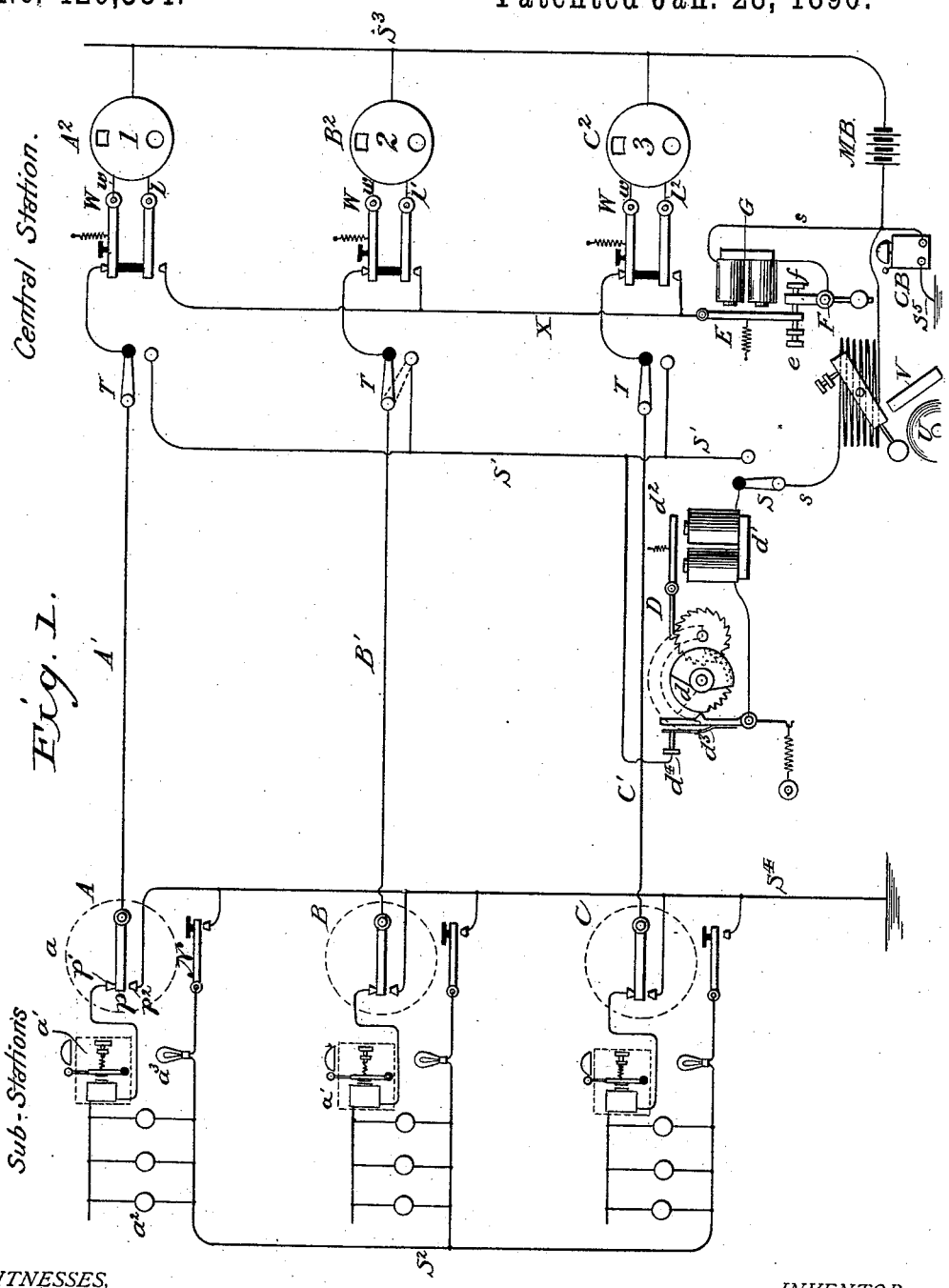
(No Model.) 3 Sheets—Sheet 1.

A. G. HOLCOMBE.

ELECTRICAL COMMUNICATING SYSTEM.

No. 420,384. Patented Jan. 28, 1890.



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(No Model.) 3 Sheets—Sheet 2.

A. G. HOLCOMBE.

ELECTRICAL COMMUNICATING SYSTEM.

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Fig. 2.

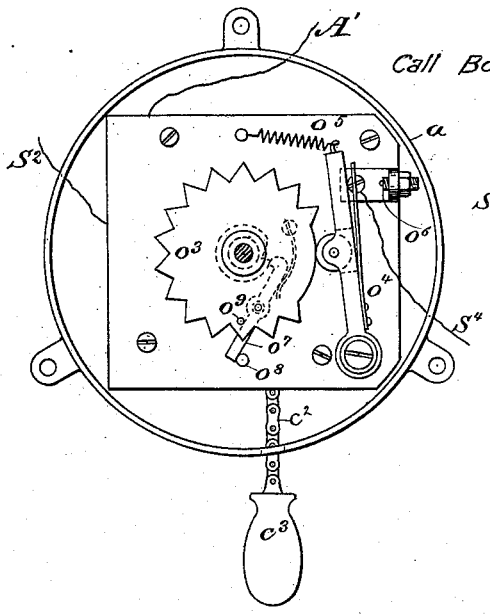


Fig. 4.

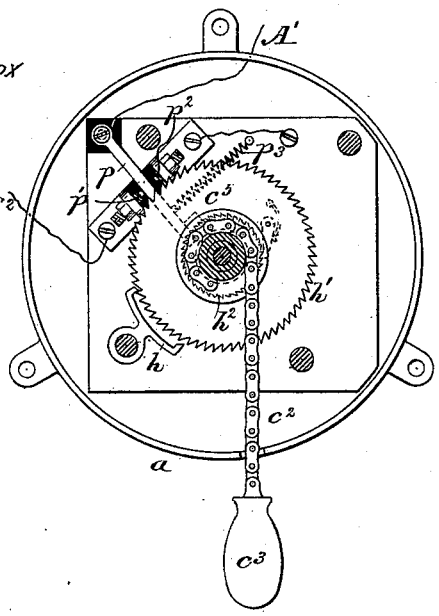
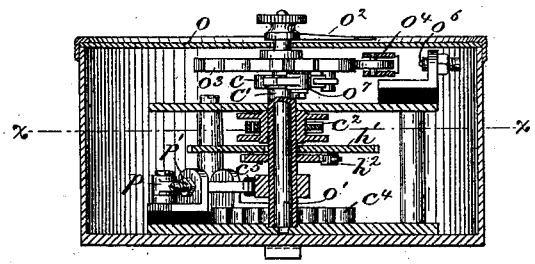


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

A. G. HOLCOMBE.

ELECTRICAL COMMUNICATING SYSTEM.

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Fig. 5.

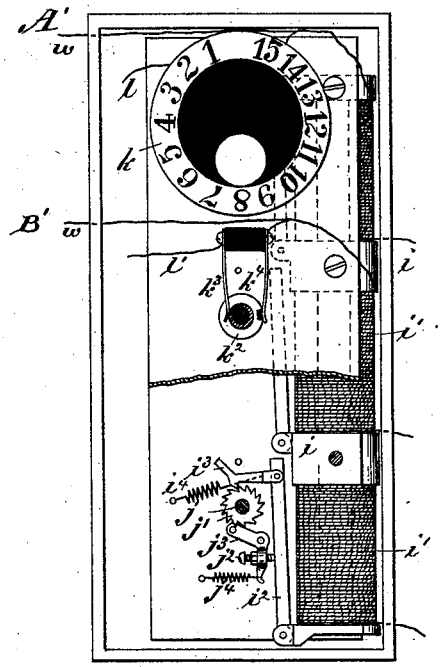
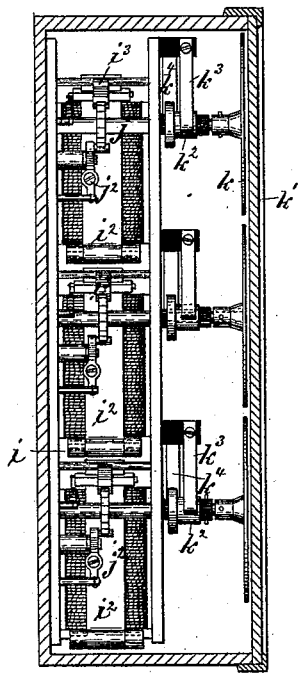


Fig. 6.



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UNITED STATES PATENT OFFICE.

ALFRED G. HOLCOMBE, OF NEW YORK, N. Y., ASSIGNOR TO THE ELECTRIC SIGNAL MANUFACTURING COMPANY, OF SAME PLACE.

ELECTRICAL COMMUNICATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 420,384, dated January 28, 1890.

Application filed January 14, 1889. Serial No. 296,341. (No model.)

To all whom it may concern:

Be it known that I, ALFRED G. HOLCOMBE, a citizen of the United States, residing in New York, county and State of New York, have invented certain new and useful Improvements in Electrical Communicating Systems, of which the following is a specification.

This invention has reference to a system of signaling having a central station and sub-stations in which the central station may signal any one of the sub-stations and all the latter stations may signal to the central station, the system being specially designed for police service.

The present invention relates to certain organizations not claimed in my patent, No. 397,364, granted February 5, 1889, and certain improvements on the system therein shown, as appears from the following specification and claims.

In the accompanying drawings, Figure 1 is a diagram of the system; Fig. 2, a face view of the call-box with the front plate removed; Fig. 3, a central section through the same; Fig. 4, a section on the line $x\,x$ of Fig. 3; Fig. 5, a part face view and part section of the annunciator with the face-plate removed; and Fig. 6, a side elevation of the actuating mechanism of the same, the frame being in section.

A B C indicate three outlying stations, each having a call-box a, a bell a', signaling-lights a^2, and branch circuit by the push-button N.

A′ B′ C′ are the individual lines, and A^2 B^2 C^2 are the annunciator apparatus of said stations at the central office.

M B indicate the main battery. One pole of this battery is connected by a wire s with a switch S, by means of which the central-office-signaling mechanism D may be thrown into the circuit or the battery connected around the signaling mechanism. The line S′ from the signaling mechanism, or from the switch S, runs to one of the points of a switch T of each of the individual lines.

The signaling mechanism may be of any suitable character, that shown being a toothed wheel d, which may be adjusted to expose any desired number of notches, as is well understood. The wheel may be actuated, as is common, by a weight or spring, and is released by an electro-magnet d', attracting an armature-lever d^2, one end of which engages a detent or escapement-wheel. Normally, the circuit-connections are closed in the signaling mechanism D, and whenever the projection or wedge on the pivoted lever d^3 enters a notch in the wheel d the circuit is broken at d^4.

The signal is reproduced at the sub-station by the extinguishment of the signal-lamps and the sound of the signal-bell a', the hammer of which delivers its stroke as the armature is drawn away from the bell-magnet by its retractile spring.

Tracing the circuit from the battery, it is as follows: by wire s to switch S, through the signaling apparatus to wire S′, and then by the contact of any one of the individual lines whose switch is put over, as indicated by dotted lines at the switch of line B′, and its switch T over the individual line through the call-box, bell, and incandescent electric lamp or lamps of that particular sub-station to the collective line S^2, the current then dividing among all the remaining sub-stations and returning over their individual lines through the annunciator mechanisms to the line S^3 and opposite pole of the battery. The current in returning through the various sub-stations is thereby divided, and no one station takes sufficient current to operate its lamps or magnets. When, therefore, the switch T of any station is connected with the line S′ and the switch S is moved to throw the signaling mechanism into circuit, the circuit from the battery M B is normally closed, and the lights at the particular sub-station are normally lighted. As the wheel d revolves, the circuit is broken at each tooth therein and the lights are momentarily extinguished. This is a desirable method of operation, possessing many advantages over the operation shown in my prior patent above mentioned. For instance, during the transmission of the signal the lamps being normally illuminated the attention of the patrolman is more readily attracted than in the other system, because in the latter case unless he were looking at the lamps at the very moment of flashing he might not perceive that they were being operated.

I place a visual and audible indicator in

the line s between the switch S and the battery M B. This indicator may consist of a polarized bar pivoted at the middle and enveloped by a coil forming part of the wire s. One end of the bar carries a hammer operating against a gong U. A permanent magnet V is fixed in such relation to the pivoted indicator as to attract it when it comes within its field and cause the hammer to strike the gong.

This apparatus has two functions: First, it serves as a visual indicator, by means of which a patrolman at one of the outlying stations can send a return-signal to indicate that a call transmitted to his station or beat has been received. For this purpose it operates in the following manner: While the circuit is still closed and the signal being repeated to one of the sub-stations, the patrolman at that station by operating his call-box, as presently described, causes the lever p of the call-box a to break contact with its upper stop, thus opening the circuit. The magnetic bar of the indicator returns, therefore, to its normal position indicated in the drawings, and, coming within the field of the magnet V, is attracted and the hammer strikes the gong. A like action does not, however, occur during the momentary interruptions of the circuit by the transmitting mechanism, as the magnetic bar does not fully respond to such brief interruptions.

The second function of this apparatus is that of an indicator for testing the line. For instance, on cutting out the transmitting apparatus by putting the switch S to the right, the switches T being in the position indicated in the drawings, the battery-circuit previously traced is open, and by closing and opening the switches T successively the individual circuits will be successively closed, and the current that will then flow, if the circuit be in proper order, deflects the magnetic bar and gives a visual indication of a condition of the circuit.

The call-boxes and annunciator apparatus shown are the same as those illustrated in my prior patent.

The call or signaling box shown in detail by Figs. 2, 3, and 4 is to have the signals marked or printed on its face o on radial lines, as usual, and as shown in my prior patent. On the central shaft o', in front of the face o, is secured the pointer o^2 and thumb-piece, by which it can be rotated, and immediately behind the face is located the serrated disk o^3, rigidly secured to the shaft o' and provided with as many teeth as there are signals or wants. A roller on the lever o^4, pivoted to the frame of the instrument, is caused to bear against the edge of the disk o^3 by means of the spring o^5, and this lever, when the disk is rotated, is caused by the action of the teeth of the disk against the roller to make contact with the insulated stop o^6. This stop o^6 is joined to the line S^4. At the back of the disk o^3 and pivoted to it is the spring-acting hooked pawl o^7, the projecting tail of which strikes the stud o^8 when the pointer o^2 is brought back to the zero position, and thus moves the hooked end of the pawl clear of the notch in the flange c on the end of the sleeve c', through which the shaft o' passes, as shown in Fig. 2. The movement of the pawl o^7 when struck by the stop o^8 is limited by a pin o^9 on the disk and the rotation of the disk checked.

To a flanged drum on the sleeve c' is attached the chain c^2, which passes down through the lower side of the case and is provided with the knob or handle c^3. A coil-spring c^4 is attached to the rear end of the sleeve c' and to the frame, and to this sleeve, just in front of the spring c^4, is secured the insulated lug c^5, which acts as a stop for the spring and determines the normal position of the sleeve c' and attached parts by resting against the end of the lever-switch p, to which the individual line A′ B′ C′ is connected. This lever p plays between the two insulated stops p' and p^2, but is held against the stop p', to which the collective line S^2 is connected through the lamp and call-bell by the lug c^5, and is brought into contact with the other stop p^2 by the spring p^3 when the sleeve c' is rotated. This stop p^2 is electrically connected through the frame to the lever o^4.

The speed-controlling gear h h' h^2 is of the ordinary construction.

In the indicating-annunciator three sections only are shown, and in Fig. 5 a different face view of the mechanism of each section is given. The electro-magnets of all sections in each vertical row of the annunciator are composed of a single bar of iron provided with pole-pieces i, between which the coils of insulated wire i' are wound. In front of each of the coils, hinged to a pole-piece, is an armature i^2, the free end of which faces the pole-piece next above the one to which it is hinged, thus forming a nearly-closed magnetic circuit with the part of the bar constituting the core between said adjacent pole-pieces.

As the operative parts are alike in all sections of the annunciator and similarly lettered, the following description will apply to the mechanism of each section: The shaft j extends through the frame in front of the armature i^2, and is provided with the ratchet-wheel j', into which plays the hooked pawl i^3, pivoted to the upper end of the armature i^2, said pawl being held in contact with the ratchet-wheel j' by the spring i^4, which also draws the armature away from the pole-piece i of the magnet. The extent of the movement of the armature is determined by the adjustable screw j^2, fitted in the bell-crank lever j^3, the other arm of which is provided with a pin arranged to come in contact with the teeth of the ratchet-wheel j', and thus rectify the position of the wheel and lock it when the armature in its retrograde movement strikes the screw j^2, thus preventing the

shaft j and attached parts from being moved farther than one tooth of the ratchet-wheel j' for each movement of the armature toward the magnet. The light spring j^4 holds the pin on the lever j^3 always against the ratchet-wheel, thus causing it to act as a back-stop therefor.

On the end of the shaft j is secured the disk k, having a series of numbers 15 marked on its face corresponding to the signals marked on the call-boxes, and a blank space between the numbers which correspond to the number of teeth formed on the ratchet-wheel j'. The central part of this disk, with the exception of a circular spot, is made black.

The face k' of the annunciator has numbers marked thereon indicating the stations, and each section has two holes, one in front the blank space between the numbers 1 and 15 and the other in front of the circular white spot on the disk when the disk is in normal position; but when the disk is rotated by its electro-magnet, so as to expose a number in place of the blank space, then a black circle appears in the lower opening, which makes a distinctive mark on the face of the annunciator, by means of which the attendant readily observes the number of the station making the call.

On each of the shafts j, but insulated therefrom, is the flanged collar k^2, against which the insulated springs k^3 and k^4 bear, the flange having an insulated piece on which the spring k^4 normally rests. Each of the springs k^4 is connected to one of the individual lines A′ B′ C′ through the upper part of the switch-lever W and line w, Figs. 1 and 5, and each of said lines is also joined to one end of its respective coil i', and the springs k^3 are connected by the lines l l' l^2, respectively, to the lower part of the switch W, Fig. 1. The other ends of the coils i are connected to one terminal of the battery M B by the line S^3.

When an officer at a sub-station signals, he simply turns the pointer o^2 of his call-box until it lies over or points to the desired word or number. This in itself does not affect the circuits. It may here be mentioned that the pointer can be rotated forward and back to the starting-point indiscriminately without any injury to the apparatus. When the pointer is thus set, the hooked pawl is carried around with the serrated disk o^3. The officer now pulls down the knob c^3, which winds up the spring c^4 and allows the spring p^3 to move the lever p against the stop p^2, thus breaking the collective circuit p' and connecting the individual lines A′ B′ C′ to the lever o^4, which lever closes the main line at o^6 each time a tooth of the disk o^3 acts thereon, as the disk is caused to move back into normal position by the engagement of the notch in the flange c with the hooked end of the pawl o^7.

The circuit is as follows: from one pole of the battery M B by the line S^3 through the annunciator, through the upper bar of the switch-lever W to the switch T, individual line and contact-lever p of the sub-station signaling-box, its contact p^2, call-box frame, lever o^4, contact o^6, and line S^4, common to all the sub-stations and running to earth, and the circuit is completed through the earth to the earth-terminal S^5 at the central station, through the call-bell C B, and then by a portion of the line s to the opposite pole of the battery. This line S^4 S^5, &c., I term the "all-around-battery connection" since it connects this pole of the battery with all sub-stations. The impulses thus caused to flow through the annunciator energize its coil i', and through the medium of the armature and pawl move the ratchet-wheel j forward, thus exposing the number in the opening of the face of the annunciator. These impulses in passing through the main line actuate the call-bell C B. The attendant at the central station, having noted the call, informs the officer that his signal has been received by moving the switch T, thereby separating the individual line from the annunciator and connecting it through the signaling mechanism D, thereby lighting the lamp and ringing the bell at the sub-station. The attendant at the central office may now set the disk k back to the zero position by pressing on the switch-lever W of the line and bringing its lower arm against the bottom contact which is in connection with a conductor X.

A local circuit, including the battery M B, is thus established, as follows: from one pole of the battery by line S^3 to the annunciator through the magnet i' and the springs k^3 k^4, and then by the lower bar of the switch-lever W to the wire X and to a vibrating armature-lever E. This lever is by its retractile spring drawn against its back contact e. An adjustable contact-screw f in the end of a vertical pivoted gravity-bar F normally bears against the lever E. Below its pivot the bar F carries an adjustable weight that tends to bring it into a vertical position and against the lever E when the parts are in the normal position illustrated. From the vertical lever F the circuit is continued through the coils of a magnet G, of which the lever E is the armature, thence to the wire s and opposite pole of the battery. The switch-lever W having been depressed, the circuit is closed, and magnet G, being energized, attracts its armature. In its forward movement the armature-lever carries the gravity-lever with it until the armature-lever is arrested. The gravity-lever, however, by reason of its momentum, continues its movement, thus opening a circuit at e f, and the parts all return to their normal position shown, the action being repeated until the annunciator-disk has reached zero, when the circuit is opened by the spring k^4 coming upon the insulation in the collar k^2.

No claim is made herein to the flash-light method of signaling, as it is claimed in an-

other application, a division of this case, filed May 8, 1889, and numbered 310,057.

I claim as my invention—

1. The combination, substantially as set forth, of a source of electric energy, individual lines leading from the central to the sub-stations, signaling devices interposed between the individual lines and one pole of the source of energy, a collective line to which all the individual lines run, flash-lights placed between the collective line and the sub-station apparatus, and circuit-connections which connect the opposite pole of the source of energy with the individual lines, substantially as set forth.

2. The combination, substantially as set forth, of a source of electric energy, individual lines, an annunciator for each line through which the line is connected with one pole of the source of energy, signaling apparatus interposed between the opposite pole of the source of energy and the individual lines, circuit-connections and switches by which any individual line may be disconnected from its annunciator and connected with said signaling apparatus, signaling electric flash-lights in each individual line, and a collective line with which all the individual lines connect.

3. The combination, substantially as set forth, of a source of electric energy, individual lines, an annunciator for each line, through which the line is connected with one pole of the source of energy, signaling apparatus interposed between the opposite pole of the source of energy and the individual lines, circuit-connections and switches by which any individual line may be disconnected from its annunciator and connected with said signaling apparatus, call-boxes, and signaling electric flash-lights in each individual line at each sub-station, and a collective line with which all the individual lines connect.

4. The combination, substantially as set forth, of individual lines connecting a central and sub stations, signaling apparatus at the sub-stations, a return-conductor from the sub-stations to the central station, a source of electric energy, annunciators, one for each individual line, through which the individual lines are connected with one pole of the source of energy, circuit-connections and switches *s*, S, S′, and T, by which the individual lines may each be disconnected from the annunciator and connected to the opposite pole of the source of energy, and an indicator in the line *s*.

5. The combination, substantially as set forth, of the individual lines connecting a central station and sub-stations, a source of electrical energy at the central station, annunciator devices through which the individual lines are connected with one pole of said source, the transmitting apparatus between the other pole of the generator and the individual lines, circuit-connections and switches, the indicator U V in the line, and signaling devices at the sub-stations.

6. The combination, with a step-by-step annunciator and source of energy, of the individual line, including the annunciator-magnet, the shunt-circuit X S^3, including the annunciator-magnet, a magnet G, the armature E of the magnet G, and the pivoted gravity-lever F, substantially as set forth.

7. The combination, substantially as set forth, with the battery and step-by-step annunciator, of the individual lines, including the annunciator-magnets, the shunt-circuit X S^3, including the annunciator-magnets, the magnet G, also in said shunt-armature E, gravity-lever F, and a switch W for each annunciator.

8. The combination of individual lines connecting the central and sub stations, the annunciator of each line, circuit-connections and switches T W, by which each line is connected through its annunciator with one pole of a battery, the conductor *s*, including an indicator U V, a switch S, line S′, and the signaling apparatus included in a branch of the line S′, running to a point of the switch S, substantiallly as and for the purpose set forth.

In testimony whereof I have hereunto subscribed my name.

ALFRED G. HOLCOMBE.

Witnesses:

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LLOYD B. WIGHT.