

(No Model.)

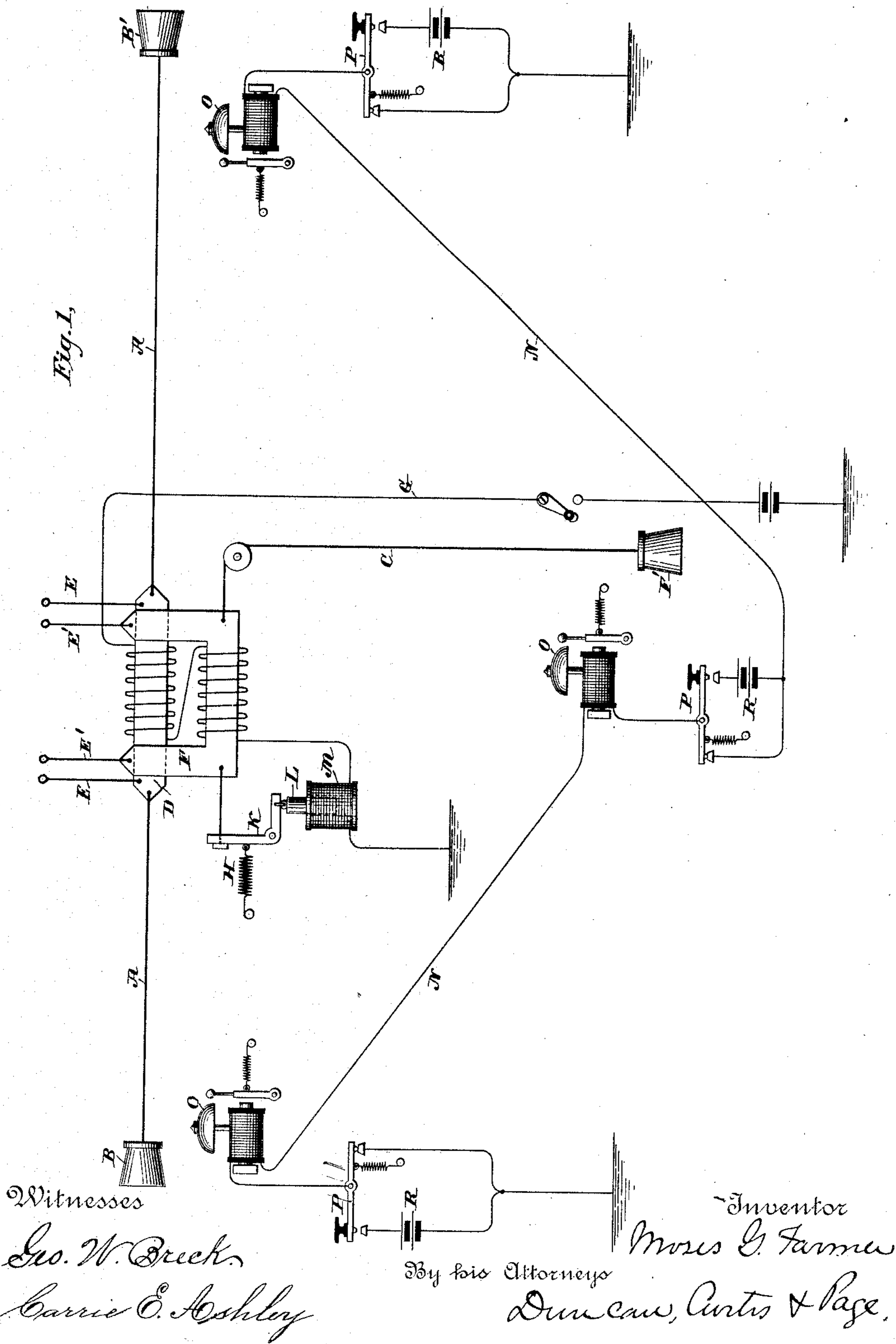
M. G. FARMER.

3 Sheets—Sheet 1.

MECHANICAL TELEPHONE SYSTEM.

No. 351,588.

Patented Oct. 26, 1886.



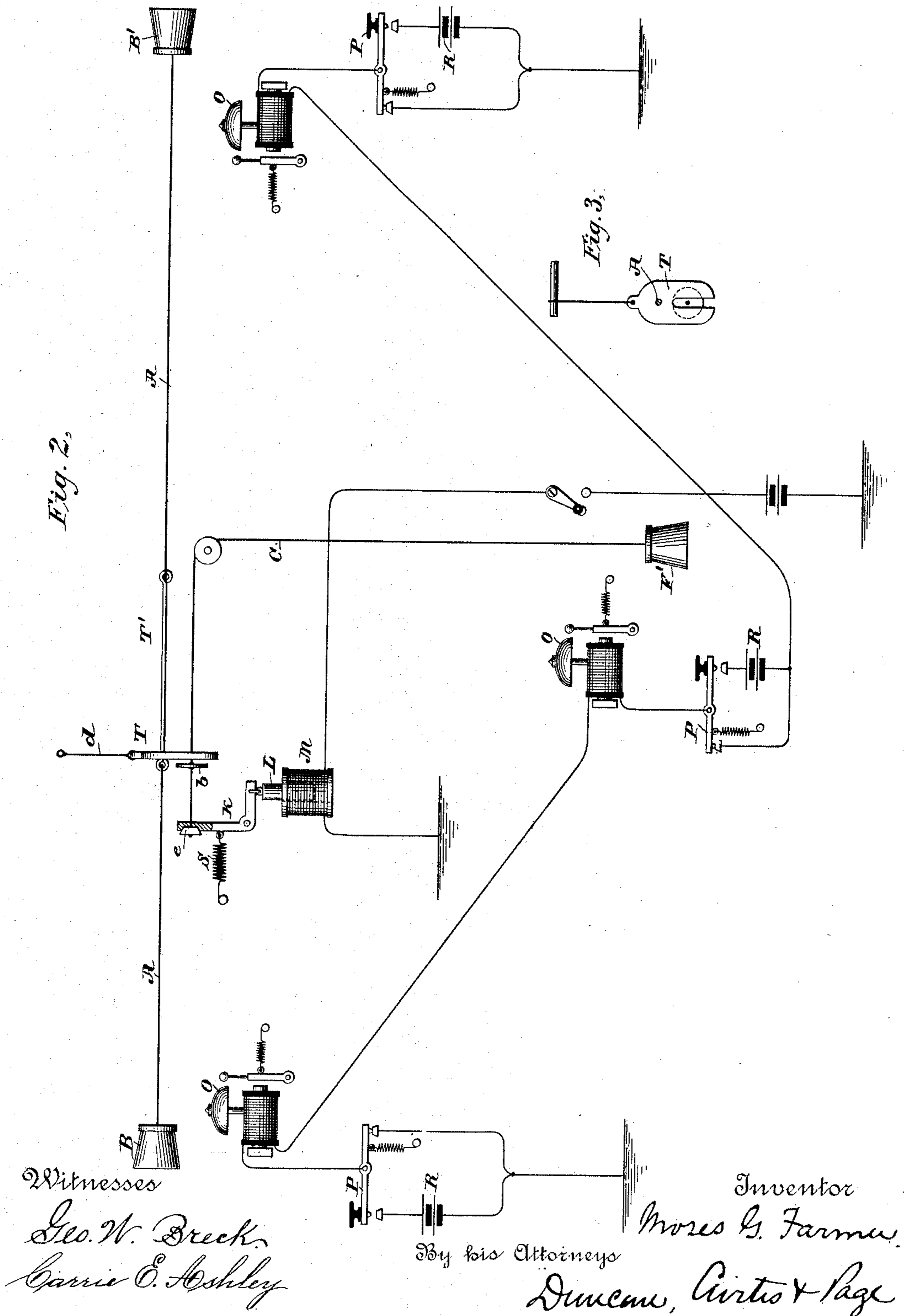
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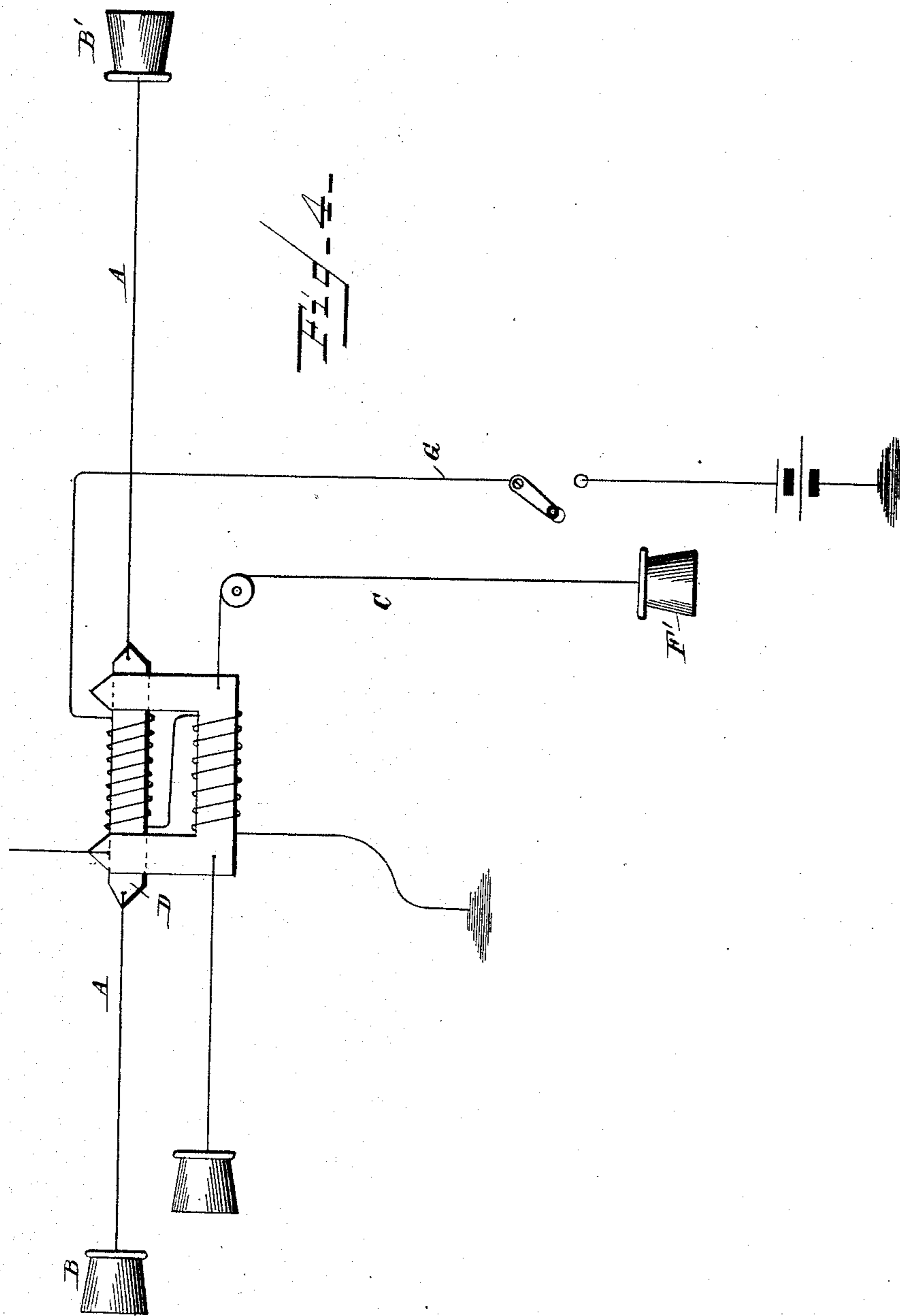
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*WITNESSES*

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# UNITED STATES PATENT OFFICE.

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## MECHANICAL-TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 351,588, dated October 26, 1886.

Application filed June 23, 1886. Serial No. 205,978. (No model.)

*To all whom it may concern:*

Be it known that I, MOSES G. FARMER, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Mechanical-Telephone Systems, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

This invention relates to that class of instruments known as "mechanical telephones," and is an improvement in systems for using or operating the same, comprising means for connecting three or more of the instruments together in a common system.

With the appliances heretofore devised it has not been practicable to transmit speech by means of mechanical telephones except from one terminal to the other of a line, so that any approach to a system of communication between a number of different points—such as is found in the ordinary electric-telephone systems—would involve such a multiplicity of lines and instruments as to prevent the use of mechanical telephones except on isolated lines.

The object of my invention is to increase the capacity of a mechanical-telephone line, whereby three or more instruments may be connected to the same line and messages sent from any one to another.

The invention is particularly applicable to localities where a comparatively small number of subscribers reside within a short distance of one another—as in small towns or villages—and on account of its applicability and usefulness in this respect I designate the invention a "village-telephone system."

In my improvement the system may be conveniently regarded as comprising a main and branch lines. Communication between the terminals of the main line is effected in the ordinary manner—that is to say, a string or wire is connected to the diaphragms of the telephones and stretched and suspended so as to take up the vibrations produced in one and reproduce them in the diaphragm of the other. The other instruments are not permanently connected in operative relation with the main line; but means are provided for bringing one or more of them into such relation at any time, and in this feature my invention resides.

The invention may be carried out by many different devices. For example, at any point on the main line where it is desired to take off a branch line I insert a flat iron strip directly in the line, suspending it by two or more strings or wires. In close proximity to this strip I also suspend a flat U-shaped piece of soft iron, arranged so that its ends may come into contact with the strip on the line. Both the strip, which I designate an "armature," and the U-shaped piece, which I designate the "magnet," are wound with an insulated wire which is in a local circuit containing a switch located near the telephone of the branch line. By closing this circuit the magnet and armature are held in contact, so that vibrations in the main line are imparted to the magnet. If the latter form part of a local or branch line, it is obvious that the telephone therein will respond to the vibrations produced in the main line. Another way of accomplishing the same result is to use an electro-magnet or solenoid to overcome the pull of a spring that normally holds the end of a local line out of mechanical contact with the main, and to include this magnet in a local circuit which is closed when a person desires to use the telephone on the branch line. Since each branch line has normally no connection with the main line, it is evident that a number of them may be used, and the above illustrations serve to exemplify the principle of construction and mode of operation of the devices constituting my invention. The specific character of the same will be described by reference to the drawings.

Figure 1 is a diagram of the system, showing the parts and devices in their proper relations. Fig. 2 is a diagram of a somewhat modified form of the invention. Fig. 3 is a side view of a device used in the system shown in Fig. 2, and Fig. 4 is a modification of the system shown in Fig. 1.

A A in Fig. 1 represent a mechanical-telephone line with terminal instruments B and B'. The character of the line and instruments is well known and requires no further description, the latter being what are commonly known as mechanical or "lovers' telephones," connected, preferably, by a light wire.

One branch line, as C, is shown for purposes of illustration. It will be understood,

however, that others may be used, in which event their arrangement is in all respects like that shown. At the point where this branch is to meet the main line a flat and comparatively light strip of soft iron, D, is inserted directly in the main line and forms a part thereof, the wire A being severed at that point and its ends connected to those of the strip D. The strip D is preferably suspended by rubber bands, cords, or the like, E, from a stationary support. The introduction of this device in the line, as is well known, has no sensible effect upon the transmission of speech over the line. On one side of the strip D and close thereto is suspended a flat U-shaped piece of soft iron, F. This is suspended by the bands or cords E', which connect with the ends of the piece. The piece F is included in the branch telephone line C by severing the wire of said line and connecting its ends to opposite sides or corners of the piece. The terminals of the branch line are connected each to a telephone, or one to a telephone, as F', and the other to a spring-support, hereinafter described. Normally there is no connection between the two iron pieces D and F, and the telephone F' is in no wise affected by the operation of the line A. To bring the telephone F' and its branch circuit into operative relation with the main line, so that conversation may be carried on between either B or B' and F', or between F' and any other branches, I wind the two pieces of iron D and F with insulated wire, making them, respectively, an armature and magnet; but these coils are so made that they do not touch the pieces D F, but permit them to move freely within the coils. I also run an electric circuit, G, from a point near the instrument F', and ground this circuit through the coils on the magnet and armature. By closing this circuit the magnet and armature, being energized, are brought in contact and adhere to one another so long as the circuit G remains closed. Under such conditions the vibrations produced in one line will be imparted to the other, and the instrument F' is thus brought into operative relation with either of the main-line instruments, or with any other branch instrument which may be at any time connected with the main in a similar manner.

As I have above stated, the ends of line C may be connected to telephones. I prefer to use, however, but one instrument for each branch line, and to connect the other to a spring. The former plan is illustrated in Fig. 4, which shows each end of the line C fitted with a telephone. In such case both telephones may be used by different persons. This may be so arranged as to have at all times the same tension—that is to say, the spring may be secured to a fixed support at one end and directly to the line at the other—or it may be modified. For example, the spring H is connected at one end to a fixed support, and at the other to a pivoted bell-crank lever, K. The end of line C is connected to the same end or

arm of this lever as the spring, so that normally the full effect of the spring is exerted in maintaining the line under tension. The other end of the bell-crank lever K carries the core L of a solenoid, M, which I include in the circuit G. When the circuit G is closed, the solenoid stretches the spring H and relaxes the tension of the line to a certain extent. Under the action of the spring alone the line C is so taut as to hold the magnet F away from its armature; but by relaxing this tension somewhat the contact of the two is made easier.

With this system I employ an electric circuit with call-bells of some kind. This circuit N is represented as running to each telephone, at which it includes a bell, O. There are also provided keys or switches P, with back contacts that ground the line at its terminals and batteries R, one with each switch, so that any subscriber can call up any of the others. Any ordinary call or signal system may be used for this purpose.

In Fig. 2 I have shown a modification of the means for connecting the main line and a branch, all the other parts remaining the same as in Fig. 1. In this case the line C carries a small disk or plate, b, rigidly secured to it. The line runs through a slot in a metal plate, T, which is secured to the line A or to a short metal bar, T', inserted in the line. The plate T is suspended by a cord or strap, d, and may be of any shape. The line C ends in a conical button, e, that fits in a countersunk perforation in the end of the bell-crank lever K. A spring, S, is connected with this lever, as in the former case, and the other end carries the core of a solenoid, M, in the circuit G. Normally the strength of the spring S tightens the line C and holds the button or disk b out of contact with the plate T, thus breaking the connection between the main and branch lines. In order to operate the telephone F' by either of the telephones B or B', or conversely, the circuit G is closed. This draws the button b over into contact with the plate T and overcomes the tension of the spring S. In this way the two lines A and C are so connected that vibrations in one are transmitted to the other. It is important to observe that these and many similar devices which may readily be designed from the above illustrations effect more than a simple contact of the two lines. The branch line in all cases is maintained at the proper tension, its direction and relation being such with reference to the main that it forms practically a continuation of the same.

From the examples I have given of the way in which my invention is or may be carried into effect it will be seen that the underlying idea or principle of the system is to bring two mechanical-telephone lines into or out of operative relation with one another at will, and, secondly, to effect this by electrical agency. The features of novelty which these involve are summarized in the claims.

I am aware that several mechanical-tele-

phone wires or lines have been brought together at a given point or station and means provided at such point for connecting together any two or more of such lines upon notice to an attendant, and this I do not claim.

What I claim is—

1. The combination, with two mechanical-telephone lines provided with couplings or mechanical connections for uniting the two lines, of means, substantially as described, for operating or controlling the couplings, and thereby bringing the lines into or out of operative relation with one another, as herein set forth.

2. In a mechanical-telephone system, the combination, with a main line and one or more branch lines, of couplings or mechanical connections for uniting a branch line to the main line, and means, substantially as described, for controlling or operating the couplings, and thereby bringing the branch line into or out of operative relation with the main, as set forth.

3. In a mechanical-telephone system, the combination, with a main and branch lines, of a coupling or mechanical connection, the two parts of which are connected, respectively, to the two lines, an electric circuit, and devices therein adapted to be operated by the current and to control or operate the coupling, and thereby bring the two lines into or out of operative relation with each other, as set forth.

4. In a mechanical-telephone system, the combination, with a main and branch lines, of an armature inserted in one line and a magnet in the other and placed or suspended in proximity to one another, and an electric circuit for causing an attraction between the magnet and

armature, whereby they are brought together and the lines thereby connected at will, as set forth.

5. In a mechanical-telephone system, the combination, with a main line and a branch line, and means for mechanically connecting and disconnecting the same, of a spring connected to the branch line for holding it taut, and an electric circuit containing an electro-magnet or solenoid acting in opposition to the spring, and means for operating or controlling the connection between two lines, as set forth.

6. In a mechanical-telephone system, the combination, with a main line, of a branch line normally disconnected from the main, means for connecting the main and branch lines, an electric circuit extending from the terminals of the branch line to its point of connection with the main, and devices included therein for controlling or operating such connection, as set forth.

7. In a mechanical-telephone system, the combination, with a main line, of a branch line or lines normally disconnected from the main, means for connecting the main and branch lines, an electric circuit for each branch extending from the terminus thereof to the point of connection with the main, devices included therein for controlling or operating such connection, and an electric-signaling line running to all the telephones on the lines, as set forth.

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Witnesses:

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TIMO. DAME.