

No. 626,463.

Patented June 6, 1899.

W. D. GHARKY.  
TELEPHONE SYSTEM.

(Application filed Dec. 24, 1898.)

(No Model.)

Fig. 1.

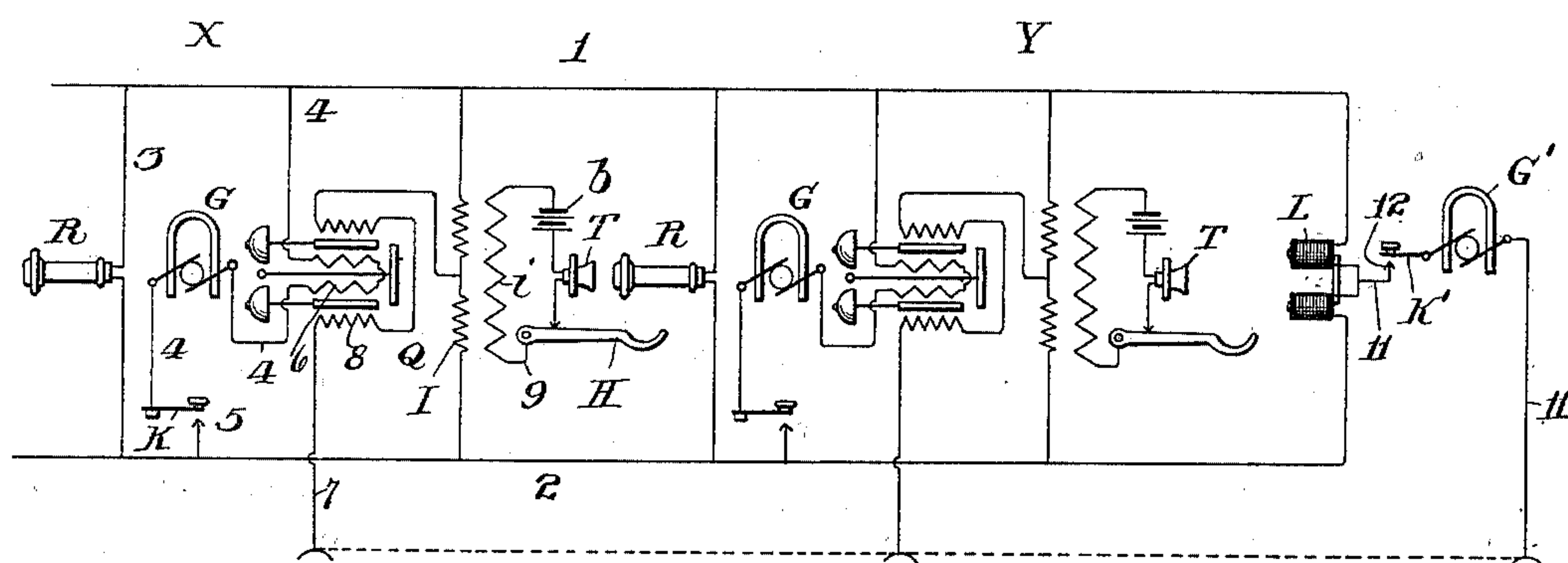
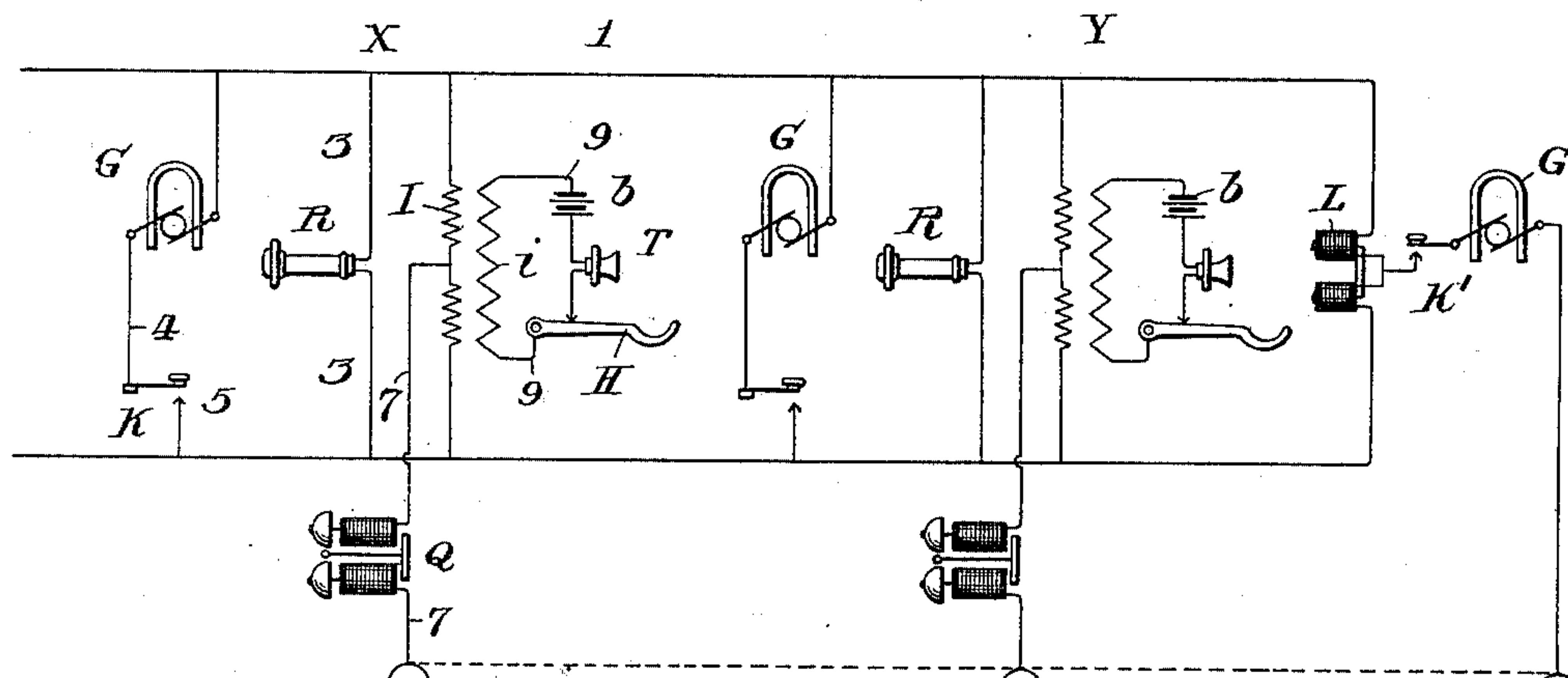


Fig. 2.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 626,463, dated June 6, 1899.

Application filed December 24, 1898. Serial No. 700,200. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM D. GHARKY, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented certain Improvements in Telephone Systems, of which the following is a specification.

My invention relates to telephone systems, and particularly to those systems in which it is found necessary to connect a number of subscribers with the same line, making what is known as a "multiple-station" or "many-party" line.

My invention has for its object the provision of improved means for calling the stations of the line, also for the avoidance of the disturbing effect of atmospheric charges and inductive influences, and it also looks to the simplification and improvement of subscribers' apparatus in systems of this character.

In its most specific form my invention contemplates apparatus and connections such that subscribers may call the central station without calling each other, and the central station may call any or all of the subscribers at will.

Broadly stated, the construction by which I attain my objects consists in using a metallic circuit for conversation, with subscribers so connected thereto that any or all of them may use the same. The metallic circuit is also utilized with its two component wires in multiple as one side of a signaling-circuit, the other side of which may be the earth or a return wire. The signals at the subscribers' stations are bridged across this signaling-circuit and may or may not be fitted with individual selective devices, whereby one may be called to the exclusion of others. I have not shown nor do I describe any selective devices, for the reason that they form no part of the present invention in themselves, and since I make no claim which would include them they would only unnecessarily complicate the drawings. Specifically, I arrange the circuits so that only outgoing calls from the central station pass over the multiple signaling-circuit, while the subscribers' generators are adapted to be bridged across the metallic talking-circuit, the line-signals at the central office being therefore of necessity also connected in the metallic circuit. In order

that a subscriber may be assured that his signal is going in, I provide means, such as an extra winding on each ringer-magnet, for operating the signal when the corresponding generator is actuated.

My invention is fully illustrated in the accompanying drawings, wherein the same letters and figures of reference point out the same parts throughout.

In the drawings, Figures 1 and 2 are diagrams showing each two stations connected to a party-line after the manner contemplated by my invention.

Referring to Fig. 2, wherein the simplest form of my complete invention is shown, X and Y are two subscribers' stations intended to use in common the line-wires 1 and 2 as a metallic circuit for purposes of conversation. Each subscriber's station is provided with a transmitter, a receiver, a generator, and a ringer Q. The transmitter T is included in a local circuit 9, containing also a battery *b* and adapted to be closed when in use through the agency of a hook-switch H. The local circuit is connected with the primary winding *i* of the usual induction-coil, the secondary winding I of which is bridged between the main line wires 1 and 2. The receiver is included in a separate bridge 3 3, while the generator is also in a separate bridge 4 4, which, however is normally open, but adapted to be closed by a suitable key or push-button K, coöperating with an anvil or contact 5. From the middle point of the secondary winding I a wire 7 is led to the ringer Q and thence to ground. This arrangement of a subscriber's circuit, or that shown in Fig. 1, is the preferred form; but divers changes may be made therein without affecting the operation.

Turning to Fig. 1, it will be observed that I provide a magnet L, included in the metallic circuit, at the central station C. From the middle point of the windings of this magnet a wire 11 is led through a circuit-closer K', normally separated from its anvil 12, to the generator G' and to ground. The circuits at the subscriber's station are the same in every respect as those described in connection with Fig. 2, except that the wire 4 is connected to and includes an extra winding 6 upon the ringer-magnet Q in each case. The ordinary



winding 8 of each ringer is included in the ground tap 7, as before. It results from this construction that the subscribers by depressing their keys K and actuating the generators G may energize the signal L at the central office. Obviously, however, no subscriber has it in his power to ring any bell on the line other than his own. The central office, however, by depressing the key K' may connect the generator G' through the windings of the line-signal L to both line-wires 1 and 2 simultaneously, whereupon the actuation of the generator G' will cause all of the bells or ringers Q to respond.

Atmospheric charges and induced currents finding their way over the line-wires 1 and 2 will have no effect upon the talking-circuit or any of the instruments therein, but will be dissipated and conducted harmlessly to ground by the numerous branches I provide.

The feature disclosed herein of having the bridged bells in a separate circuit from the talking sets results in a very much cheaper and more efficient type of instrument than it has heretofore been possible to use successfully on bridged party-lines. Heretofore it has been necessary where the ringers were bridged directly across the talking-circuit to wind them of very high impedance and resistance, say from one thousand to several thousand ohms. The ringers in my system are not necessarily high-wound, and excepting the extra winding in Fig. 1, which in practice need be a comparatively few turns, the parts are all of standard and common construction. It is a fact, however, that even with the most ordinary apparatus the highest efficiency is developed. There is absolutely no leakage of voice-currents to ground, and the line resistance is so much reduced by multiplying that the ringing-current from an ordinary generator will do more useful work than has ever before been rendered possible.

I am aware that it is not new to use the two sides of a metallic circuit in multiple for signaling purposes, nor is it new to give various pieces of apparatus, such as the induction-coil or the receiver at my subscribers' stations, a dual function depending upon differential or cumulative use. I believe it is new with me, however, to apply these principles to a multiple-station line and to combine them so as to produce the ends I attain. I would call attention to the fact that in the use of my invention illustrated in Fig. 1 the generator and the extra winding 8 on the ringer are normally entirely disconnected from the circuit. No shunt is therefore required for the generator, and in the use of machines that are designed to have a shunt the circuit-closer ordinarily used may readily be adapted by simply changing the connections to take the place of the circuit-closer K.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a telephone system a metallic circuit

extending to a number of substations and common to all of them, coils of high impedance bridged across the metallic circuit at the various stations, branches from the middle points of said coils to earth or a return-wire, signal-receiving instruments included in said branches, signal-transmitting instruments adapted to be connected across the metallic circuit at the various substations, and central-office apparatus comprising suitable receiving and transmitting apparatus to cooperate with the apparatus at the substations substantially as described.

2. In a telephone system a metallic circuit extending to and adapted to be used by more than one station, an inductive bridge at each station having its middle point connected to ground ringers included in the ground branches so formed, a central-office signal included in the metallic circuit, and generators one at each substation and one at the central station, the former adapted to be bridged across the metallic circuit, and the latter adapted to be connected to both line-wires in multiple; whereby subscribers may call the central office but not each other, while the central office may call all the subscribers, substantially as described.

3. In a telephone system a metallic circuit extending from a central office to a number of subscribers' stations, inductive bridges at the substations across the metallic circuit, ground connections from the middle points of said bridges including suitable ringer-coils, a line-signal at the central office, and suitable generators one at each subscriber's station, each having its circuit connected to and including an extra winding on its corresponding ringer, whereby a subscriber in signaling central may actuate his own signal, substantially as described.

4. In a telephone system a metallic circuit extending from a central office to a number of subscribers' stations, an inductive bridge at each subscriber's station having its middle point connected through the coils of the station-ringer to ground, a generator at each substation normally disconnected but adapted to be connected with the metallic circuit together with an extra winding on the coils of the station-ringer, a line-signal in the metallic circuit at the central office, and a calling-generator also at the central office adapted to be connected to both line-wires in multiple, whereby a subscriber may signal to the central office, and in so doing actuate his own ringer but no other, while the central office may throw current upon the main circuit-wires in parallel and through the ringers to ground to call any or all of the subscribers, substantially as described.

In testimony whereof I have hereunto set my hand this 21st day of December, 1898.

WM. D. GHARKY.

Witnesses:

EDWARD E. CLEMENT,  
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