

(No Model.)

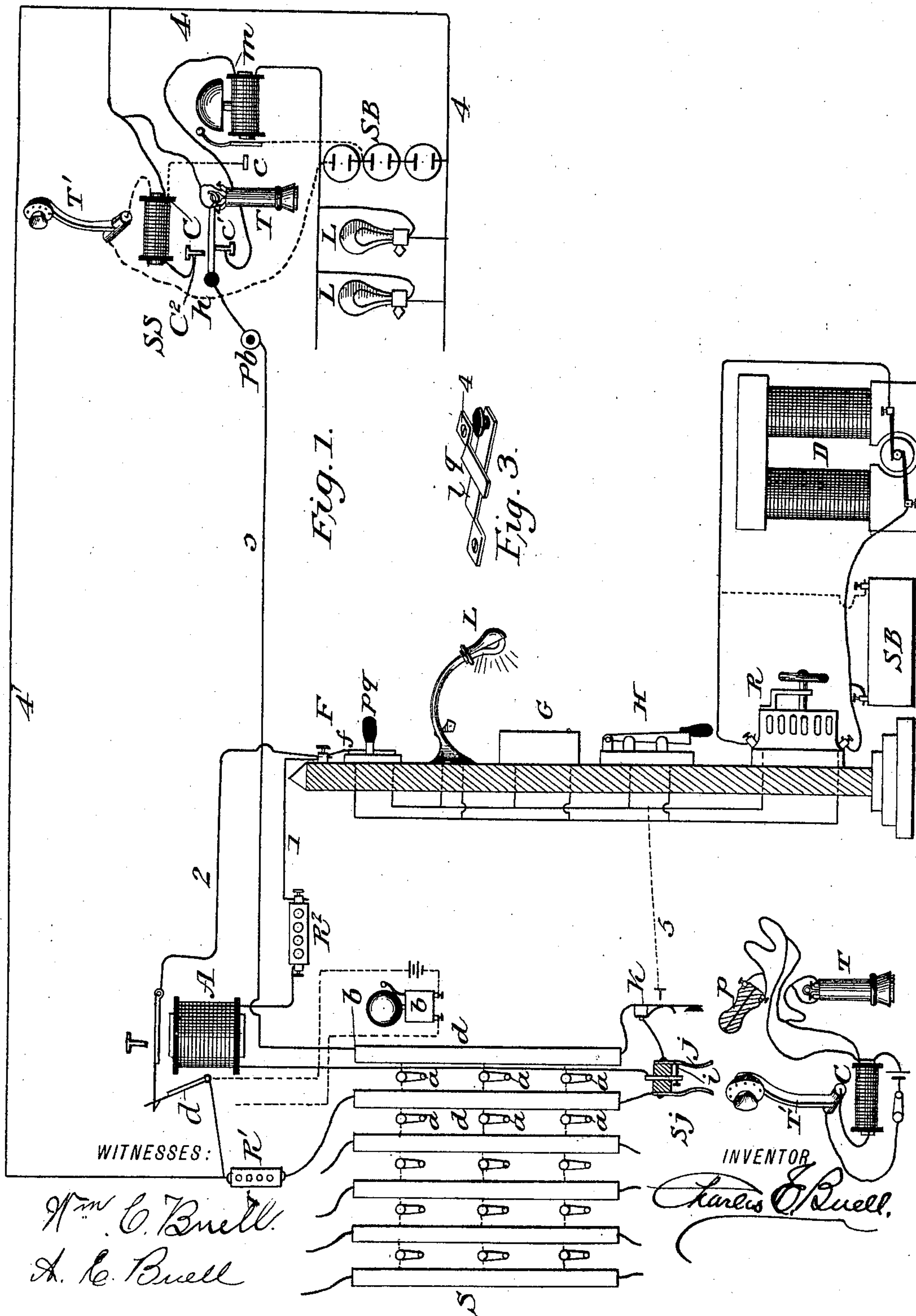
2 Sheets—Sheet 1.

C. E. BUELL.

COMBINED TELEPHONE AND ELECTRIC LIGHTING SYSTEM.

No. 581,246.

Patented Apr. 20, 1897.



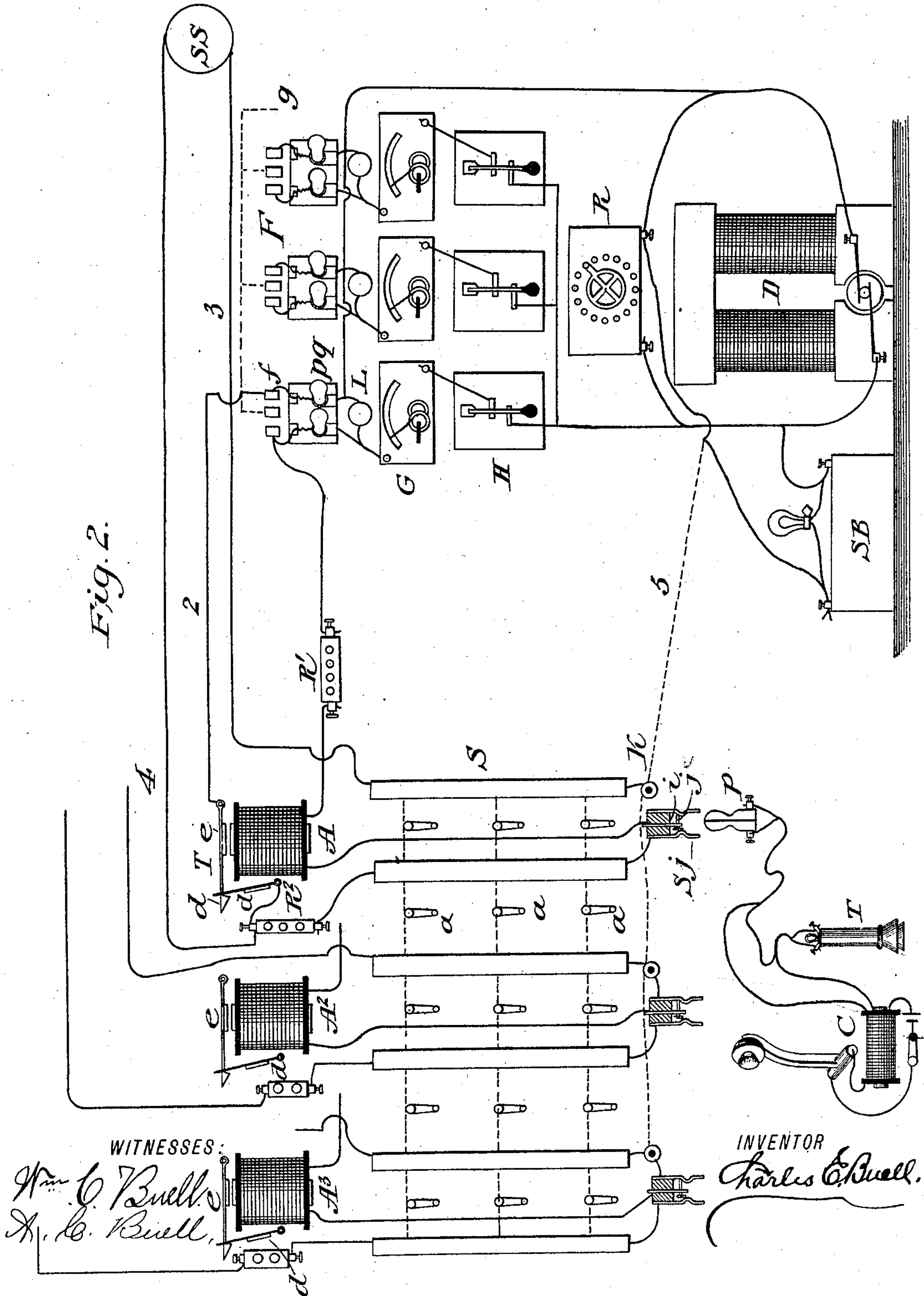
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Fig. 2.



UNITED STATES PATENT OFFICE.

CHARLES E. BUELL, OF NORTH PLAINFIELD, NEW JERSEY.

COMBINED TELEPHONE AND ELECTRIC-LIGHTING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 581,246, dated April 20, 1897.

Application filed July 27, 1896. Serial No. 600,727. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. BUELL, of North Plainfield, Somerset county, State of New Jersey, have invented a Combined Telephone and Electric-Lighting System, of which the following is a specification.

My object is to provide the means whereby a system of lines that are used for electric lighting can be utilized for the transmission of oral communications.

In the accompanying drawings, Figures 1 and 2 show two views of a system embodying my invention, and Fig. 3 shows a detail of the apparatus used in carrying out my invention.

In Figs. 1 and 2 there is shown an electric-lighting switchboard F, adapted to connect a series of radiating lines to a generator D through the fuse-wire *f*, current-indicator G, switch H for each line, and there is also provided the rheostat R and a secondary battery S B for regulating and steadying the currents delivered by dynamo D.

In connection with the "feed-block," so called, there are shown incandescent lamps L, plug-switch *pq*, and a ground for lightning-arrester *g* for each line.

Each line radiating from the switchboard F passes to a remote station S S over wires 1, 3, and 4, and include the resistance R', annunciator-helix A, strips *d d*, and spring-jack S_j of the telephone-switchboard S and resistance R² of wire 4, in connection with the said telephone-switchboard, and at the station S S the line includes the branch line in which lamps L L and secondary battery S B are in multiple, the call-bell *m*, contact *c'*, and switch *h* when the circuit is in the condition shown in the drawings. As shown, the lines are being charged from the dynamo D and the current is passing through wire 2 over armature and drop *e* of the annunciator A to wire 4, being largely diverted from the resistances R' R² and helix of annunciator A and the switchboard S.

By the employment of the derived path for the current of wire 2, armature, and drop *e* the conductivity of the circuit is enlarged and the danger from heavy currents circulating in switchboard S is avoided both by the resistance of R' and R² in the direct line and

by the better conductivity of the diverted circuit over wire 2.

A push-button Pb is shown at station S S for opening the line comprising wires 3 and 4 for producing calls on the bell *b* at switchboard S and for disconnecting the generator D from the line when it is desired to use the line for oral communication, the interruption of the circuit being accomplished by the interposition of the rheostats R' R² by the throwing down of the drop *e* and the cutting out of the dynamo D by the introduction of the plug *p* in the spring-jack S_j, separating the contacts *i* and *j*.

The telephone T, transmitter T', coil C, and plug *p* are well-known appliances, requiring no description. There is shown a calling-key K at switchboard S of well-known construction, having connection to the charged line over wire 5 for sending outgoing calls without interrupting the circuit in the annunciator A, and admitting of receiving a responsive signal from the station S S by the throwing down of the drop of the annunciator and thereby operating the bell *b* in an obvious manner.

When the current is withdrawn from the line and the telephone T of station S S has been removed from its support *h*, the lamps L L and secondary battery S B at station S S will be withdrawn from the line, and the lamps will be maintained by the current from secondary battery S B, while the branch containing the transmitter T', telephone T, and the secondary of the induction-coil C will be included in the uncharged main line by the contact of the telephone-support *h* with contact-stop *c*².

The primary of the induction-coil is connected into circuit with the portion of the secondary battery S B over the dotted lines to include the armature of call-bell *m* and the back contact-stop *c*, together with the transmitter T', or a separate local battery can be used for the transmitter, as is shown at the switchboard S.

Fig. 3 shows the push-button Pb as a closed-circuit push-button key, the lever *l* normally resting against the back contact-stop *q* and when depressed acts to open the circuit formed by the connected wires 3 4.

The operation of the system is as follows: When the lines and apparatus are in the positions shown in the drawings, the dynamo D being in motion, the lamps L L L at the subscriber's station S S are being lighted by the current delivered by the dynamo over the path through the light-switchboard, over wire 2, through the lever and drop of the annunciator A, wire 4, through the branch wire at the subscriber's station that includes the lamps L L L and the secondary battery S B, bell-magnet *m*, contact *c'*, the switch-lever *h*, and the return-wire 3, over strip *d* of the telephone-switchboard, through calling-key *h'* and spring-jack S*j*, through the helix of annunciator A and the resistance R² in line 1 to and through the path of return-current in electric-lighting switchboard to the dynamo D. When the normally-closed push-button key P*b* is pressed, the current from dynamo D is interrupted by the opening of wire 3, which sounds a call on bell *b* at the telephone-switchboard through the operation of the annunciator A, which causes the drop *e* to fall, closing the local circuit that includes the bell *b*, and at the same time, by the throwing down of drop *e*, opening the lighting-circuit over wire 2 and providing a circuit through spring-jack S*j* and the branch that includes resistance R', over which oral communication can be carried on by the means of the telephone apparatus at the telephone-switchboard and that at the subscriber's station S S without danger or annoyance from dynamo-currents, while the lamps L L L at the subscriber's station S S are maintained by the currents from the secondary battery S B without interruption that is observable at the moment of transferring the lamps from the dynamo-current to the secondary-battery current. By the means of calling-key *k* at the telephone-switchboard a subscriber can be called up, and when the telephone at the called subscriber's station is removed from its support the dynamo is disconnected from the line, as when the key P*b* is pressed, and the two lines thus made ready for oral communication can be connected at the telephone-switchboard for the intercommunication of subscribers' stations that are included in separate main lines. By restoring the telephones to their supports at the two subscribers' stations and restoring the annunciator-drops of each line to the position shown in the drawings, with the plug P of the telephone apparatus at the central switchboard withdrawn from spring-jack S*j*, the lines so recently in use for oral communication will be again charged from the dynamo, and lamps L L L will be again maintained by the dynamo-current, and the secondary battery S B will be charging.

What I claim is—

1. A series of lines radiating from an electric-lighting switchboard, a generator for charging said lines, connections from said lines to a telephone-switchboard, devices at

subscribers' stations for cutting off the charging-current, and connections from the several lines to apparatus for oral communication. 70

2. A series of lines radiating from an electric-lighting switchboard, a generator charging said lines, connections from said lines to a telephone-switchboard that include resistance for each line, current-actuated mechanism for each line that is adapted to automatically open the circuit charged by said generator when the current in the line falls below normal, and electric lamps, and a secondary battery in multiple, at outlying stations having connections to the said charged lines. 75 80

3. A series of lines radiating from a central station, connections from said lines to a telephone-switchboard, and to an electric-lighting switchboard, a generator for charging said lines; a secondary battery and electric lamps normally in each of said charged circuits at outlying stations, devices for signaling over said charged circuits, and apparatus having connections to said circuits for oral communication. 85 90

4. A series of charged lines, secondary batteries having connections to said lines at outlying stations, connections from said lines to a telephone-switchboard and to an electric-lighting switchboard, current-operated mechanism for disconnecting the lines from the electric-lighting switchboard by the interruption of the circuits, and telephone apparatus having connection to the said lines. 95 100

5. A series of charged lines, a secondary battery and electric lamps having connections to said lines at outlying stations, in a manner to be charged thereby, telephone apparatus having connection to said lines, and switch mechanism that is adapted to place the said lamps and secondary batteries and said telephone apparatus, successively, in said lines. 105

6. In a combined system of electric lighting and telephone transmission, the combination with a series of charged lines that include electric lamps, of telephone apparatus having connection to the said lines through switch mechanism that is adapted to disconnect the said lines from the charging-generator and to include the said telephone apparatus in said lines. 110 115

7. A series of lines, a generator charging said lines, secondary batteries having connections to said lines at outlying stations, translating devices in circuit with said secondary batteries, telephone apparatus having connections to said lines through switch mechanism that is adapted to automatically disconnect the said generator from the said lines and include the telephone apparatus in said lines. 120 125

8. A series of lines, a charging-generator having connections to said lines, secondary batteries and translating devices normally included in said charged lines, at outlying stations, switch mechanism at outlying stations that is adapted to interrupt the charged lines, current-operated devices having connection 130

to said lines that are adapted to disconnect the charging-generator from each of said lines when the current therein is interrupted, and telephone apparatus having connection to the 5 said lines.

9. The combination with a series of charged lines centering at a telephone-switchboard of current-operated mechanism included in said lines that is adapted to disconnect the charged 10 lines from the source of electrical supply, and to transfer the circuit formed by said lines to include a spring-jack and resistance, substantially as described.

10. A series of lines, a generator charging 15 said lines, connections from said lines to a telephone-switchboard, current-operated mechanism included in said lines that is adapted to disconnect the said generator from each of the said lines when the current in 20 said line falls below normal, electric lamps and a secondary battery at outlying stations on each line having connections to each other and telephone apparatus having connection to the said lines at outlying stations, through 25 switch mechanism that is adapted to disconnect the said lamps and secondary battery and connect the telephone apparatus to said line.

11. A series of lines, a generator charging 30 said lines, outlying stations on said lines each provided with a secondary battery in multiple with electric lamps, telephone apparatus at each, and switch devices at each for disconnecting said secondary battery and lamps 35 from the line and interconnecting said telephone apparatus with the line.

12. A series of lines, a generator charging 40 said lines, outlying stations on said lines, each provided with a secondary battery and lamps in multiple in the line, telephone apparatus at each, switch mechanism at each for alternately including the lamps and secondary 45 battery and the telephone apparatus in the line, and switch devices for interrupting the charged line, at each, for signaling, and for disconnecting the charging-generator from the line.

13. The combination with one main line

that is normally charged, of a secondary battery having connections to the said line and 50 to lamps, and telephone apparatus having connection to said line; the said connections for the secondary battery and telephone apparatus comprising devices for alternately interconnecting the said battery and the said 55 telephone apparatus with said line.

14. A series of lines radiating from a central station, connections from each to a charging-generator and to a telephone-switchboard, an annunciator in each line and a shunt 60 branch for each annunciator that includes the lever and drop of the annunciator, subscribers' stations on said lines, each provided with a secondary battery and lamps in multiple, 65 and an independent branch at each that includes telephone apparatus, devices for successively interconnecting the lamps and battery, and the telephone apparatus with the line, and a circuit-interrupter at each for operating the annunciator of such line to open 70 the said shunt branch.

15. A charged line having connection to a secondary battery and electric lamps at outlying points, current-operated mechanism in said line that is adapted to open said line 75 when the current charging the same falls below normal, a key for sending outgoing signals without interrupting the said line, and telephone apparatus having connections to said line. 80

16. The combination of the following elements, a series of lines, a generator charging said lines, outlying stations for said lines each provided with a secondary battery and lamps, a telephone apparatus at each, switch 85 devices for interconnecting the battery and lamps, and the telephone apparatus with the line, and for interrupting such line, at each, and current-operated mechanism included in each line that is adapted to disconnect the 90 charging-generator when the current therein is interrupted.

CHARLES E. BUELL.

Witnesses:

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H. N. SPENCER.