

No. 674,515.

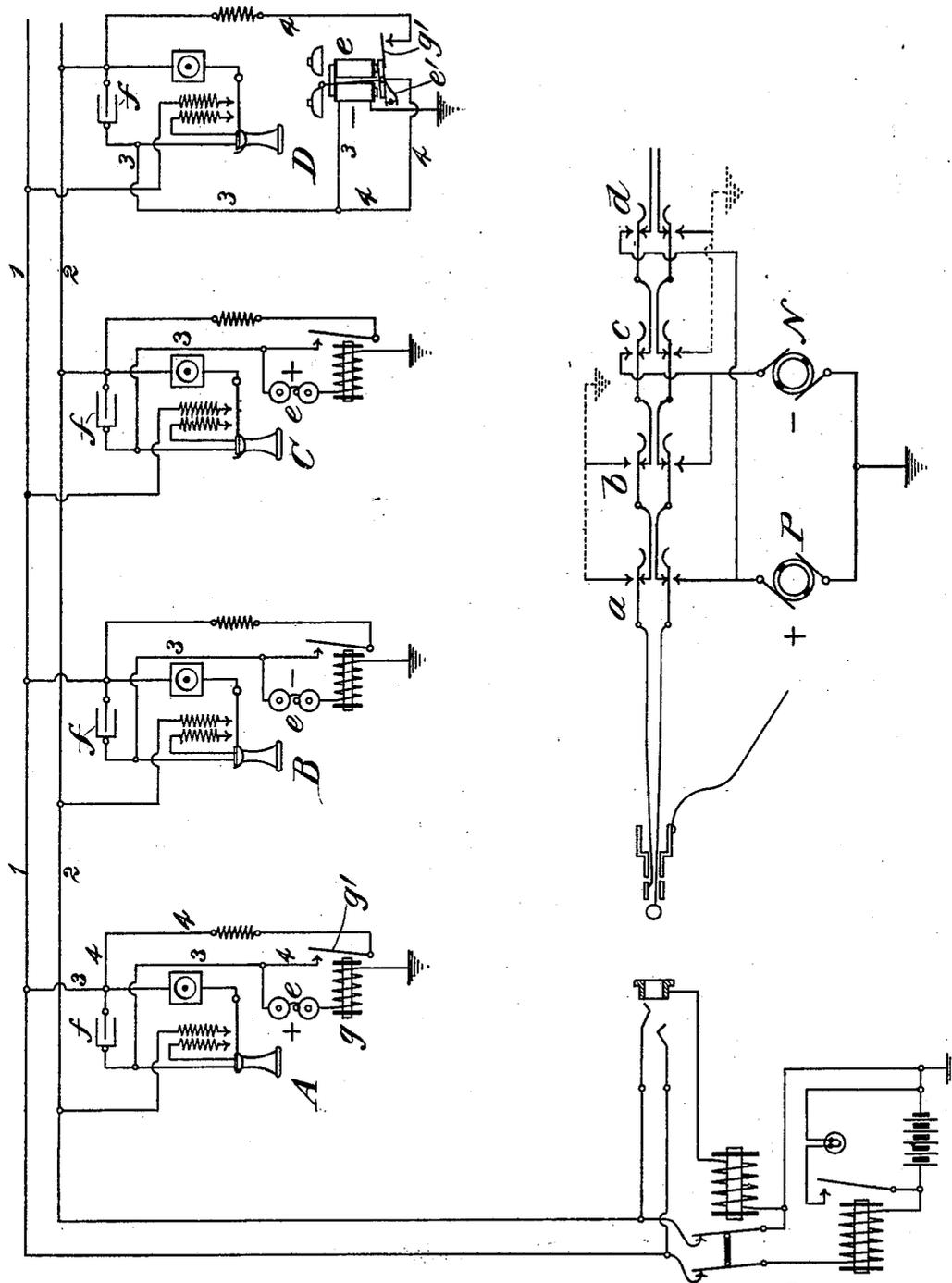
Patented May 21, 1901.

J. J. O'CONNELL.

CALLING APPARATUS FOR PARTY TELEPHONE LINES.

(Application filed Dec. 26, 1899.)

(No Model.)



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## CALLING APPARATUS FOR PARTY TELEPHONE-LINES.

SPECIFICATION forming part of Letters Patent No. 674,515, dated May 21, 1901.

Application filed December 26, 1899. Serial No. 741,602. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH J. O'CONNELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Calling Apparatus for Party Telephone-Lines, (Case No. 4,) of which the following is a full, clear, concise, and exact description.

10 My invention relates to calling apparatus for party telephone-lines, and has for one object to provide means whereby the subscriber's call-signal at each of the substations on the party line may selectively be operated  
15 from the central office; and more particularly my object is to avoid certain difficulties which have heretofore arisen in practice by maintaining a normal insulation of the line from earth with respect to direct currents, though  
20 permitting the ringing of the call-bells in grounded branches from the line conductors by pulsating current.

It has been usual in the art to provide call-bells of high resistance adapted to respond  
25 to pulsating currents of characteristic sign connected in grounded branches from the line conductors; but in modern telephone-exchanges, where automatic signals are employed, these grounded branches have interfered  
30 with the operation of the signals. To prevent this, it has been attempted to include condensers in the grounded branch circuits to maintain the normal insulation of the line from earth; but it has been found that the  
35 call-bells cannot be rung satisfactorily with pulsating current through the condenser.

In accordance with my invention a condenser is provided at each subscriber's station in a grounded circuit or branch from the  
40 limb of the telephone-line over which ringing-current is directed, and relay mechanism is included in circuit with said condenser for closing a branch circuit with which the call-bell is associated, whereby the call-bell may  
45 be operated by current in the circuit which is controlled by the switch-contacts of the relay, thus securing the protection to the telephone-line circuit which is afforded by the condensers at the subscribers' stations, while  
50 permitting the bell to be rung as freely as if the condenser were absent.

I will describe my invention more particularly by reference to the accompanying drawing, which illustrates, diagrammatically, with the use of conventional symbols, a party telephone-line connected with four substations  
55 and extending to a central-office switchboard.

The four stations A B C D of the party line are provided with call-bells *e e*, which are connected in grounded branches from the two  
60 limbs of the telephone-line. The grounded branches at stations A and B are connected with the limb 1 of the line, while at the stations C and D the grounded branches are connected with the limb 2. The call-bells *e e*  
65 are adapted to respond to pulsating current of characteristic sign. Thus of the two bells which are both connected to the limb 1 of the line at stations A and B, respectively, the one  
70 at station A is adjusted to respond only to pulsating currents of positive sign, while the other at station B responds only to pulsating currents of negative sign. Similarly the bells  
75 at stations C and D, which are connected to the limb 2 of the line, are adjusted to respond to positive and negative pulsating currents, respectively.

At the central office the usual ringing apparatus is provided, comprising grounded  
80 generators of positive and negative pulsating current P N and keys *a b c d* for connecting the terminal of each generator with either side of the cord-circuit, and so for impressing upon either limb of the telephone-line  
85 positive or negative pulsating current to ring the call-bell at either of the substations on the line according to the key depressed.

I have shown the apparatus at stations A, B, and C of the same character, while that at station D is an embodiment of a modification  
90 of my invention.

Referring to station A, the grounded branch  
3 includes in series the condenser *f*, the call-bell *e*, and the winding of a small quickly-acting relay *g*. When the relay is excited,  
95 the armature *g'* thereof is adapted to close a shunt-circuit 4 about the condenser. As each pulsation of current is received from the telephone-line the condenser is charged and at the same time the relay is excited, closing  
100 the shunt-circuit 4 about the condenser and permitting the bell to receive ringing-current

over the circuit which is controlled by the switch-contacts of the relay. The relay also permits the discharge of the condenser in a local circuit, thus clearing it out, so that it will take the next impulse.

Referring now to the apparatus at station D, it will be seen that the bell *e* itself serves to take the place of the relay *g* shown at the other substations. For this purpose the armature-lever of the bell is provided with a light bias spring *e'* to keep it normally at one side, and a contact-point is provided against which a contact-spring *g'*, carried by the armature-lever, is adapted to strike in vibrating. The vibrating armature and its contact thus form the terminals of the shunt-circuit about the condenser, and the bell of itself controls this shunt in the same manner as does the relay shown at stations A, B, and C. In the particular embodiment of my invention illustrated in the drawing the subscriber's call-bell is included in a branch from a limb of the telephone-line with a condenser and a circuit-closing device adapted when ringing-current is directed over said branch to close a shunt-circuit about the condenser and provide a local circuit for the current caused by the discharge of the condenser. Each pulsation of current charges the condenser and actuates the circuit-closing device and bell, the condenser then being discharged and "cleared out" for the next impulse. I do not, however, limit myself to this particular construction, since it is evident that the relay or circuit-closer may be combined with circuits varying from the particular form of shunt-circuit which I have illustrated.

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

1. The combination with a circuit having two branches in multiple, of a bell, condenser and circuit-closing device connected in each of the said branches, the bells of the different

branches responding respectively to current of opposite direction and the circuit-closing device responding to current of either direction, the circuit-closing device of a given branch being adapted to short-circuit the condenser and provide a local circuit for the current caused by the discharge of the same, when ringing-current is directed over said branch to actuate the bell thereof, substantially as and for the purpose specified.

2. The combination with a multiple-station telephone-line, of a source of pulsating current applied to the line at the central office, a branch of the line at each station, a condenser, a relay of high impedance, and a call-bell adapted for operation by pulsating currents in each of said branches, and a shunt of said condenser controlled by said relay; the relay being adapted for quick response to currents through it, as described.

3. In combination with a multiple-station metallic-circuit telephone-line, means for applying a pulsating current of either direction in a grounded circuit with either line conductor thereof, two ground branches from each line conductor at different stations, a condenser, a sensitive quick-acting relay of high impedance, and a bell adapted for operation by pulsating currents in each ground branch, and a shunt of each condenser controlled by the relay in the same branch; the bells in ground branches from the same line conductors being polarized to respond to currents of opposite direction, whereby the bell at any required station may be operated by applying current of suitable polarity to one of the line conductors, as described.

In witness whereof I hereunto subscribe my name this 22d day of December, A. D. 1899.

JOSEPH J. O'CONNELL.

Witnesses:

J. W. SKINKLE,  
ALBERT LYNN LAWRENCE.