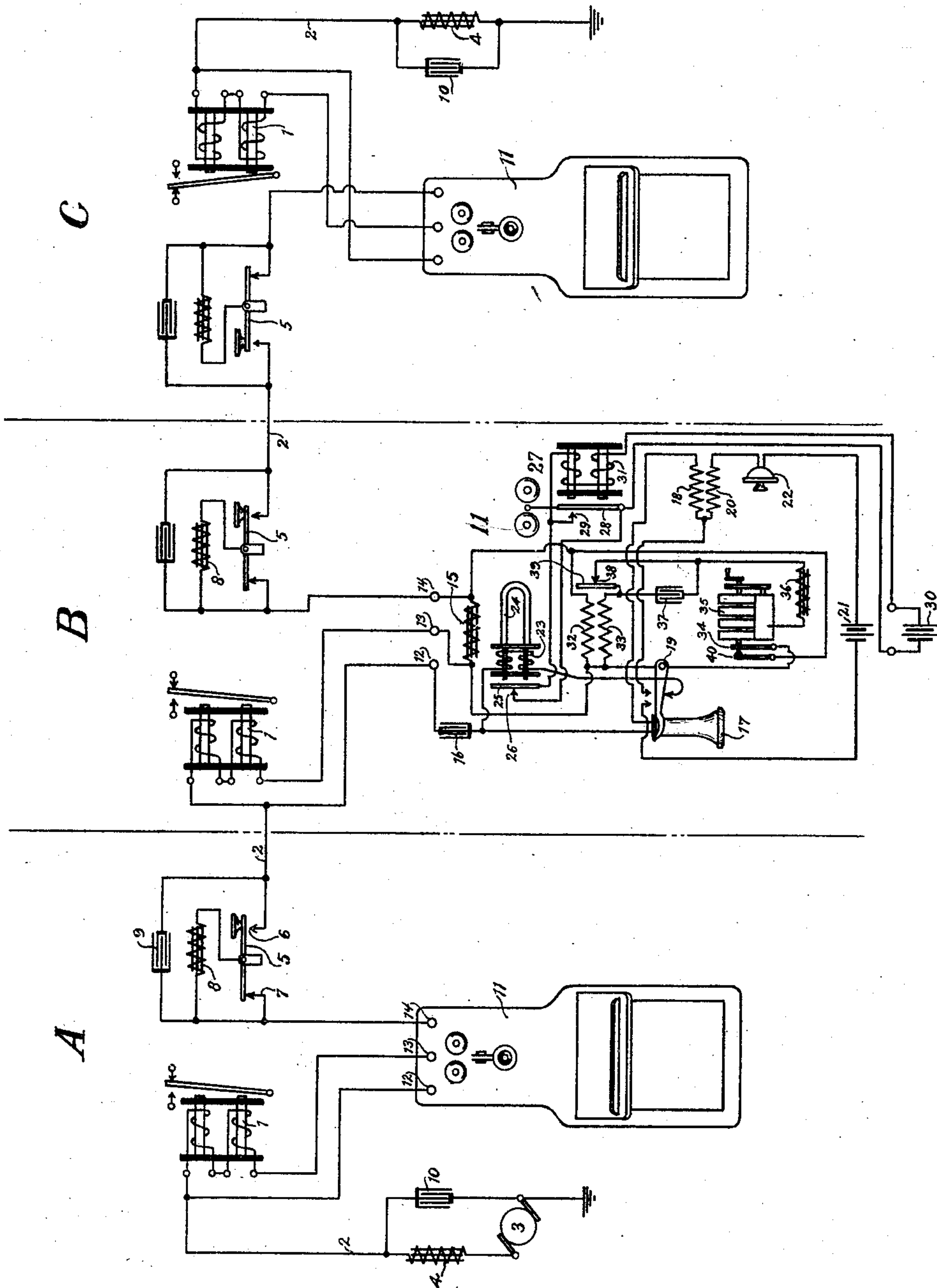


O. M. LEICH.
COMPOSITE TELEPHONE AND TELEGRAPH SYSTEM.
APPLICATION FILED JUNE 19, 1908

978,909.

Patented Dec. 20, 1910.



WITNESSES:

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Specification of Letters Patent. Patented Dec. 20, 1910.

Application filed June 19, 1908. Serial No. 439,313.

To all whom it may concern:

Be it known that I, OSCAR M. LEICH, a citizen of the United States, residing at Genoa, in the county of Dekalb and State of Illinois, have invented a certain new and useful Improvement in Composite Telephone and Telegraph Systems, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of the specification.

My invention relates to composite telephone and telegraph systems, and more particularly to such systems where telephonic apparatus is used for intercommunication upon telegraph systems without the addition of extra line wires.

My invention contemplates the provision of improved circuits and apparatus for the inclusion of telephone talking circuits on telegraph circuits without interfering in the operation of the telegraph circuits, and yet obtaining good talking results between the various telephones so included.

I will describe my invention more in detail by reference to the accompanying drawing illustrating the preferred embodiment thereof, which shows three separate and distinct, combined signal receiving and signal sending stations.

I have illustrated station A as provided with the ordinary telegraph relay 1, similar relays 1—1, being provided in the two other stations B and C. This telegraph relay can suitably operate a telegraph sounder, as is well understood in the art, the telegraph relay being serially included in the line wire 2. At the end of the line wire 2, for instance at the station A, is included a generator, 3, for the purpose of furnishing currents to operate the telegraph relays, which direct current is fed to the line wire 2, through an impedance coil 4, which impedance coil prevents noises on the telegraph line due to the generator, and which noises would injuriously influence the telephone transmission. A similar impedance coil 4, is shown at the end of the line at station C. Telegraph keys 5—5, are serially included in the line wire 2, at the various stations, which keys serve to make and break the telegraphic circuit through the various relays 1—1, in sending a message. For this purpose a front contact 6, is provided in connection with the key 5 whose shortcir-

cuiting switch as universally used in telegraph practice has been omitted for the sake of clearness. I also provide a back contact 7, so that when the key is operated to close circuit with the contact 6, the telegraphic circuit passes through an impedance coil 8, which impedance coil prevents undue noises due to self-induction, and other disturbances from injuriously influencing the talking service of the telephones.

I provide a condenser 9, around the key 5, which condenser permits talking currents to be transmitted from one side of the key to the other, without interference when the key is being operated. I further provide condensers 10—10, which condensers permit the voice currents traveling from the line wire 2, to seek the ground without having passed through the impedance coils 4—4. Telephones 11, are connected at each of the stations A, B and C, respectively, through binding posts 12, 13 and 14, and impedance coil 15, is bridged between binding posts 13 and 14. The talking circuit extends from binding post 12 through condenser 16, receiver 17, secondary winding 18, switchhook lever 19, and from thence to the binding post 14, by virtue of short circuiting devices to be explained hereafter. The primary 20, is in closed circuit with the battery 21 and the transmitter 22 when the telephone is in use. The signal receiving circuit can be traced from binding post 12, through the winding 23, of the relay 24, to the binding post 14, which winding actuates armature 25, drawing it away from its back contact 26, thereby operating vibrating bell 27, whose armature 28, and back contact 29, are short circuited by the armature 25 and back contact 26. The vibrating bell 27, is operated by battery 30, acting on its winding 31. The signal sending device at the telephone consists of the primary winding 33, secondary 32, shunt spring 34 of the generator 35, operating in connection with the impedance coil 36, the condenser 37, the back contact 38 and the armature 39. The coil 36 has no special importance it being merely included serially with the armature of the generator in the actual circuit as originally tested, where it was used to cut down the generator current. I further provide by means of this improved arrangement means whereby the generator short circuits binding posts 13 and 14, when the generator 35 is

not being actuated to project a call from the line wire 2. For this purpose I employ an additional shunt spring 40, which is normally connected to the shunt spring 34, so
 5 that the binding post 13, which is permanently connected with the shunt spring 34, and the binding post 14, which is permanently connected with the shunt spring 40, are short circuited. When the generator is
 10 operated, the counter shaft of the generator, while remaining in contact with the spring 34, permits spring 34 to move away from spring 40, thus opening the short circuit between the binding posts 13 and 14, and per-
 15 mitting the projection of signaling currents serially of the line wire 2, directly from the secondary 32, past the impedance coil 15. This improved arrangement permits me to project serial signaling current which is
 20 adapted to call the other telephone 11, on the line, and yet it does not require the inclusion of special apparatus in the line wire circuit, which would necessitate a breaking of contact, or necessitate the inclusion of an
 25 objectionable amount of impedance. The vibratory or undulatory currents sent out by the secondary 32, operate the armatures 25, at the various telephones, thus releasing them from their engagements with the back
 30 contacts 26, thereby permitting the vibratory bells 27 to ring. The currents in the secondary 32 are induced by the primary 33, due to the breaking of contact between the armature 39 and the back contact 38, in
 35 addition to the ordinary inductive effect between the two, due to the alternating character of the primary current. This result is accomplished by means of the currents sent out by the generator 35, although
 40 some other suitable prime source of current may be employed. The advantages of my improved system will thus be apparent.

The talking currents are projected serially on to the line wire 2, past the relay 1,
 45 through the binding posts 12 and 14. To prevent these voice currents from being objectionably influenced when the key 5, is operated, I provide, as before stated, the back contact 7, and shunt around this back
 50 contact, the impedance coil 8. This impedance coil 8, reduces the sharp click which would be occasioned in the telephone circuit when the key 5 is operated. I thus provide a very clear talking circuit, which talking
 55 circuit I make highly efficient through the condenser 9 around the terminals of the key 5.

Having thus described the preferred embodiment of my invention, what I claim as
 60 new and desire to secure by Letters Patent, is:

1. A composite telephone and telegraph system comprising telegraph relays and telegraph operating keys, a line circuit for said
 65 relays and keys, three or more telephones

also associated with said line circuit, said telephones having their talking circuits in bridge of said relays serially with the line circuit, and condensers bridged around the telegraph operating keys to provide bypaths
 70 for the telephonic currents.

2. A composite telephone and telegraph system comprising electromagnetic telegraph receiving devices, keys for operating said devices, a line circuit for said keys and
 75 devices, three or more telephones also associated with said line circuit, said telephones having their talking circuits in bridge of said devices serially with the line circuit, and means bridged around said keys to con-
 80 duct the voice currents when the keys are being operated, said means not materially influencing telegraphic communication over said line circuit.

3. A composite telephone and telegraph
 85 system comprising electromagnetic telegraph receiving devices, keys for operating said devices, a line circuit for said keys and devices, three or more telephones also associated with said line circuit, said telephones
 90 having their talking circuits in bridge of said devices serially with the line circuit, and condensers bridged around said keys to conduct the voice currents when the keys are being operated, said condensers not ma-
 95 terially influencing telegraphic communication over said line circuit.

4. A composite telephone and telegraph system comprising electromagnetic telegraph receiving devices, keys for operating same, a
 100 line circuit for said keys and said devices, telephones also connected to said line circuit, a back contact for each key, and an inductance bridged around said back contact to decrease the telegraphic disturbance on the
 105 telephone talking circuit.

5. A composite telephone and telegraph system comprising electromagnetic telegraph receiving devices, keys for operating same, a
 110 line circuit for said keys and said devices, telephones also connected to said line circuit, a back contact for each key, and an impedance coil bridged around said back contact to decrease the telegraphic disturbance on the telephone talking circuit.
 115

6. A composite telephone and telegraph system comprising electromagnetic telegraph receiving devices, keys for operating same, a
 120 line circuit for said keys and said devices, reactive means associated with the telegraph circuit by the operation of the keys aforesaid, and three or more telephones having talking circuits serially associated with said line circuit.

7. A composite telephone and telegraph
 125 system comprising electromagnetic telegraph receiving devices, keys for operating same, a line circuit for said keys and said devices, an impedance device associated with the telegraph circuit by the operation of the keys
 130

aforesaid, and three or more telephones having talking circuits serially associated with said line circuit.

5 8. A composite telephone and telegraph system comprising electromagnetic telegraph receiving devices, keys for operating same, a line circuit for said keys and said devices, an impedance device serially associated with the telegraph circuit by the operation of the
10 keys aforesaid, and three or more telephones having talking circuits serially associated with said line circuit.

9. A composite telephone and telegraph system comprising electromagnetic telegraph

receiving devices, keys for operating same, a 15 line circuit for said keys and said devices, telephones also associated serially with said circuit, and three or more reactive means associated with said line circuit by the operation of the keys aforesaid to decrease tele- 20 graphic disturbances in the telephones when said keys are operated.

In witness whereof, I hereunto subscribe my name this 31st day of March, 1908.

OSCAR M. LEICH.

Witnesses:

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