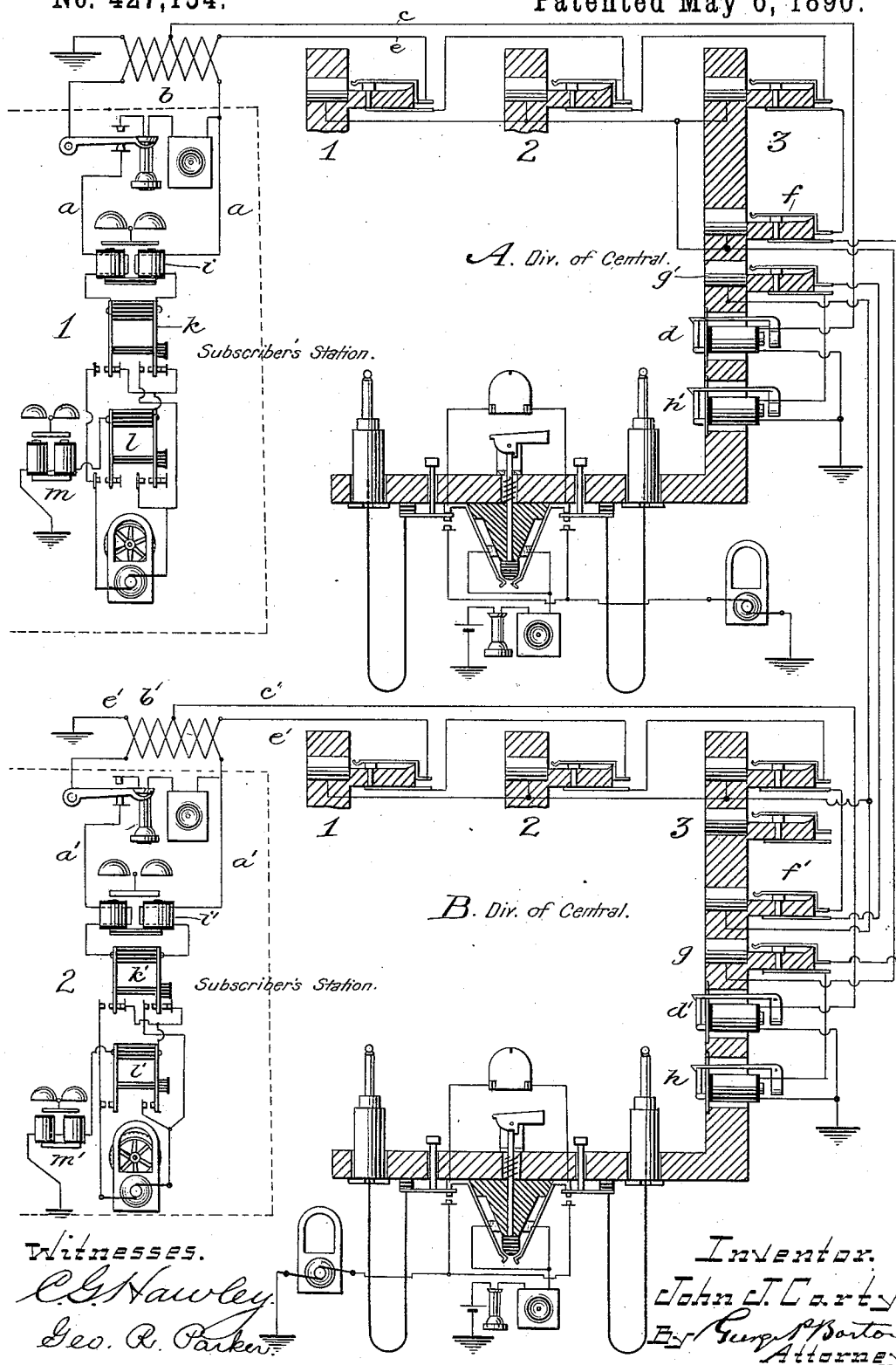


(No Model.)

J. J. CARTY.
DIVIDED MULTIPLE SWITCH BOARD.

No. 427,154.

Patented May 6, 1890.



UNITED STATES PATENT OFFICE.

JOHN J. CARTY, OF NEW YORK, N. Y., ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS.

DIVIDED MULTIPLE SWITCH-BOARD.

SPECIFICATION forming part of Letters Patent No. 427,154, dated May 6, 1890.

Application filed October 26, 1889. Serial No. 328,288. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. CARTY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Divided-Multiple-Switch-Board Systems, (Case 6,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

Heretofore in multiple-switch-board systems it has been sometimes thought more convenient to divide the exchange into two sections, each of the boards in one section containing a switch for each line of its particular division. Each line, however, in addition to its special switch on each board of its division and its annunciator upon one of the boards of its division, has been run to one board only of the other division and provided with an annunciator thereon. The circuits and apparatus have been so arranged that a subscriber wishing to communicate with another could signal to his annunciator of one of the divisions of the exchange or to his annunciator of the other division, accordingly as the subscriber wanted belongs to one or the other division. It has been suggested to provide polarized annunciators so arranged that current of one polarity would operate one of the annunciators while current of the opposite polarity would operate the other individual annunciator of the subscriber.

My invention herein relates to the apparatus at the subscribers' stations and circuits therefrom to the individual annunciators of the different lines.

My invention consists in a metallic-circuit telephone-line, including at the central office one coil of a converter, a branch from the center of this coil through the individual annunciator at one division, and a circuit through the other coil of the converter, including switching apparatus, and extending to the other division of the exchange and including the other individual annunciator of the line, with means at the subscriber's station for sending current from ground over the two limbs of the metallic circuit connected as a single circuit to operate one annunciator or

for sending current over the metallic-circuit line through the coil of the converter included therein to induce current in the other coil of the converter, which other coil is included in the circuit containing the annunciator of the second division.

My invention is illustrated in the accompanying drawing, in which I have shown in detail the apparatus at two subscribers' stations and the connections thereof with the central office, each line being connected with the three switch-boards of its particular division and with one of the switch-boards of the other division.

Station 1 is provided with a telephone-line *a*, which includes one coil of the converter *b* at division A of the exchange. The branch *c* extends from the center of the coil of converter *b*, included in telephone-line *a*, through the individual annunciator *d* on one of the boards of division A, and thence to ground. The other coil of the converter *b* includes the wire *e*, this wire *e* extending from ground through said coil and through each of the switches of the different boards 1 2 3 of division A, through the answering spring-jack *f* upon one of the boards, and thence through an answering spring-jack *g* of board 3 of division B, and thence through the annunciator *h* to ground. The subscriber at station 1 is thus provided with a connection on each of the boards of division A, and with an annunciator on one of the boards of said division, and with one switch and an individual annunciator upon one board only of division B.

The subscriber's outfit at station 1 consists of an ordinary telephone and telephone-switch, a bell *i*, with its different coils in different sides of the telephone-line *a*, the switch *k*, for looping the generator into the line *a*, and the switch *l*, for connecting the metallic circuit *a* with the ground branch, which preferably includes a bell *m*. By simply pressing upon key *k* the generator at station 1 will be included in the circuit of line *a*, and the current being sent through one coil of the converter *b* will induce currents in the wire *e*. The induced currents sent over wire *e* will pass through the annunciator *h* at board 3 of division B, thus indicating to the operator at said board that service is wanted by sub-

scriber at station 1. On the other hand, by depressing key *l* the two sides of the circuit *a* will be connected together and to ground through the branch containing bell *m*, and thus a ground-circuit including the generator will be established. This ground-circuit may be traced from ground at station 1 through the generator, and thence to the two springs of switch *k*, and thence in multiple through the different coils of bell *i*, and thence to branch *c* and over branch *c* through individual annunciator *d* on board 3 of division A to ground. In this manner the subscriber at station 1 may call up the operator at board 3 of division A or at board 3 of division B. Now it will be understood that many lines will be connected in the same manner with the same exchange. The apparatus at station 2 is in all respects the same as the apparatus at station 1. The metallic-circuit telephone-line *a'* is included in a coil of the converter *b'*. The branch *c'* passes through individual annunciator *d'* on board 3 of division B—that is to say, the division to which station 2 belongs—to ground. The circuit *e'* includes the other coil of the converter *b'*, and extends through a switch on each of the boards 1 2 3 of division B to the answering spring-jack switch *f'*, and thence to the spring-jack switch *g'* on board 3 of division A, and from said switch through individual annunciator *h'* to ground. The bell *i'* at station 2 has one of each of its coils included in a different side of the metallic circuit *a'*. The switch *k'* has two springs or contacts adapted to be closed with the different poles or terminals of the generator, so as to loop the generator into the metallic circuit *a'*.

The key *l'* serves when depressed to form a ground-circuit, including the branch containing bell *m'*, the generator, the springs of loop-switch *k'*, the coils of bell *i'*, connected in multiple, the two sides of the metallic circuit *a'*, and the wire *c'*, extending through annunciator *d'* to ground.

A usual operator's outfit is shown at each of the boards 3 of divisions A B, whereby the operator may connect with any line, and, having received the order, may test the line of the subscriber of her particular division called for, complete the connection therewith, and do all the work usually required. Thus suppose subscriber at station 1 wishes connection with the subscriber of station 2; he will depress his key *k*, so as to send induced currents over wire *e*, through individual annunciator *h* at board 3 of division B. The operator, seeing annunciator *h* fall, will insert a plug in switch *g*, and bringing her telephone into circuit, as shown, will receive the order. She will then with the other plug first test line *a'*, applying the tip of the plug to the socket or test-piece of the switch of said line *a'* upon said board 3 of division B in the usual manner. If the line is free, the plug will be inserted and current from the oper-

ator's generator will be thrown over wire *e'* through the coil of the converter *b'*, including the same, so as to induce currents in the circuit *a'* to ring the bell *i'*. The subscriber at station 2 then, by simply taking down his telephone, will be looped into the circuit *a'*, and will thus be connected with the subscriber at station 1, who has also taken down his telephone.

It will be understood that the exchange will be classified—as, for example, the subscribers having odd numbers will be connected with each of the boards of division A and those of even number will be connected with division B of the exchange. A subscriber then at a glance, on seeing the number of a subscriber, will know which key to operate. Thus the subscriber at station 1 calling for an odd number—that is, one of his particular division—will operate key *l*, and, if requiring connection with a subscriber having an even number, he will operate key *k*. On the other hand, the subscriber at station 2 requiring an odd number will operate key *k'*, and, if requiring a subscriber having an even number, he will operate key *l'*. When the generator is looped into the circuit, the bell included therein will be rung and currents will be induced in the circuit containing the other coil of the converter, so as to throw down the individual annunciator of the subscriber at the division to which the circuit containing said other coil is extended. When, however, the subscriber connects his circuit to ground at his station, the bell included in the ground-branch will be rung, while the bell through which the circuit is connected in multiple at his station will remain silent, and as the current will pass in opposite directions through each of the two halves of the coil of the converter containing the metallic circuit no current will be induced in the circuit containing the other coil of the converter.

The bells *i i'* should be wound differentially, so that when the generator is looped into the metallic circuit or when currents are induced therein the bell will be operated. The operator calls by throwing the calling-generator onto the circuit which includes the coil of the converter, whereby current is induced in the metallic circuit. Thus the operator at board 3 of division B, having connected with switch *g* of station 1, will send current over circuit *e*. This current will induce current in the metallic-circuit telephone-line *a* and cause the bell *i*, which is differentially wound, to respond.

Either subscriber may clear out by looping his generator into the metallic circuit and operating the same to throw down the annunciator included in the circuit of the cords connecting the circuit-lines together.

It is evident that my invention and the apparatus embodying the same admits of various modifications which would readily suggest themselves to those skilled in the art,

and I therefore do not limit myself to the details of construction shown.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A telephone-line including one coil of a converter at the central office, in combination with a generator at the subscriber's station of the line, a branch from said coil of the converter through an annunciator of one division of a telephone-exchange, the other coil of the converter being included in a circuit extending through an annunciator of another division of the exchange, and switching devices at the subscriber's station, whereby the subscriber at will may connect the generator into a grounded circuit or loop the same into the metallic circuit to operate one or the other of said annunciators.

2. A telephone-line including one coil of a converter at the central office, in combination with a generator at the subscriber's station of the line, a branch from the center of said coil of the converter through an annunciator of one division of a telephone-exchange, the other coil of the converter being included in a circuit extending through an annunciator of another division of the exchange, and switching devices at the subscriber's station, whereby the subscriber at will may connect the generator into a grounded circuit or loop

the same into the metallic circuit to operate one or the other of said annunciators.

3. A telephone-line extending in metallic circuit from the subscriber's station thereon to the central office and including one coil of a converter at the central office, a branch extending from the center of said coil of the converter through an annunciator located at one division of an exchange, in combination with a circuit including the other coil of said converter and extending through another annunciator at another portion or division of the exchange, and a source of electricity at the subscriber's station and two switching devices connected therewith, whereby current may be sent from said source of electricity from ground at the subscriber's station over said telephone-line through the branch containing one annunciator on operating one of the switches, while on operating the other of the switches the current will be sent over the metallic circuit to induce currents in the circuit containing the other annunciator, substantially as and for the purpose specified.

In witness whereof I hereunto subscribe my name this 5th day of October, A. D. 1889.

JOHN J. CARTY.

Witnesses:

C. G. HAWLEY,
ELLA EDLER.