which is positioned near contact point 19 so that a switch as 22 may be pivotally mounted between said points and be adapted to contact with each for switching the current in any desired direction. Connected to wires 18 and 19 is a second contact point 23 that is adapted to contact with a listening key 24 for conveying current to a receiver 25 that is adapted to receive sound from telephone set B which will be more fully hereinafter described.

Connected to induction coil 3 is a polarized relay 26. The relay 26 is provided with a substantially inverted U-shaped magnet 27 preferably a permanent magnet which has secured to the legs 28 and 29 thereof adjustable pole pieces 30 and 31. The pole pieces 30 and 31 are preferably passed through suitable apertures in members 28 and 29 and are held in any desired

position by securing means as set screws 32 and 33. Mounted upon the pole pieces 30 and 31 are solenoids 34 and 35 for assisting the permanent magnet 27 in projecting a magnetic flux from the ends of the pole pieces or for retarding the projection of a magnetic flux as may be desired. Secured to magnet 27 is a pivot plate 36 which has pivotally mounted therein a tongue or pivot 37 that carries an armature 38 preferably a magnet. By providing a magnet, as armature 38, the pivotally mounted tongue 37 will only respond or operate by current from a single direction. Secured to the windings of the solenoids 34 and 35 are supports 39 and 40 formed from any desirable insulating material. Supports 39 and 40 are provided near their upper end with adjusting members 41 and 42 for regulating the amount of swing that is given to the tongue 37.

Magnet 27 is secured in any desired manner as by screws 43 to a suitable base board or supporting member 44. Upon each side of magnet 27 are positioned binding posts 45, 46, 47, and 48. From binding post 48 the wire 39' leads to and is connected with adjusting member 42, which when tongue 37 is brought in contact therewith will complete a circuit through the tongue 37, magnet 38 wire 50, binding post 47, wire 51, battery 51', a sounder 52' of any desired type, and wire 52. It will thus be seen whenever a current passes through solenoid 35 in such a direction as to attract armature 38 a circuit will be formed for the sounder connected to wires 51 and 52. As soon as the current ceases to flow in solenoid 35, armature 38 will be repelled from polar extension 31 and consequently break the circuit at 42. When the current is again passed through solenoid 35 the armature 38 will again be attracted and close the circuit at 42 which again operates the sounder positioned between wires 51 and 52. The sounder will be operated every time a pulsation is allowed to pass through solenoid 35 in such direction as to attract armature 38. If a current should pass through solenoid 35 in an opposite direction, it will be evident that armature 38 will not be attracted and consequently the sounder positioned between wires 51 and 52 will not be operated.

When it is desired to send a message the operator's key 12 is opened and closed in the usual manner and in the opening and closing thereof an alternating current is taken from binding posts 16 and 17 as heretofore described. Before operating key 12, switch 22 is brought into contact with contact point 21 and consequently into communication with wire 20. When switch 22 has thus been closed and key 12 depressed a current will flow from binding post 16 through

wire 18, wire 53, binding post 45, wire 54 to solenoid 34, from solenoid 34 through wire 55 to solenoid 35, and from solenoid 35 through wire 56, binding post 46 through wire 57, from wire 57 to wire 58, from wire 58 through switch 22, contact point 21, wire 20 through binding post 17 and back to windings 6 in the induction coil 3. When key 12 is released a current will be passed through the circuit just traced in a reverse direction as will be evident, and as will be evident one of the currents generated will energize solenoid 35 in such a way as to attract armature 38 and close the circuit of the sounder positioned between wires 51 and 52 by bringing in contact tongue 37 and adjusting member 42. The other current will, of course, not have any effect upon solenoid 35 but will cause solenoid 34 to more firmly attract armature 38. By alternately depressing and releasing key 12 a current will be provided for solenoid 35 for connecting the circuit of the sounder positioned between wires 51 and 52 so that the sounder will be operated at every movement of key 12. At the same time that current is sent through coil 35 from the secondary windings 6, a current is taken off wire 58 by wire 59 which is connected to line wire 2. From wire 59 current is permitted to pass over line wire 2 to enter a telegraph set similar to telegraph set A, through the same back to line wire 1, wires 60, and 18 to binding post 16, from which it is adapted to enter winding 6.

When it is desirable the switch 22 may be left midway between contact points 21 and 19 which will disconnect transformer 3 from the relay 26. The relay 26, however, will be in connection with line wires 1 and 2 and ready to receive any current therefrom. The current therefrom will pass through solenoids 34 and 35 and if the same is in the correct direction will attract armature 38 so as to make contact point 37 contact with adjusting member 42 for closing the circuit of the sounder positioned between wires 51 and 52. If current should come over lines 1 and 2 and pass through solenoids 34 and 35 in a reverse direction to the current required for attracting armature 38, armature 38 would remain in contact with the polar extension 30 and would consequently not affect the sounder positioned between wires 51 and 52.

It will be observed that current passing in one direction over wires 1 and 2 will cause solenoid 35 to attract armature 38 and current traversing wires 1 and 2 in the reverse direction will cause solenoid 35 to repulse armature 38 and cause solenoid 34 to attract armature 38. If the current passing over wires 1 and 2 causes armature 38 to be attracted by solenoid 33 the sounder between wires 51 and 52 would be operated,

but if the current passing over wires 1 and 2 is in the reversed direction contact point 37 will be held from adjusting member 42 and consequently no circuit will be formed for the sounder located between wires 51 and 52.

A telephone set B is provided with a receiver of any desired construction 61 and a transmitter 62 of any desired or usual construction. In providing a telephone set according to the present invention, I provide a generator 63 which is adapted to give a pulsating current either positive or negative at will. The generator 63 is adapted to provide current for the polarized bell 66. Bell 66 is what is known as a selective bell or ringing movement, and is designed to respond to pulsating current flowing in one direction only. An armature 98 is provided for polarized bell 66, and a spring 99 and a set screw 100 for regulating the movement thereof. When it is desired to ring bell 66, push button 67 is closed and current will flow from point 69 of generator 63 to wire 71, button 67, wire 68, binding posts 64, wire 97, wire 96, bell 66, wire 95, wire 93, back to generator 63, through connecting member 105. At the same time the current is flowing in this circuit, current will flow from 69 through wire 71, push button 67, wire 68, wire 101, line wire 1 through a bell similar to 66 in another telephone set similar to telephone set B, back through line wire 2, wire 102, binding post 65, wire 93 through binding post 105 to generator 63. From this it will be observed that generator 63 and bell 66 are connected to binding posts 64 and 65, and current is provided for bell 66 whenever push button 67 is closed. Connected to binding posts 64 and 65 are also a receiver 61 and transmitter 62, together with an induction coil of any usual or preferred type 85 and a receiver hook 74. When it is desired to send a message from telephone set B to another telephone set similar to set B connected to line wires 1 and 2, contact is made at push button 67 and the signal bells 66 are rung and then the contact at button 67 is broken and receiver 61 is removed from hook 74. When receiver 61 is removed from hook 74 circuit will be completed by receiver hook 74 connecting wires 73 and 103. Starting with battery 61' current will flow through wire 89, binding post 79, wire 103, hook 74, wire 75, binding post 81 thence to binding post 80, wire 87, primary winding of induction coil 85, wire 86, transmitter 62, thence back to battery 61'. This current will continue to flow as long as receiver 61 is off its hook 74.

Condenser 72 is preferably of one-fourth M. F. capacity and is wired into the receiver circuit as will be seen for the purpose of eliminating as far as possible the passage

of current through the receiver, except the high frequency telephonic currents, such as take place in the secondary winding and circuits of the induction coil 85. It will be observed that if the receiver 61 is off hook 74 and the telegraph key 12 of set A is operated so as to give a pulsation of current of the secondary winding 6 of the transformer 3, that a part of the current will pass through the bell 66, but will not operate the latter owing to the tension of the spring 99. It will also be observed that binding posts 80 and 81 are connected by a wire for connecting the primary and secondary windings of induction coil 85 through wires 87 and 84 for the purpose of reducing the number of contacting points at the switch hook 74.

By the provision of the condenser 72 which is preferably of small capacity telephone set B may be freely used on the same line wires as telegraph set A, as the comparatively low frequency current from the secondary winding 6 of the transforming coil 3 of telegraph set A will not seriously affect telephone set B as the passage of the same is resisted by condenser 72. Condenser 72 however, will permit the free passage of the comparatively high frequency currents that take place in the secondary winding and circuits of the induction coil 85 of the telephone set B.

In operating a device formed according to the present invention it is usually preferable to use open circuit batteries so as to have the wires deprived of current at all times except when actually in use. This leaves the lines in better condition for telephone service, and does not affect the condition of the line for telegraph service. By this construction a telephonic message may be sent over the same line at the same time that a telegraphic message is being sent.

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

1. In a composite telephone and telegraph system, the combination with a pair of line wires and a telephone set, of a telegraph set connected with said line wires comprising a polarized relay adapted to suppress the ringing currents from said telephone set, and also the telephone currents from said telephone set, a sounder circuit including the tongue of said polarized relay, whereby the sounder responds to the current waves of one polarity only, means for supplying alternating current for telegraphic purposes, means for controlling the action of said current supplying means.

2. In a composite telephone and telegraph system, the combination with a pair of line wires and a telephone set, said telephone set including means for preventing alternating telegraph current from entering the re-

ceiver of said telephone set, of a telegraph set connected with said line wires including a polarized relay adapted to suppress the ringing currents and the telephone currents
5 from the telephone set, a sounder circuit including the tongue of said polarized relay, whereby the sounder responds to current waves of one polarity only, an induction coil including a battery for supplying alternating current for telegraphic purposes, and a
10 switch for controlling the action of said induction coil device.

3. In a composite telephone and telegraph system, the combination with a pair of line
15 wires, and a telephone set comprising a transmitter, a receiver, a circuit for said receiver, a circuit for said transmitter, a call bell, and means for preventing telegraph

current from entering said receiver, of a telegraph set connected with said line wires, comprising a polarized relay adapted to suppress the ringing currents from the telephone set, and also the telephone currents from said set, a sounder circuit including the tongue of said polarized relay, whereby
25 the sounder responds to the current waves flowing in one direction only, means for supplying alternating current, and means for controlling the action of said current supplying means.
30

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

CLINTON L. BOPP.

Witnesses:

C. J. WRIGHT,
JOHN TERRILL.

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