

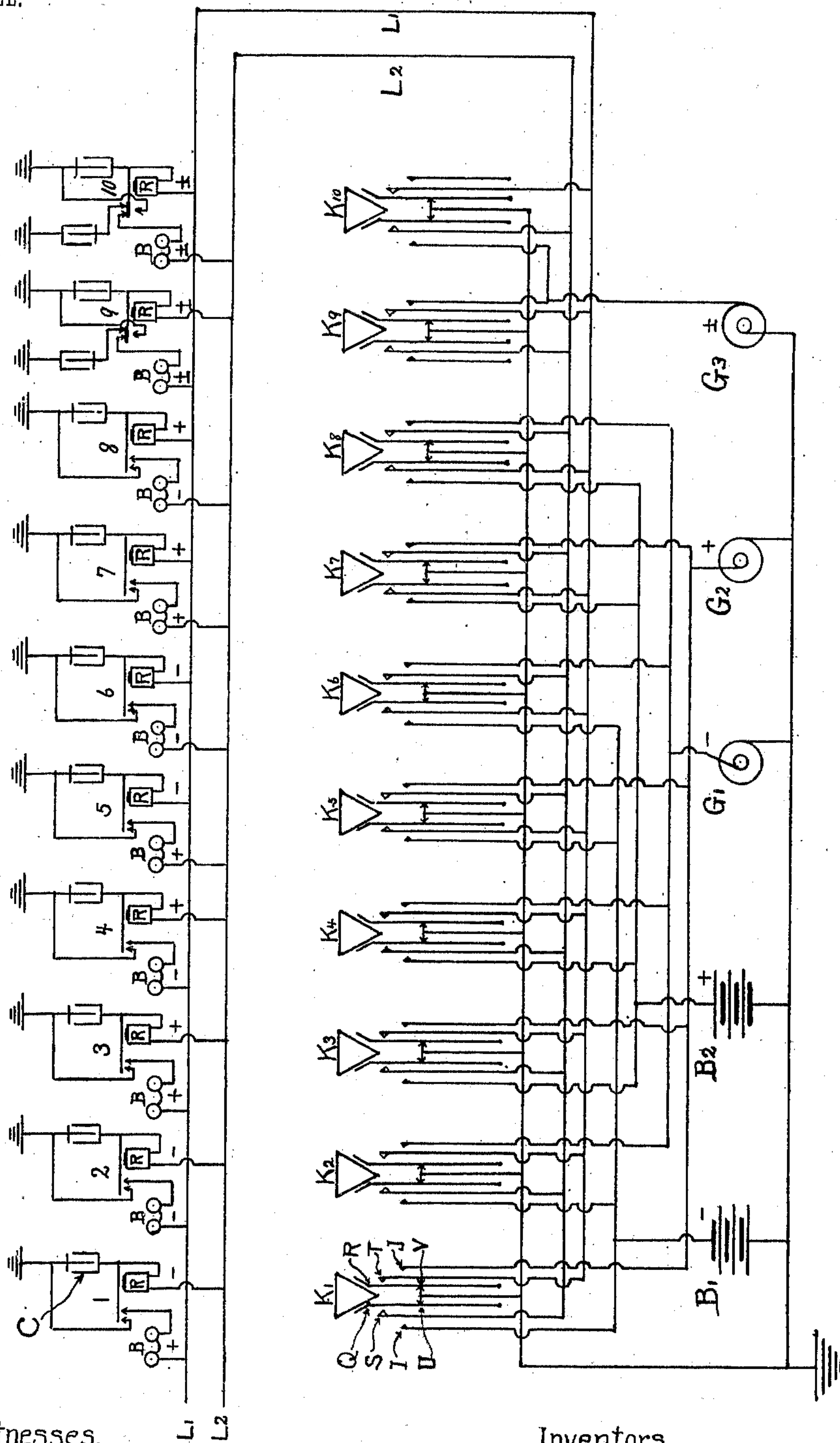
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F. C. PENFIELD & O. TEMPLIN.
SELECTIVE SIGNAL SYSTEM.

APPLICATION FILED MAR. 17, 1902.

NO MODEL.



Witnesses.
Estella Northrup
Lizzie Bennett.

Inventors.
Fred. C. Penfield.
Olin Templin

UNITED STATES PATENT OFFICE.

FRED C. PENFIELD AND OLIN TEMPLIN, OF LAWRENCE, KANSAS.

SELECTIVE SIGNAL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 760,399, dated May 17, 1904.

Application filed March 17, 1902. Serial No. 98,564. (No model.)

To all whom it may concern:

Be it known that we, FRED C. PENFIELD and OLIN TEMPLIN, citizens of the United States, residing at Lawrence, in the county of Douglas, State of Kansas, have invented certain new and useful Improvements in Selective Signal Systems, of which the following is a specification.

This invention relates to electric signaling where a series of signaling mechanisms are placed on a single metallic circuit and each is selected at will from one station on the line and operated independently of all the rest. We employ two line conductors having branches adapted to be grounded at each station, a central station provided with several suitable sources of continuous direct electric current having their respective poles adapted to be connected to the line conductors in a manner to send impulses in opposite directions, sources of pulsating current adapted to be connected in like manner, and a source of alternating current also adapted for connection with the line conductors, all of which are associated with a keyboard and suitable keys adapted to operate the respective circuits, whereby impulses of current corresponding in character and direction with the respective current source and arrangement will be sent to the line-circuit, and a plurality of local stations each containing suitable signal receiving and transmitting devices—such, for instance, as a bell and a circuit-controller, the latter for closing and opening suitable circuits, a condenser, and a relay adapted to automatically operate the circuit-controller.

Our invention is intended as an improvement upon a previous one, application for Letters Patent for which was filed February 3, 1902. In our former invention the grounded branches of the local stations in some cases were normally closed. While this fact does not interfere with its use in telephone systems where the central station is called by means of a magneto, it is inapplicable to common battery systems. It is this defect which we now wish to overcome. We accomplish this by a novel principle, whereby a continuous direct current is shunted around a condenser, as hereinafter explained. We have also de-

vised a novel method of discharging the condensers and line.

We have illustrated our invention by the accompanying drawings, in which there is shown diagrammatically a system of ten local stations and a central and calling station.

1 2 3 4 5 6 7 8 9 10 are the local stations placed on the two line conductors L' L'' . B represents the bells or other signaling mechanisms of said local stations, and R the relays of the same. In the stations 1 2 3 4 9 the bells are placed in grounded branches of L' . In stations 5 6 7 8 10 they are similarly placed in grounded branches of L'' . In stations 9 10 a condenser is placed in said grounded branches in series with the bell. In each of the branches containing the bell a circuit-closer is also introduced to make and break the circuit through said branch. In stations 1 2 3 4 9 the relays are placed in grounded branches of L'' , while in stations 5 6 7 8 10 they are similarly placed on L' . In all stations a condenser is placed in series with the relay. There is also provided a shunt around said condenser including a circuit-closer adapted to be controlled by said relay. The relays at stations 1 2 5 6 are adapted to respond to negative continuous current, those at stations 3 4 7 8 are adapted to respond to positive continuous current, and those at stations 9 10 are adapted to respond to either positive or negative continuous current. We have found that when a current is sent to the line which is of such a character as to operate the relays of that line it will attract the armatures of said relays for an instant while the condensers are being charged. This action of the relays closes the signaling-circuits, but since the armatures would be immediately withdrawn, thus breaking said signaling-circuits, no signal could be given; but the same relay is adapted to close a second circuit, forming a shunt around the condenser. As soon, therefore, as the action of the relay has closed said circuit the current flows around the condenser, keeping the circuits closed, whereby the continuous direct current flows uninterruptedly through the magnet of said relay and the alternating or pulsating current flows through the magnets of the bell. It is therefore obvious that a signal may be given at any

station where such conditions are caused to exist, and that for any desired period of time. In stations 9 10 the operation of the various parts is as just described, except that the relay opens the signaling-circuit at the same time that it closes the shunt. In stations 1 3 5 7 the bells are made responsive to pulsating current of positive polarity. In stations 2 4 6 8 they are made responsive to negative pulsating current. In stations 9 10 they are made responsive to alternating current. The signaling-circuits of stations 1 2 3 4 5 6 7 8 stand normally open and are closed by the action of the relays. The signaling-circuits of stations 9 10 stand normally closed and are opened by the action of the relays. To avoid any possible trouble resulting from the charged condition of any part of the system, its discharge is accomplished by means of an automatic switch attachment at the central station, as hereinafter described.

At the central station B' B^2 are batteries with grounded terminals providing continuous direct currents of negative and positive polarities, respectively, and G' G^2 G^3 are generators or other sources of negative pulsating current, positive pulsating, and alternating currents, respectively. Contact-springs S connect, through contact-points I , the line conductor L^2 with the conductor leading to one of the batteries. Contact-springs T connect, through contact-points J , the line conductor L' with the conductor leading to one of the generators. A series of push-keys are adapted to make the necessary contacts to close said circuits, so that impulses of the proper currents will be sent to the two line conductors of the system to operate the mechanisms of the local stations, as already described, each key controlling its similarly-numbered station. The springs Q R are normally in contact with the contact-points U V , respectively, and these are connected with a grounded conductor. The springs Q R are so constructed that the depression of the push-key K will cause them to first make contact with contact-springs S T and later break their connection with U V . During the interval between the making and breaking of these contacts the line conductors L' L^2 are grounded, which would result in the release of any charge in the condensers, as previously indicated.

With the foregoing description of the construction of the system its operation becomes easily understood. Depression of K' sends to line conductor L^2 an impulse of negative continuous direct current, which operates the relays at stations 1 2 9, closing the signaling-circuits of stations 1 2, and opening that of station 9. At the same time there is sent to line conductor L' an impulse of positive pulsating current, which will operate the bell at station 1. No other bell will be rung, since of the bells that are on L' the one at station 2 is not responsive to positive current, those at

stations 3 4 have not had their circuits closed, and that at station 9 has had its circuit opened. By reference to the drawing it is easily seen that in a similar manner the bells at stations 2 3 4 5 6 7 8 may be selected and independently rung by the depression of K^2 K^3 K^4 K^5 K^6 K^7 K^8 . Depression of K^9 sends to L' alternating current, ringing the bell at station 9, and depression of K^{10} sends to L^2 alternating current, ringing the bell at station 10. In neither of these cases will any other bell be rung, since there is no other closed signaling-circuit on the line. It is therefore perfectly clear that any one of the local stations of the system may be selectively called from the central station and that there may stand normally on the line conductors a continuous direct current for telephonic or other purposes.

In case our invention were used for party telephone-lines the circuits would stand normally as described, and shown in the drawing, and when a subscriber responded to a call by removing the receiver from its hook or other convenient manner he would automatically complete the metallic circuit of the two line conductors for talking purposes. This would be accomplished by arrangements of conductors and contacts according to ordinary telephone practice.

It is evident that the order of arrangement of the stations on the circuit is not fixed and that it may depart in any manner from that assumed in the drawing. In like manner the number of stations is not specified, it being evident that a system of a smaller number may be made up by the use of the desired number selected from the entire system, as shown.

Having described our invention, what we claim, and desire to secure by Letters Patent, is -

1. A selective signal system comprising a plurality of local stations connected together with a central station by means of a metallic circuit of two line conductors, both of which have at each of said local stations branches leading to the ground or other return conductor, at the central station sources of alternating, positive continuous, negative continuous, positive pulsating and negative pulsating currents with means for sending the same to said line conductors, at each of said local stations a signaling mechanism placed in the grounded branch of one of said line conductors, with a circuit-closer placed in said branch in series with said signaling mechanism, and in the grounded branch of the other of said line conductors a relay adapted to control said circuit-closer and in series therewith a condenser, also a shunt around said condenser with a circuit-closer in said shunt controlled by said relay, substantially as specified.

2. A selective signal system comprising a plurality of local stations connected together with a central station by means of a metallic circuit of two line conductors both of which

have at each of said local stations branches leading to the ground or other return conductor, at the central station sources of continuous and pulsating currents of both polarities with means for sending the same to both of said line conductors, at each of said local stations a signaling mechanism made responsive to pulsating current of one direction and placed in the grounded branch of one of said line conductors with a circuit-closer placed in said branch in series with said signaling mechanism, and in the grounded branch of the other of said line conductors a relay made responsive to continuous current of one direction and adapted to control said circuit-closer, and in series therewith a condenser, also a shunt around said condenser with a circuit-closer in said shunt also controlled by said relay, also means for discharging said condensers, substantially as specified.

3. In a selective signal system comprising a central station connected with a plurality of local stations by means of a metallic circuit of two line conductors, the combination of said line conductors, sources of supply of alternating, continuous, and pulsating currents with means for sending the same to said line conductors, at each of said local stations grounded branches of both of said line conductors, in one of said grounded branches a signaling mechanism and in series therewith a circuit-closer, and in the other of said grounded branches a relay adapted to control said circuit-closer, and in series with said relay a condenser, and a shunt around said condenser with a circuit-closer in said shunt, said circuit-closer being controlled by said relay, and means for discharging said condensers, substantially as specified.

4. In a selective signal system comprising a central station connected with a plurality of local stations by means of a metallic circuit of two line conductors, the combination of said line conductors, sources of supply of continuous and pulsating direct currents of both polarities with means for sending the same to said line conductors, at each of said local stations grounded branches of both of said line conductors, in one of said grounded branches at each station a signaling mechanism made responsive to pulsating current of one direction and in series therewith a circuit-closer, and in the other of said grounded branches a relay made responsive to constant current of one direction and adapted to control said circuit-closer, and in series with said relay a condenser, and a shunt around said condenser with a circuit-closer in said shunt being controlled by said relay, and means for discharging said condensers, substantially as specified.

5. In a selective signal system comprising a central station connected with a plurality of local stations by means of a metallic circuit of two line conductors, the combination of said

conductors, sources of supply of alternating current and of continuous currents of both polarities with means for sending the same to said line conductors, at each of said local stations grounded branches of both of said line conductors, in one of said grounded branches at each station a signaling mechanism made responsive to alternating current and in series therewith a condenser and a circuit-closer, and in the other of said grounded branches a relay made responsive to constant current of one direction and adapted to control said circuit-closer, and in series with said relay a condenser, and a shunt around said condenser with a circuit-closer in said shunt, said circuit-closer being controlled by said relay, and means for discharging said condensers, substantially as specified.

6. A selective signal system comprising a central station, a plurality of local stations connected thereto, two line conductors and a return-conductor by means of which said stations are connected, means for connecting said line conductors to the return-conductor at each of said local stations; at the central station the following instrumentalities, to wit: a source of alternating current, a source of positive continuous current, a source of negative continuous current, a source of positive, direct pulsating current, a source of negative, direct pulsating current, and means for directing current from said sources of current to said line conductors; and at each of the said local stations the following instrumentalities, to wit: a signal device adapted to be included in circuit between one of the line conductors and the return-conductor, a circuit-closer adapted to close said circuit, a relay included between the other line conductor and the return-conductor adapted to control said circuit-closer, a condenser in circuit with said relay between said line conductor and said return-conductor and a shunt around said condenser including said circuit-closer, substantially as specified.

7. A selective signal system comprising a central station, a plurality of local stations connected thereto, two line conductors by means of which said stations are connected, a return-conductor, means for connecting said line conductors to said return-conductor at each of said local stations; at the central station the following instrumentalities, to wit: a source of continuous direct current, a source of pulsating direct current and means for directing current from said sources of current to said line conductors; at one or more of the said local stations the following instrumentalities, to wit: a signal device responsive only to direct pulsating current flowing in a given direction adapted to be included in circuit between one of the line conductors and the return-conductor, a circuit-closer adapted to close said circuit, a relay responsive only to continuous direct current in a given direction

included between the other line conductor and the return-conductor adapted to control said circuit-closer, a condenser in circuit with said relay and a shunt around said condenser adapted to be closed through the instrumentality of said relay, substantially as specified.

8. A selective signal system comprising a central station, a plurality of local stations, two line conductors and a return-conductor adapted to connect said stations, sources of current-supply of alternating, continuous direct, and pulsating direct characters, means for directing currents therefrom to said connecting-conductors; at each of the local stations signal devices adapted to be included in circuit with one of the line conductors and the return-conductor, a relay adapted to be included in circuit with the other line conductor and the return-conductor, a circuit-closer adapted to close both circuits and adapted to be operated by said relay, a condenser in circuit with said relay, and a shunt around said condenser including said circuit-closer, substantially as specified.

9. A selective signal system comprising a central station, a plurality of local stations, two line conductors and a return-conductor adapted to connect said stations, sources of current-supply of continuous direct and pulsating direct characters, means for directing currents therefrom to said connecting-conductors; at each of said local stations a circuit-closer for connecting said line conductors to the return-conductor; at one or more of said local stations a signaling device responsive only to a pulsating direct current in a given direction, adapted to be included in circuit with one of said line conductors and the return-conductor by means of the said circuit-closer, a relay responsive to a continuous current adapted to be included in circuit with the other line conductor and the return-conductor adapted to operate said circuit-closer, a condenser in circuit with said relay, a shunt

around said condenser including said circuit-closer, substantially as specified.

10. A selective signal system comprising a central station, a plurality of local stations, two line conductors and a return-conductor adapted to connect said stations, sources of current-supply of continuous direct and alternating characters, means for directing currents therefrom to said connecting-conductors; at each of said local stations a circuit-closer for connecting said line conductors to the return-conductor; at one or more of said local stations a signaling device responsive to an alternating current adapted to be included in circuit with one of said line conductors and the return-conductor by means of said circuit-closer, a relay responsive to a continuous current adapted to be included in circuit with the other line conductor adapted to operate said circuit-closer, a condenser in circuit with said relay, a shunt around said condenser, including said circuit-closer, substantially as specified.

11. In a selective signal system provided with two line conductors and a return-conductor, the combination therewith of a circuit adapted to join one of said line conductors and the return-conductor including a signaling device, a circuit, including a responsive device, and a condenser adapted to join the other line conductor and said return-conductor, a shunt-circuit around said condenser, and a circuit-closer operated by said responsive device to close all of the said circuits, substantially as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

F. C. PENFIELD.
OLIN TEMPLIN.

Witnesses:

ESTELLA NORTHRUP,
AUSTA NORTHRUP.