

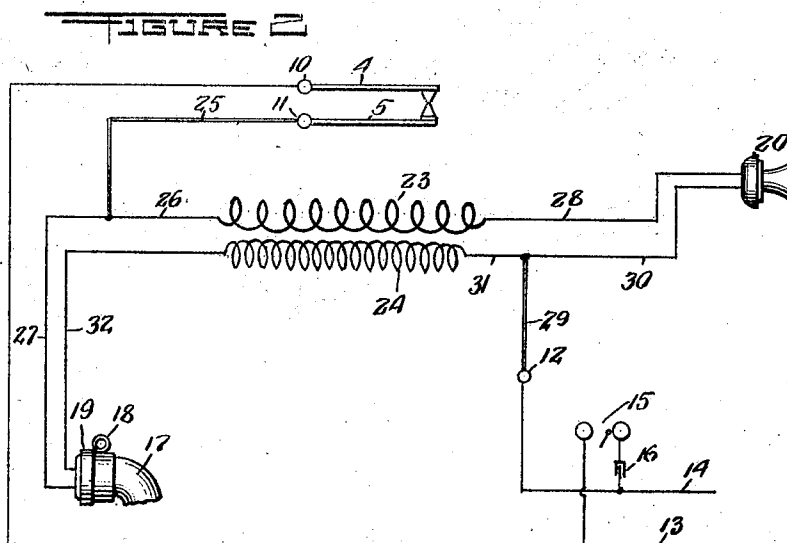
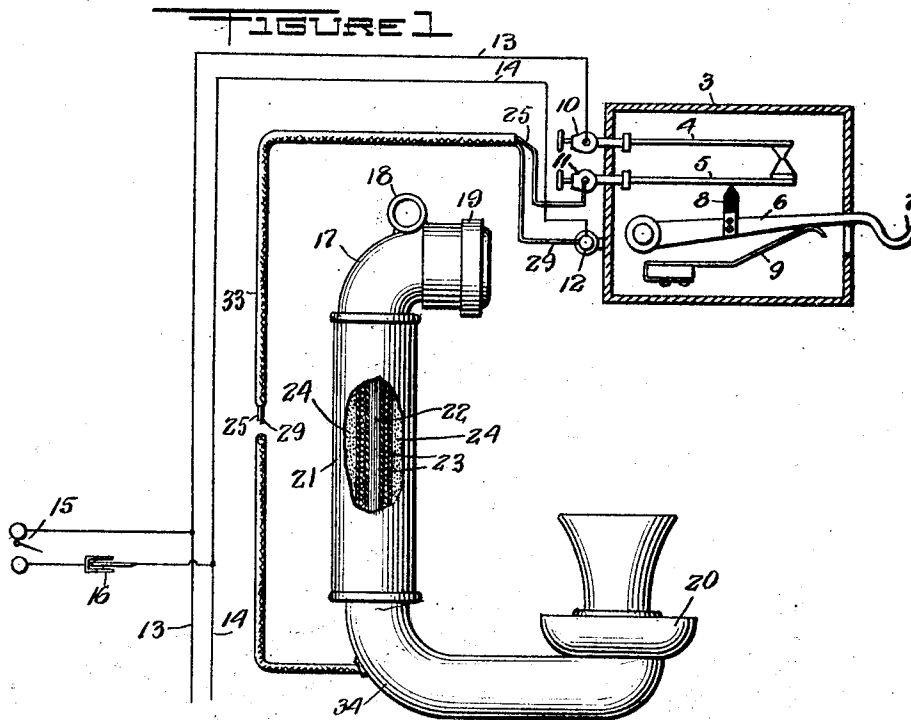
March 9, 1926.

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TELEPHONE INSTALLATION

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TELEPHONE INSTALLATION.

Application filed September 11, 1924. Serial No. 737,052.

To all whom it may concern:

Be it known that I, EDWARD A. DRISCOLL, a citizen of the United States, and resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Telephone Installations, of which the following is a full, clear, and concise description.

My invention relates to telephone installations, my special purpose being to simplify the apparatus constituting each individual telephone set, so as to reduce to a minimum the number of parts required; and to enable a single contact, and a single actuating lever for opening and closing said contact, to control the telephone set.

I have discovered that a telephone set of the kind ordinarily used, for instance a subscriber's hand set, can be readily controlled in the manner just mentioned so as to be capable of giving service of good quality, both as to receiving and transmitting, and yet may be made up of a relatively small number of separate parts if the parts and their connections be suitably proportioned as to the relative ohmic resistance of certain of these parts and otherwise arranged in accordance with my invention.

I accomplish the beneficial results above mentioned by so arranging the various electrical connections as to practically split a short portion of the line into two portions in parallel with each other, one portion including the primary winding in series with the transmitter, the other portion including the secondary winding in series with the receiver, the last mentioned portion being preferably of higher ohmic resistance than the other portion mentioned.

I call attention to my Patent No. 1,507,668, Sept. 9, 1924, upon a telephone installation.

Reference is made to the accompanying drawing forming a part of this specification, and in which like reference characters indicate like parts in both figures.

Figure 1 is a view partly sectional and partly diagrammatic, showing how my system is used in connection with a telephone set—in this instance a hand set, suitable for testing.

Figure 2 is a diagram of the wiring.

A casing is shown at 3 and has the form of a small box, mounted in any convenient

position, and made of wood or metal as desired.

Mounted within this box are a pair of contact members 4 and 5, together constituting a single contact, and an actuating lever 6 for opening and closing this contact. The lever 6 is provided with a portion 7 formed into a hook, and with a presser finger 8, the latter being of insulating material. A spring 9, mounted within the casing 3, engages the under side of the lever 6.

The casing 3 carries a pair of binding posts 10 and 11 connected with the two contact members 4 and 5, and also carries another binding post 12, used as hereinafter described.

A pair of line wires are shown at 13, 14, and bridged across them is a bell 15 and a condenser 16, these parts and their uses being of the kind well known in this art.

A hand casing 17 carries the different elements of a hand set, connected as hereinafter described. The casing is provided with a suspension ring 18, by aid whereof the hand set as a unit may be hung upon the hook portion 7 of the actuating lever 6. With the hand casing thus hung up the actuating lever 6 occupies its lowermost position; and the single contact, made up of the two contact member 4 and 5, is open. When, however, the hand casing is taken off the hook portion 7, the contact is closed, due to action of the spring 9.

A watch case receiver 19 and a transmitter 20 are carried by the hand set casing 17, and may each be of the usual or any desired construction.

A step up induction coil 21, carried by the hand set casing, serves as a handle for the hand set casing and parts carried thereby, in addition to performing the usual function of any induction coil.

The core of the induction coil appears at 22, the primary winding at 23 and the secondary winding at 24, these parts being constructed in the usual or any desired manner, the primary winding comprising a few turns of coarse wire, and the secondary winding having a much larger number of turns of finer wire.

A cord 25 is connected with the binding post 11, and is joined to two wires 26 and 27, the wire 26 leading to the primary winding 23, and the wire 27 leading to the re-

ceiver 19. From the primary winding 23 a wire 28 leads to the transmitter 20.

Connected with the post 12 is a cord 29, which is joined to wires 30 and 31; the wire 30 leading to the transmitter 20, and the wire 31 being connected with the secondary winding 24. From this secondary winding a wire 32 leads to the receiver 19.

The two cords 25 and 29 are united into the form of a single cord 33; which extends into the casing 17 through an opening eye 34 used for the purpose.

The ohmic resistance of the receiver 19, transmitter 20, primary winding 23 and secondary winding 24 may be chosen within wide limits. One typical apportionment of the resistance of the parts just mentioned might be as follows: for the receiver 19, seventy-five ohms; for the transmitter 20, fifty ohms; for the primary winding 23, three ohms; for the secondary winding 24, one hundred ohms. Thus the total resistance of the transmitter and primary winding, considered as in series with each other, is fifty-three ohms; and the total resistance of the secondary winding and receiver, considered as in series with each other, is one hundred and seventy-five ohms. The figures here given, though adapted to work well in practice on almost any ordinary telephone line, are more or less arbitrary. It is a matter of engineering to apportion the resistances of the various parts mentioned, and the problem is different with different conditions encountered in practice.

Generally speaking, however, I prefer to have the aggregate resistance of the transmitter and primary winding, considered as in series with each other, considerably lower than the total resistance of the receiver and secondary winding, considered as also in series with each other.

Referring to the diagram shown in Figure 2, it will be noted that the two cords 25 and 29, connected respectively with the binding posts 11 and 12 as indicated more particularly in Figure 1, are essentially parts of the line; and for purposes of the line, as used for talking, are in series with each other. Such being the case, and the ohmic resistance of the transmitter and the primary winding being, as above described, considerably less than the ohmic resistance of the receiver and secondary winding, it follows that the portion of the line, from the cord 29 to the cord 25, is essentially divided into two portions in parallel with each other, one of these portions being of lower ohmic resistance than the other, the path of lower ohmic resistance including the transmitter and primary winding, the path of higher resistance including the receiver and secondary winding.

The bell 15 and the condenser 16, bridged across the line as above described and as

indicated in the drawing, are used in the conventional manner; the ringing of the bell taking place while the contact is open, or in other words while the actuating lever 6 is in its lower position.

Whenever the hand casing is removed from the hook 7 of the actuating lever 6, the contact is closed and the line is in condition for talking.

Suppose, now that the operator is talking into the transmitter 20. A talking circuit may be traced as follows: line wire 14, post 12, cord 29 to junction of wires 30 and 31; here the circuit divides, but owing to the high resistance of the secondary winding 24 and receiver 19, most of the current flows through the wire 30, transmitter 20, wire 28, primary winding 23, wire 26, cord 25, binding post 11, contact members 5 and 4, binding post 10 and line wire 13 to central station, or to another subscriber's station as the case may be, through a source of electricity not shown, and back to line wire 14.

This circuit energizes the primary winding 23, and causes the same, by inductive action upon the core 22, to energize the secondary winding 24. The secondary currents thus induced energize the entire line, considered as including the receiver 19.

Any tendency for the secondary currents to become short-circuited through the transmitter 20 and the primary winding 23 appears to be, to a great extent at least, offset by a choking action of the primary winding 23.

It is probable also, that in so far as the secondary or talking currents thus induced in the winding 24 are not neutralized by a choking action of the primary winding 23, as just described, and therefore succeed in passing through and energizing this winding 23, they cause this winding to perform its normal function as a primary winding and thus to act inductively upon and energize the secondary winding 24, so as to generate currents therein and in so doing to conserve a portion of the energy which would otherwise be wasted by short circuiting.

In any event, I find by trial that by talking into the transmitter 20 the line is energized quite strongly by currents in which the current variations are apparently as great as they would be in the absence of any tendency toward short circuiting.

For purposes of incoming signals the talking currents, under control of a distant station, in passing through the cord 29 and various intermediate parts to the cord 25, tend to divide as above described with reference to the currents under control of the transmitter 20; but for the reasons already stated, the incoming currents pass mainly if not altogether through the secondary winding 24 and receiver 19, rather than through the primary winding 23 and receiver 20, and

thus practically follow only one of the two paths presented.

The secondary or talking currents used for incoming signals, and thus controlled from a distant station, follow a circuit which may be traced as follows: line wire 14, binding post 12 and cord 29 to junction of wires 30 and 31; here the current tends to divide, but for reasons already described continues for the most part, if not practically in its entirety, through wire 31, secondary winding 24, wire 32, receiver 19 and wire 27 to wire 25, thence through binding post 11, contact members 5 and 4, binding post 10, line wire 13 to some other station, thence through source of electricity not shown, and back to line wire 14.

My invention can be employed on any ordinary line used for talking purposes and whether used with a central energy system or with individual batteries at the respective stations.

I find that in practice, with my invention used upon a telephone line of the type commonly employed in large cities, the transmission is clear, side tones are reduced to a minimum, relatively little electric energy is required for operation of the line, and many kinds of nondescript vagrant sounds, otherwise actually or constructively developed by the receiver, are completely done away with.

My construction is relatively simple, the various mechanical parts required being reduced to a minimum number, and the various electrical connections being so arranged as to develop a high degree of efficiency in the system as a whole.

Above all I find this system well adapted for reducing to a minimum the number of contacts and contact members required, the particular embodiment here shown and described having for the individual station only a single contact consisting of two contact members.

While the induction coil is here shown as associated with a testing set and as incorporated in a handle, it is obvious that the induction coil can be used with any set, and placed in any convenient receptacle as in the prior art.

I do not limit myself to the precise mechanism shown as variations may be made

therein without departing from my invention, the scope of which is coextensive with my claims.

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

1. In a telephone installation, the combination of a transmitter, a receiver, a contact, an induction coil having a primary winding and a secondary winding, a telephone line including said contact and having two portions in parallel with each other and each in series with said contact, one of said portions including said primary winding, the other of said portions including said receiver and the secondary winding of the induction coil, and a ringer bridged across the line, said ringer and both portions of said telephone line being controllable by said contact.

2. In a telephone installation, the combination of a telephone line, a contact for opening and closing the same, a receiver, a step up induction coil having a primary winding and a secondary winding; said receiver and the secondary winding of said induction coil being in series with each other and with said contact and receiver, but in parallel with said primary winding with reference to said contact, and a ringer bridged across the line, said ringer and said induction coil being controllable by said contact.

3. In a telephone installation, the combination of a telephone line, a contact for opening and closing the same, a ringer bridged across said telephone line and controllable by the opening and closing of said contact, a receiver, a transmitter, and an induction coil having a primary winding and a secondary winding; said transmitter and the primary winding of said induction coil being in series with each other and with said contact, said receiver and the secondary winding of said induction coil being also in series with each other and with said contact, but in parallel with said transmitter and with said primary winding with reference to said contact.

Signed at New York City, in the county of New York and State of New York, this 8th day of September, 1924.

EDWARD A. DRISCOLL.