C. L. BOPP.

COMBINED TELEGRAPH AND TELEPHONE SYSTEM.

APPLICATION FILED NOV. 27, 1909.

1,044,981. Patented Nov. 19, 1912.

Fig. 1.

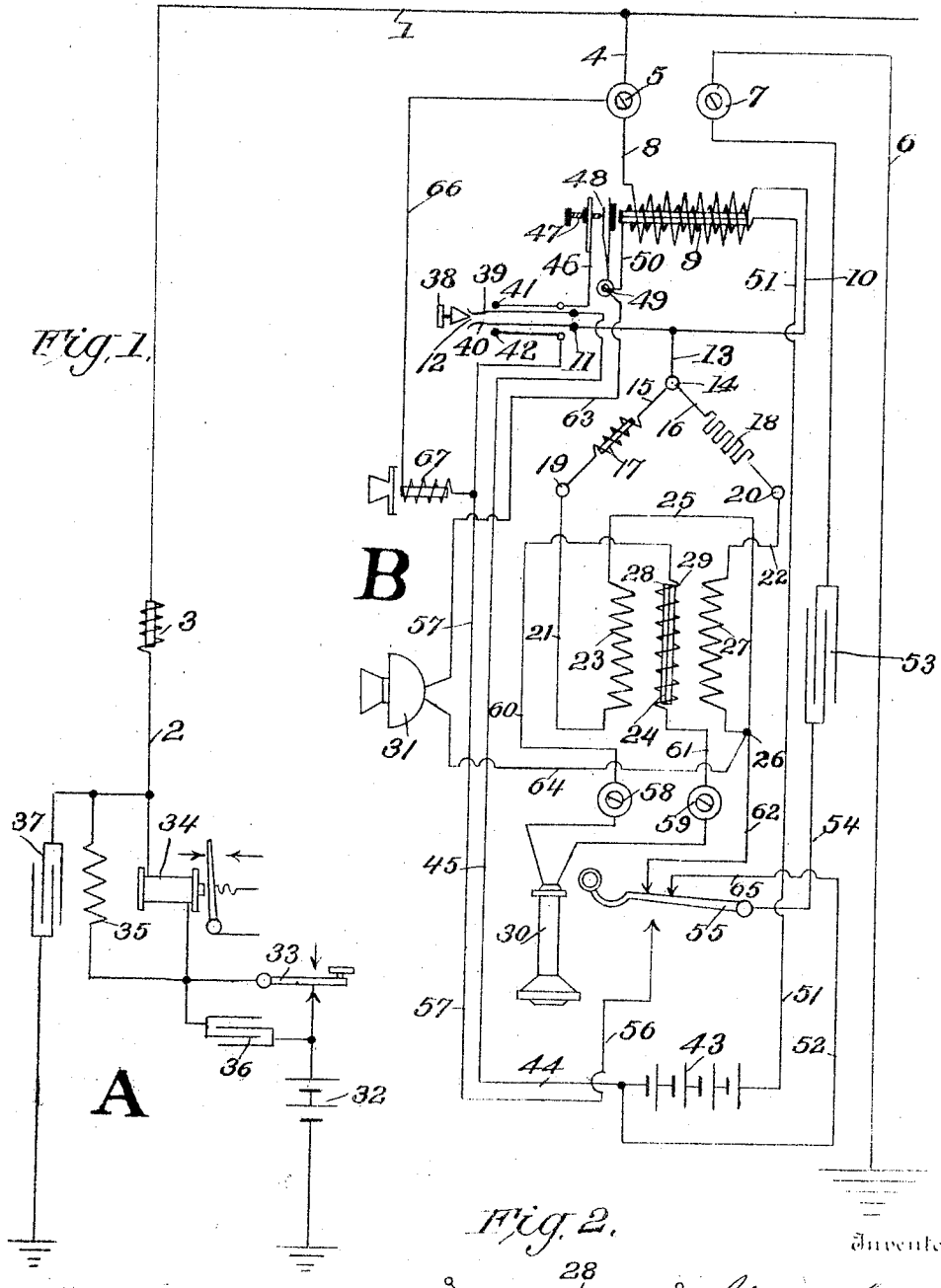
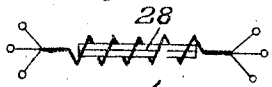


Fig. 2.



Witnesses

A. Staines

A. J. Kitchin

Inventor

Clinton L. Bopp

By Mason Fenwick & Lawrence

his Attorneys

UNITED STATES PATENT OFFICE.

CLINTON L. BOPP, OF HAWKEYE, IOWA.

COMBINED TELEGRAPH AND TELEPHONE SYSTEM.

1,044,981. Specification of Letters Patent. Patented Nov. 19, 1912.

Application filed November 27, 1909. Serial No. 530,219.

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 Combined Telegraph and Telephone 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 signaling devices, and particularly to means for using the same line wire for telegraph and telephone sets at the same time, and has as one of the objects means which will electrically kill the telegraphic impulses leaking into the telephone sets.

A still further object of the invention is the arrangement in a combined telephone and telegraph system, of telephone sets including a balanced system for causing the electrical killing of telegraphic impulses and for diverting the telephonic impulses to one side of the balanced system for actuating the telephonic instruments.

With these and other objects in view the invention comprises certain novel constructions, combinations, and arrangement of parts, as will be hereinafter more fully described and claimed.

In the accompanying drawings: Figure 1 is a diagrammatical view of a telegraphic and telephonic set connected to the same line wire. Fig. 2 is a detail fragmentary view of a core and encircling wires embodying certain features of the invention.

In constructing and arranging the combined telephone and telegraph sets, telegraph instruments of any desired kind may be used, but those of the Morse type are preferable. An impedance coil is inserted between the telegraph sets and the line wire for preventing the comparatively high frequency telephone and ringing currents from entering the telegraph instruments. Connected to the same line wire as the telegraph instruments are a plurality of telephonic instruments and associated devices for killing or suppressing low frequency current of the telegraphic instruments, but using or permitting the telephonic and ringing currents operating the telephonic instruments and the bell or howler.

In order that the invention may be more clearly understood an embodiment of the same is shown in the accompanying drawings, in which 1 indicates a line wire to which the telegraph set A is connected, and telephone set B is also connected. Of course, it will be understood that a plurality of telegraph sets A are connected to line wire 1, and also a plurality of telephone sets B are connected to the same wire. The telegraph set A is of any desired kind, preferably of the Morse type, and is connected to line wire 1 by wire 2. An impedance coil 3 is interposed in wire 2 for preventing the high frequency currents of the telephone device or sets from entering the telegraph sets. The telephone set B is connected with line wire 1 by wire 4 through binding post 5, and is also connected with the ground by wire 6 through binding post 7. It will of course be evident that instead of using the ground as a return a metallic return could be provided. A wire 8 extends from binding post 5 and is connected to a secondary winding of induction coil 9. Induction coil 9 in turn has the secondary winding thereof connected with wire 10 which extends to a binding post 11 on one side of a ringing socket 12. Connected to wire 10 between binding post 11 and induction coil 9 is a wire 13 which extends to a binding post 14 and then divides into branches 15 and 16. Branch 15 is provided with an impedance coil 17 and branch 16 is provided with an ohmic resistance 18 so that the branches act somewhat on the order of the Wheatstone bridge. The branches 15 and 16 are connected at their ends to binding posts 19 and 20 from which extend wires 21 and 22. Wire 21 is formed into winding 23 of induction coil 24. A wire 25 extends from winding 23 to a binding post 26 and wire 22 extends to the same binding post after forming winding 27 of induction coil 24. From this it will be observed that induction coil

24 has a core 28, a secondary winding 29, and two primary windings, namely windings 23 and 27. The windings 23 and 27 are wound in the same direction but current passing therethrough after dividing at binding post 14 will pass in opposite directions so as to neutralize the magnetic effect of the current flowing therethrough, and thus not affect the receiver 30 or transmitter 31.

The ohmic resistance of impedance coil 17 and resistance 18 is the same, and the ohmic resistance of windings 23 and 27 is the same, so that telegraphic current entering into the telephonic system will be equally divided between windings 23 and 27, and consequently there will be no influence brought to bear on the telephone receiver and transmitter by the telegraphic current.

A howler or bell is used and arranged to operate in the usual manner of such instruments for signaling preparatory to phoning, the specific construction of the bell or howler being of the usual kind, but improved means and an improved arrangement of circuit is provided for adapting the same to the telephone set.

In order that the invention may be more clearly understood, the circuit will be traced when sending a telegraph message, and then when sending a telephone message. Starting with a telegraph battery or source of current 32, current will pass through the key 33 in successive impulses as the circuit is made and is again broken in the usual manner. From key 33 the current passes through the usual telegraph instruments, as for instance, sounder 34, and resistance 35. A condenser 36 may be connected across the key 33, and the condenser 37 may connect wire 2 to the ground. After current has passed through sounder 34 the same will pass through wire 2 to line wire 1, through an impedance coil 3. As the telegraphic current is of low frequency the impedance coil 3 will have substantially no effect thereon, and will permit the free passage therethrough. After reaching line wire 1 the current passes along the same to the various telegraph instruments connected to line wire 1, and operates the same in the usual manner. In passing along line wire 1 some of the current will leak down line 4 to binding post 5. From binding post 5 the current will pass through wire 8 into the secondary winding of induction coil 9. From the secondary winding of induction coil 9 the current will pass through wire 10 to wire 13. As the current passes through wire 13 the same divides at binding post 14, and an equal amount passes through wires or branches 15 and 16 as the same are of the same ohmic resistance. From branches 15 and 16 the divided current passes eventually through windings 23 and 27, but in opposite directions so that the magnetic effect thereof will be neutralized, and the local circuit of the receiver 30 will not be affected. From binding post 26 the current which has leaked from the main line will pass through wire 62, hook 55 and wire 54, into condenser 53. The current cannot pass through condenser 53 to the ground, but by reason of the make and break of the telegraph key impulses will be passed through the course traced, and induce current from the ground on the opposite side of condenser 53 so that if the windings 23 and 27 were not arranged as described a click would be heard in the telephone instrument. From this it will be observed that the telegraph instruments may operate freely, and without affecting the telephone receiver.

If it is desired to use the telephone set either while the telegraph set is being operated or at another time, the plug 38 is pushed in for moving members 39 and 40 into contact with members 41 and 42. This will cause current to flow from battery 43 through wire 44, wire 45, member 39, member 41, wire 46, adjusting member 47, make and break tongue member 48, binding post 49, wire 50, and the primary winding of induction coil 9, and wire 51 back to battery 43. The make and break will, of course, cause an induced current to be generated in the secondary winding of induction coil 9, whereby a current is passed therefrom through wire 8, binding post 5, wire 4, and line wire 1. From line wire 1 the current will pass into a telephone set similar to telephone set B for operating the bell thereof or the howler, and from thence to the ground. From the ground the current will pass through wire 6, binding post 7, to condenser 53. From condenser 53 a current will pass through wire 54, hook 55, wire 56, wire 57, member 42, member 40, and wire 10, back to the secondary winding of induction coil 9. After the bell has been thus rung telephone receiver 30 is removed from hook 55, which will cut out the bell circuit, and switch in the telephone circuit. The receiver 30 is connected with a local circuit through binding posts 58 and 59.

The local circuit comprises wire 60, winding 29, wire 61, binding posts 58 and 59 and receiver 30. If the receiver, similar to receiver 30, of the second telephone set is taken off its hook current will flow from the battery of said telephone set through the same, from the battery thereof through wire 52, wire 65, hook 55, wire 62, binding post 26, wire 27, wire 22, binding post 20, resistance 18, wire 16, binding post 14, wire 13, wire 10, secondary winding of induction coil 9, wire 8, binding post 5, and wire 4 of said secondary telephone set, and from wire 4 cur-

rent passes over line wire 1, through wire 4, binding post 5, wire 8, the secondary winding of induction coil 9, wire 10, wire 13, binding post 14, branch 16, resistance 18, binding post 20, wire 22, winding 27, binding post 26, wire 62, hook 55, wire 54, and condenser 53. From condenser 53 a current is passed to binding post 7, wire 6, to the ground, and through the ground back to the battery. As the current passes from binding post 14 the same will pass through resistance 18, which is a non-inductive resistance, rather than pass through the impedance coil 17, so that coil 27 will be energized, and influence the local circuit of receiver 30, whereby a sound will be reproduced in the receiver 30. At the same time (receiver 30 being off its hook) current will flow from battery 43, through wire 51, the primary of induction coil 9, wire 50, binding post 49, wire 63, transmitter 31, wire 64, binding post 26, wire 62, hook 55, wire 65, wire 52, back to battery 43. Of course it will be understood that the corresponding telephone sets to telephone set B will be influenced by induced current in the secondary winding of induction coil 9 by battery 43.

When the corresponding telephone set, similar to telephone set B, desires to communicate with a telephone set B, a plug, similar to plug 38, is inserted into a socket, similar to socket 12, and surrounding parts, so that a ringing current will pass over line wire 1. From line wire 1 the ringing current will pass to binding post 5, through wire 66, howler or bell 67, wire 57, wire 56, hook 55, which of course is in a lowered condition, receiver 30 being suspended therefrom, wire 54, and condenser 53. From condenser 53 current will pass to binding post 7, and from binding post 7 through wire 6 to the ground, and from the ground back to its source. This circuit is completed, of course, only temporarily and sufficiently long for attracting notice. The circuit, of course, is opened when the receiver 30 is removed from hook 55. The plugs 38 of telephone set B and the corresponding telephone set, are removed, immediately after the ringing of the bell or sounding of the howler.

The induction coil 24 is made with a core 28 in the usual manner, and is provided with what appears as a single winding, as shown in Fig. 2, but which in effect are the wires of windings 23, 27 and 29 wound parallel.

In illustrating the invention only one telegraph set A is shown, and one telephone set B is shown, but of course it will be understood, that two or more of each set must be connected to line wire 1 for signaling each other. It also will be observed that both devices may be used at the same time, without interference, or at different times as desired, so that either may be used absolutely independently of the other and without detrimental effect to either device. In effect the telephone set B would be attached to the ordinary telegraph wires now in use, without in the least disturbing the telegraph instruments, so that in establishing new telephone lines no expense is necessary except the expense of the telephone sets, and the permission to use the telegraph wires. This can be done, and yet the click of the telegraph instruments not be heard by the telephone, as impulses of the telegraph system are eliminated. In the use of induction coils any desired kind may be used, as induction coil 9, but preferably the type patented by me February 12, 1907, Number 844,250.

What I claim is:

1. A combined telegraph and telephone system comprising a common line conductor, telegraph and telephone station apparatus connected therewith by independent conductors, an impedance disposed in the conductor to the telegraph station adapted to prevent the passage of current from the telephone station the said telephone station apparatus comprising two induction coils, the first induction coil having a secondary winding communicating with the conductor leading to the common line and the second induction coil comprising a primary conductor and two secondary conductors all wound in the same direction, a line extending from the secondary winding of the first coil and dividing and connected with both of the secondary windings of the second induction coil at opposite ends, resistances introduced into the divided lines of like ohmic resistance, one of said resistances being provided with inductive impedance, a transmitter apparatus connected with the primary winding of the first induction coil and a receiver connected with the primary winding of the second induction coil.

2. A combined telegraph and telephone system comprising a common line conductor, telegraph and telephone stations communicating with the common conductor by independent conductors, an inductive impedance in the telegraph conductor adapted to prevent the passage of telephone currents, two induction coils located in the telephone station the first induction coil comprising a primary and secondary winding the secondary winding being in communication with the conductor leading to the common line, a battery, a receiver hook and a transmitter, a circuit including the battery, transmitter, receiver hook and primary winding, a receiver in circuit with the primary winding of the second induction coil said second induction coil having two sec-

ondary windings, the secondary windings and the primary winding being wound in the same direction, a line extending from the secondary winding of the first induction coil and dividing and communicating with opposite ends of the secondary windings of the second induction coil, resistances of like ohmic resistance introduced into the branches of the divided line, and an impedance introduced into one of the resistances.

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

CLINTON L. BOPP.

Witnesses:

MAYME MURRAY,

LEO PAGE.