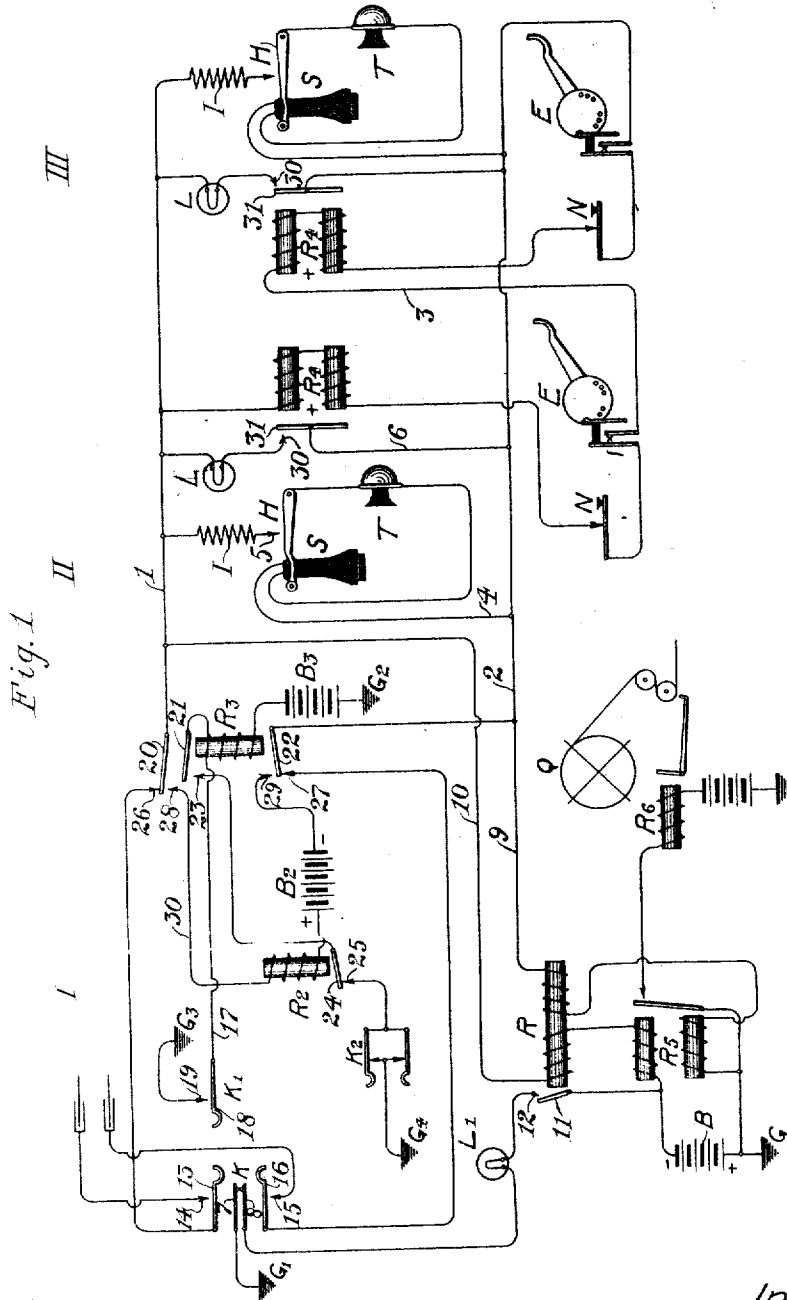


A. D. T. LIBBY.
COMPOSITE ELECTRIC SYSTEM.
APPLICATION FILED JAN. 28, 1910.

1,023,256.

Patented Apr. 16, 1912.

2 SHEETS-SHEET 1.



Witnesses
Joe J. Meyer
C. A. Severcool

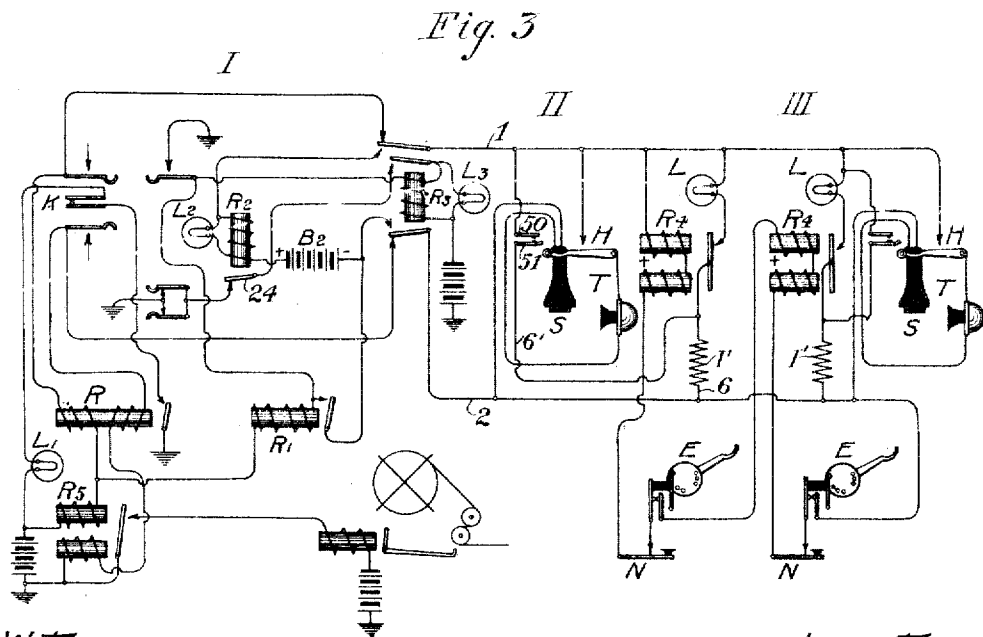
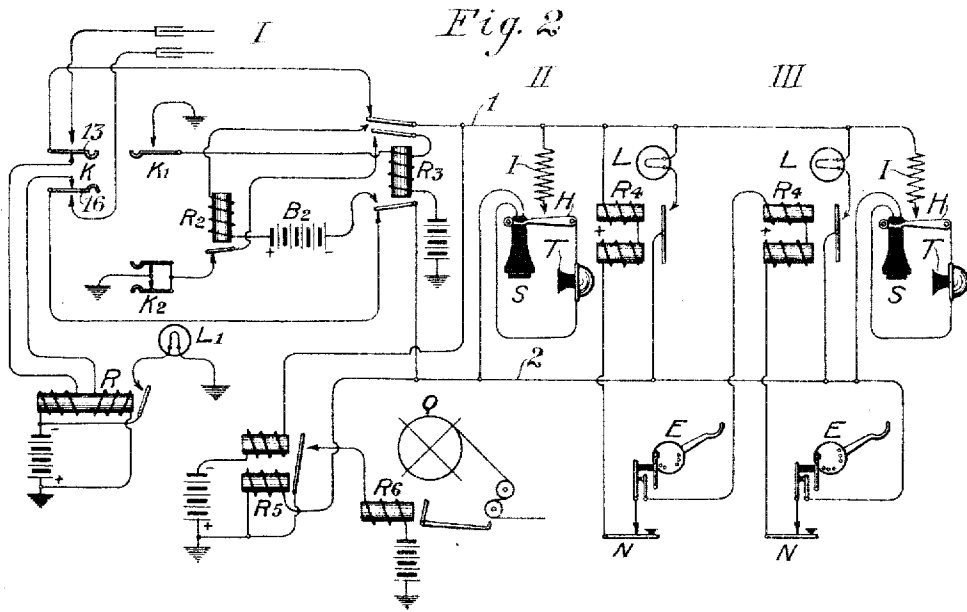
Inventor
Albion D. T. Libby
By *J. O. Richey*
His Attorney

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Witnesses

J. J. Mizer
C. A. Severcool

By

Inventor
Albion D. T. Libby

J. O. Ridley
His Attorney

UNITED STATES PATENT OFFICE.

ALBION D. T. LIBBY, OF ELYRIA, OHIO, ASSIGNOR TO THE DEAN ELECTRIC COMPANY,
OF ELYRIA, OHIO, A CORPORATION OF OHIO.

COMPOSITE ELECTRIC SYSTEM.

1,023,256.

Specification of Letters Patent.

Patented Apr. 16, 1912.

Application filed January 28, 1910. Serial No. 540,574.

To all whom it may concern:

Be it known that I, ALBION D. T. LIBBY, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Composite Electric 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.

My invention relates to composite systems consisting of combined police and telephone systems in which I provide telephone connections for talking and signaling in both directions and police signal sending devices at the substations adapted to send impulses of current to devices at the main station adapted to be operated thereby. I utilize the same conductors for these purposes and aim to reduce the number necessary as much as possible and to prevent interference between the various characters of currents which are used. I show two line conductors connecting the main station and the substations and a third conductor passing through all the substations and terminating in the main conductor. Generally it may be said that I contemplate improvements in the systems disclosed in my applications 515,044, August 28, 1909; 540,571, 540,572 and 540,573, January 28, 1910.

Other objects of and improvements made by my invention will appear from the particular description which, when taken in connection with the drawings, will be sufficient to clearly describe the same.

Referring now to the drawings, Figure 1 is a diagram of the circuit arrangement used in one form in which I contemplate embodying my invention. Fig. 2 is a second form. Fig. 3 is a third form.

Referring first to Fig. 1, I show a main station at I and two substations at II and III. These stations are connected by line conductors 1 and 2. At each substation I show a bridge 4 containing the transmitter T, receiver S hook switch H—5 and a non-inductive resistance I which is for the purpose of preventing an excessive flow of current through the telephone bridge. I show a second bridge 6 at the substation containing the lamp L and the contacts of the relay R¹. Extending through the substations I show a third conductor 3 which terminates

in the line conductors containing at each substation a high resistance polarized relay R⁴ which controls the aforementioned contacts in the lamp bridge 6, a key N, and a police signal sending device E which controls the sending of impulses over the line conductors and the bridge in multiple thereof. At the main station I show a line lamp L¹ and line relay R which latter is operated over the line conductors by current from a source B. Connected in series with the line relay I show a relay R⁵ which controls the circuit of the relay R⁶ which in turn controls the police signal receiving device Q. As long as the resistance of the relays R⁴ is in the circuit of the battery B, current flow from said circuit will be insufficient to operate the relay R. This current, however, will operate relay R⁵. When the hook switch H—5 is closed the current flow will be sufficient to operate relay R. At K I show a listening key which is adapted to bridge the attendant's set upon the line and at the same time open a switch 7—8 in the circuit of the line relay interrupting said circuit. At R³ I show a relay which controls the connection of a source of substation signal controlling and operating current B². In the circuit of B² I show a relay R² which controls contacts in the locking circuit of relay R³. This circuit is not operated by the current flowing through the bridges 3 and 6, but is adapted to be operated when the switch H—5 is closed. In this locking circuit I show a key K² by which I may manually interrupt said circuit. The apparatus and its functions will be best understood from a description of the operation of the system.

The operation is as follows: To call the attendant at the main station to the telephone, the patrolman removes the receiver from the hook H, closing the following circuit: H—T—S—4—2—9—one winding of relay R—one winding of relay R⁵—battery B—the other winding of R⁵—the other winding of R—10—1—I—5. The relay R is energized, pulling up the armature 11, closing the switch 11—12 and completing the circuit through line lamp L¹—from ground G—battery B—11—12—L¹—7—8—G¹. The attendant in responding throws his listening key, interrupting the circuit of the line lamp L¹ at 7—8 and bridging his set on at 13—14, 15—16. The talking circuit will

be between the two telephone sets over the line wires as is readily apparent. Should the attendant at the main station desire to communicate with the patrolman upon the beat, he throws the key K^1 , completing a circuit through relay R^3 —from ground G^2 —battery B^3 — R^3 —17—18—19—ground G^3 . The relay is energized, attracting its armatures 20, 21 and 22, closing a locking circuit through the following circuit: ground G^2 — B^3 — R^3 —21—23—24—25— K^2 —to ground at G^4 . The attraction of armature 20 interrupts the line limb 1 at 20—26 and the line limb 2 at 22—27 and connects the source of current B^2 to the line at 20—28 and 22—29. Current will flow from B^2 —through R^2 —30—28—20—1—bridge 3 including relays R^4 —2—22—29—back to B^2 . The relays R^4 are energized to close the switches 30—31 in the lamp bridges 6. When these switches are closed the current from the source B^2 passes through the bridges 6 to the lamps L , the flow of current through the bridge 3 being sufficient to hold up the relays. The lamps L are placed in such a position and arranged in such a way that their actuation is apparent to everyone within a reasonable distance of the lamps. The patrolman observing the light, proceeds to the box and takes the receiver from the hook H , closing the switch H —5. This forms a shunt in the bridges 3 and 6 allowing a flow of current of greater strength over the line conductors than was permitted by the devices in the bridges 3 and 6. This flow of current is sufficient to energize R^2 which pulls up its armature 24 interrupting the locking circuit of relay R^3 at 24—25. The relay R^3 is then deenergized, releasing its armatures 20, 21 and 22, and restoring the line circuit through to the listening key K . The resistance devices I are placed in these bridges to prevent a flow of current strong enough to injure the telephone instruments. They, however, admit sufficient current to operate relay R^2 . The operation of the police signal sending devices E or the switch N causes an interruption of the following circuit over which impulses of current are sent: battery B —one winding of R^5 —one winding of R —10—1—3 including R^4 , N and E —2—9—the other winding of R —the other winding of R^6 —back to battery B . This will operate relay R^5 but will not operate relay R to control its armature. The operation of relay R^5 closes a circuit through R^4 which controls the police signal receiving device.

In Fig. 2 I show the relay R^5 bridged across the line conductors on the line side of the contacts under control of relay R^2 . The circuit of the line relay is interrupted at the front contacts of the key K . Otherwise the system and its operation are identical with that of Fig. 1.

Fig. 3 is similar to Fig. 1, except that I

show in addition a relay R^1 which pulls up and closes a circuit through the police signal receiving device controlling relay R^5 when the circuit through that relay and line is interrupted at the contacts of the relay R^3 . I also show a lamp L^2 in shunt of relay R^2 which serves to indicate the current flow in the line. This is for the purpose of ascertaining the condition of the lamps at the substations.

L^3 is a lamp at R^3 which serves to indicate the connection of the line to the source B^2 , this lamp being extinguished when the circuit of relay R^3 is interrupted.

At the substation I show a branch 6' of the shunt 6 which contains the switch 50—51 normally open but which is closed for a moment in the upward movement of the switch hook H . The closure of this switch serves to place a low resistance circuit through 6', the resistance I^1 and 6 across the line and permitting the flow of sufficient current to energize R^2 which attracts its armature 24 interrupting the circuit of R^3 , cutting off the source B^2 and completing the line circuit through to the key K . The resistances I^1 are for the purpose of ballasting the circuit closed by the switch 50—51 and preventing the flow of excess current therein. I have thus produced a system in which I eliminate the third conductor between the first substation and the main station and in which I provide means for signaling the patrolman, said means being operated from the main station over the telephone conductors and automatically disconnected when the patrolman replies. I also provide a line relay and a police signal receiving device controlling relay in series in the line which are non-interfering; and in Fig. 3 I show a device for maintaining the energization of the relay R^5 after the interruption of its normal circuit.

While I have shown my invention in the particular forms illustrated and described, it will be obvious to those skilled in the art that variations of and departures from the forms thereof may be made without departing from the spirit of my invention, the same being embodied therein merely for the purpose of illustrating the same.

I claim:

1. In a composite system consisting of a combined police and telephone system, the combination of a main station, substations, conductors connecting said stations, telephone instruments adapted to be connected in circuit with said instruments, a bridge of said conductors passing through a plurality of said substations, and police signal sending apparatus connected in said bridge.

2. In a composite system consisting of a combined police and telephone system, the combination of a main station, substations, conductors connecting said stations, tele-

phone instruments adapted to be connected in circuit with said instruments, a bridge of said conductors passing through a plurality of said substations, and police signal sending apparatus connected in series in said bridge.

3. In a composite system consisting of a combined police and telephone system, the combination of a main station, a plurality of substations, a pair of line conductors connecting said stations, a third conductor connecting the substations and connected at its terminals to the circuit of the said pair of conductors, telephone instruments and police signaling apparatus adapted to operate over said conductors.

4. In a composite system consisting of a combined police and telephone system, the combination of a main station, a plurality of substations, a pair of conductors connecting said stations, a third conductor connecting the substations and connected at its terminals to the circuit of the said pair of conductors, telephone instruments adapted to be connected in bridge of said line conductors, and police signal sending apparatus connected in said third conductor.

5. In a composite system consisting of a combined telephone and police system, the combination of a main station, a plurality of substations, a pair of line conductors connecting the same, a third conductor connecting said stations and terminating in the circuit of said line conductors, signals at the substations and controlling means for said signals connected in the third conductor.

6. In a composite system consisting of a combined telephone and police system, the combination of a main station, a plurality of substations, a pair of line conductors connecting the same, a third conductor connecting said stations and terminating in the circuit of said line conductors, signals at the substations and controlling means for said signals connected in the third conductor, said controlling means under control of the main station attendant.

7. In a composite system consisting of a combined police and telephone system, the combination of a main station, a plurality of substations, a pair of conductors connecting said stations, a third conductor connecting said substations, signals at said substations, and relays controlling said signals connected in the third conductor.

8. In a composite system consisting of a combined police and telephone system, the combination of a main station, a plurality of substations, a pair of conductors connecting said stations, a third conductor connecting said substations, signals at said substations and a relay at each station controlling the signal thereat connected in the third conductor, said relays under control of the main station attendant.

9. In a composite system consisting of a combined police and telephone system, the combination of a main station, a plurality of substations, a pair of line conductors connecting the same, a third conductor connecting said substations connected to the circuit of the line conductors, police signal sending apparatus in said third conductor, signals at said substations, and means in said third conductor controlling said signals.

10. In a composite system consisting of a combined police and telephone system, the combination of a main station, a plurality of substations, a pair of line conductors connecting the same, a third conductor connecting said substations connected to the circuit of the line conductors, police signal sending apparatus in said third conductor, signals at said substations, and relays in said third conductor controlling said signals.

11. In a composite system consisting of a combined police and telephone system, the combination of a main station, a plurality of substations, a pair of line conductors connecting the same, a third conductor connecting said substations connected to the circuit of the line conductors, police signal sending apparatus in said third conductor, signals at said substations, and polarized relays in said third conductor controlling said signals.

12. In a composite system consisting of a combined telephone and police system, the combination of a main station, a plurality of substations, a pair of line conductors connecting said stations, telephone instruments adapted to be connected in circuit with said conductors, a third conductor connecting said stations, signals at said substations and polarized relays in said third conductor controlling said signals, said relays under control of the attendant at the main station.

13. In a composite system consisting of a combined telephone and police system, the combination of a main station, a plurality of substations, conductors connecting said stations, telephone instruments adapted to be connected in circuit with said conductors, a third conductor connecting said substations and terminating in the circuit of said conductors, police signal sending apparatus connected in said third conductor, signals at said substations, controlling means for said signals in said third conductor, a source of current, means for connecting said source in circuit with said signals and said line conductors.

14. In a composite system consisting of a combined telephone and police system, the combination of a main station, a plurality of substations, conductors connecting said stations, telephone instruments adapted to be connected in circuit with said conductors, a third conductor connecting said substations

tions and terminating in the circuit of said conductors, police signal sending apparatus connected in said third conductor, signals at said substations, controlling means for said signals in said third conductor, a source of current, means for connecting said source in circuit with said signals and said line conductors, and means preventing a heavy flow of current from said source through said telephone instruments.

15. In a composite system consisting of a combined police and telephone system, the combination of a main station, a plurality of substations, a pair of line conductors connecting said stations, telephone instruments adapted to be bridged across said conductors, a bridge of said conductors passing through said substations, a signal at the main station controlled from said substation, police signal impulse sending means at said substations, and means in said bridge preventing the operation of said signal by said police signal impulses.

16. In a composite system consisting of a combined police and telephone system, the combination of a main station, a plurality of substations, a pair of line conductors connecting said stations, telephone instruments

adapted to be bridged across said conductors, a bridge of said conductors passing through said substations, a signal at the main station controlled from said substation, police signal impulse sending means at said substations, and relays in said bridge whose resistance prevents the operation of said signal by said police signal impulses.

17. In a composite system consisting of a combined police and telephone system, the combination of a main station, a plurality of substations, a pair of line conductors connecting the same, a bridge of said conductors passing through said substations, a signal at the main station controlled from the substation, police signal sending and receiving means operating over said system, and means in said bridge preventing the operation of said signal at the main station by the current of the police signal sending and receiving means.

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

A. D. T. LIBBY.

Witnesses:

F. O. RICHY,
Jos. J. MIZER.