No. 724,219. PATENTED MAR. 31, 1903.

E. A. TERPENING.

TELEPHONE CALL SYSTEM.

APPLICATION FILED MAR. 12, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

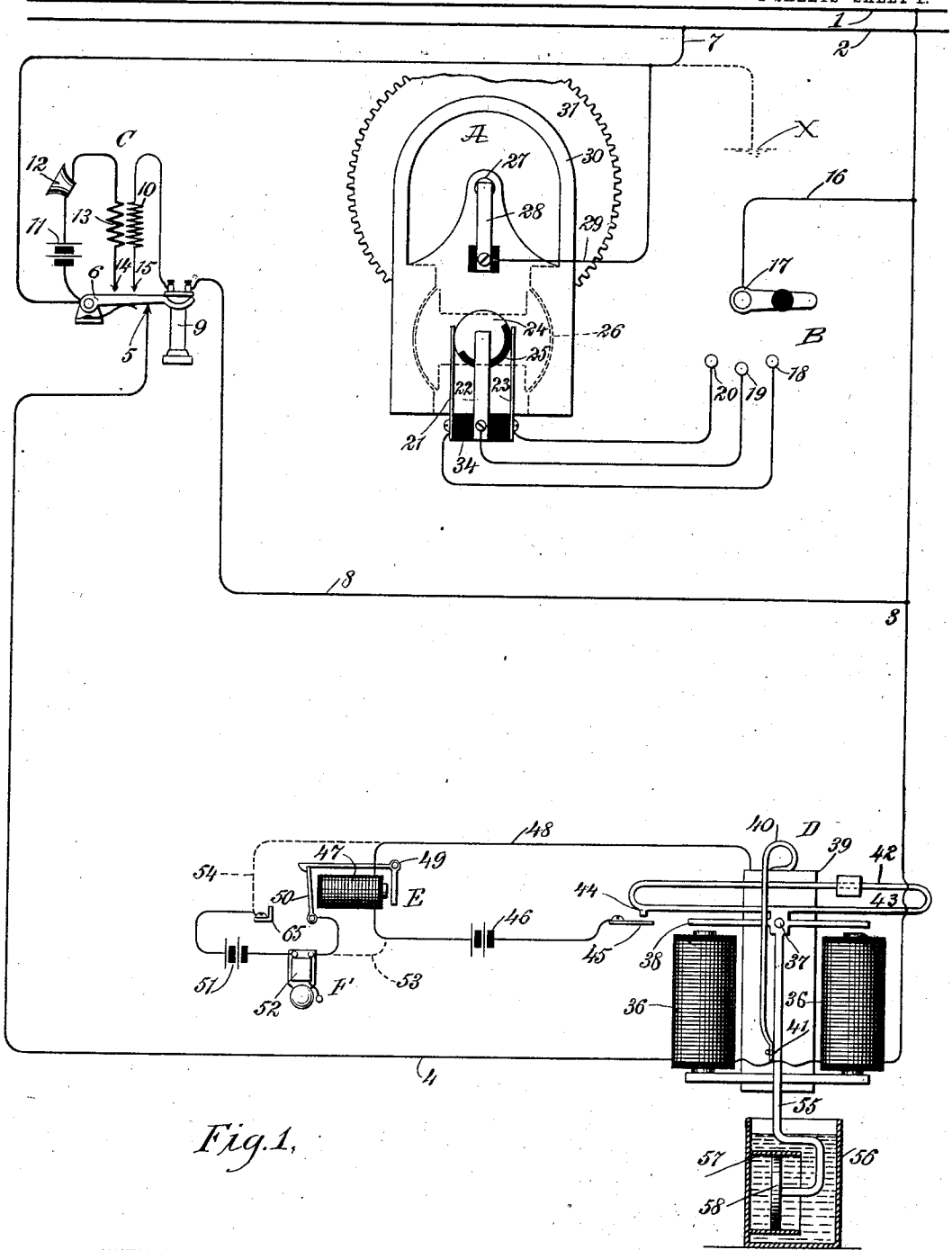

Fig. 1.

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Fig. 2.

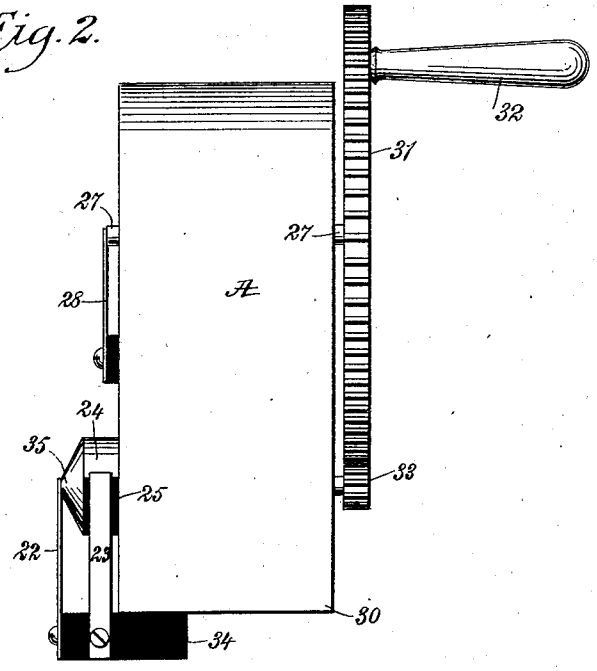


Fig. 3.

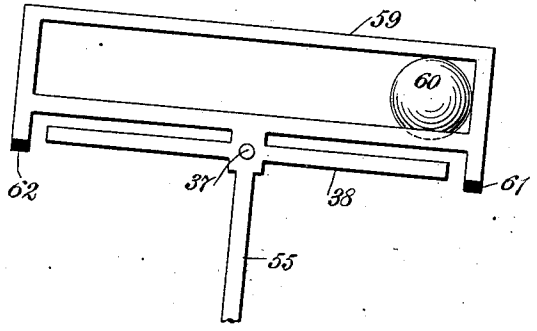
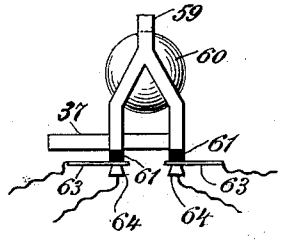


Fig. 4.



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UNITED STATES PATENT OFFICE.

ELMER A. TERPENING, OF GENESEO, ILLINOIS, ASSIGNOR OF ONE-THIRD TO NEWHALL ATWOOD, OF GENESEO, ILLINOIS.

TELEPHONE CALL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 724,219, dated March 31, 1903.

Application filed March 12, 1902. Serial No. 97,892. (No model.)

To all whom it may concern:

Be it known that I, ELMER A. TERPENING, a citizen of the United States, and a resident of Geneseo, in the county of Henry and State of Illinois, have invented a new and Improved Telephone Call System, of which the following is a full, clear, and exact description.

My invention relates to a telephone call system admitting of more or less general use, and particularly adapted to party telephone-lines employing either bridge or series circuits.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a diagram of an office equipped with my system. Fig. 2 is a side elevation of a generator used in calling; and Figs. 3 and 4 show in side and end elevation, respectively, a modification in certain details of the means for closing the local calling-circuit.

The generator or magneto is shown at A. The switch for connecting the same with the main circuit is shown at B, a talking apparatus at C, an automatic circuit-closer at D, a drop at E, and a bell at F, this drop and bell constituting an alarm.

In Fig. 1 the wires 1 and 2 are the lines of a metallic bridge system. If, however, a ground bridge system is desired instead, the wire 2 is discarded and the wire 7 at each station is grounded at X, as indicated by dotted lines in Fig. 1.

The ringing-circuit by which a subscriber is called is as follows: the wire 1, junction 3, circuit-closer D, wire 4, contact 5, switch-hook 6, wire 7, and wire 2.

The calling-circuit whereby the generator A is connected with the main line is as follows: line 1, wire 16, switch-lever 17, contact 18, 19, or 20, as the case may be, contact 21, 22, or 23, as the case may be, commutator 24, armature-coils 26, spring-contact 28, wire 29, wire 7, and line 2 or ground, as the case may be.

The talking-circuit when the receiver is removed from the switch-hook is as follows: line 1, junction 3, wire 8, receiver 9, secondary coil 10, contact 15, switch-hook 6, wire 7, and line 2 or ground, as the case may be.

The local primary talking-circuit or circuit for inducing currents in the main line is as follows: battery 11, transmitter 12, primary coil 13, contact 14, switch-hook 6, and back to the battery 11.

The local battery-circuit for actuating an alarm is as follows: battery 46, drop-magnet 47, wire 48, yoke 42, contacts 44 and 45, back to the battery 46.

When the drop 50 falls, a second local circuit relayed from the one just described is as follows: battery 51, contact 65, drop 50, bell 52, back to battery 51.

The generator A differs slightly from the kind in general use in that the spring-contacts 21, 22, and 23, which are connected by individual wires with the stationary contacts 18, 19, and 20, are free to engage a sort of commutator 24, provided with an insulating-sector 25 for the purpose of segregating different portions of the current generated in the coils 26. The rotation of the commutator 24 brings the spring-tongues 21, 22, and 23 successively into the ringing-circuit in such manner and at such moments that the currents of one direction flow to the spring-tongue 21, those of the opposite direction flow to the spring-tongue 23, and the alternating currents flow to the spring-tongue 22. By this arrangement when the switch member 17 is closed upon contact 18 the currents generated already flow through the wire 16 in one direction. If the member 17 is closed upon the stationary contact 19, the currents flowing through the wire 16 are of an alternating character, whereas if the switch member be closed upon the contact 20 the currents in wire 16 will be directed in an opposite direction to those flowing through the wire 16 when the switch member 17 is closed upon the stationary contact 18. The rotation of the gear-wheel 31 by means of the handle 32 causes rotation of the pinion 33, which in turn causes the rotation of the armature-coils 26 and the commutator 24. The commutator is provided with a point 35 for making a more perfect engagement with the

spring-tongue 22. The tongues are insulated by a block 34 of gutta-percha. The shaft 27 of the wheel 31 is free to move longitudinally, so as to make contact with the spring-tongue 28 and to break contact with the same. By this arrangement the handle 32 is gradually pressed to the left when it is desired to complete the connection between the shaft 27 and the spring-tongue 28. The object in making the spring-tongue 28 and the shaft 27 separable is to enable the generator to be used in a multitude of relations relating to bridge systems whereby the generator-coils 26 can be thrown out of use.

An important part of my system is the automatic circuit-closer D, which has the singular function of rendering the alarm sensitive only to currents of a particular direction or of a particular kind. The armature 38, pivoted at 37, is polarized by the permanent magnet 39, which renders the center of the armature of one polarity and its ends of another polarity, while the magnets 36 present unlike poles to the two ends. A leaf-spring 40 is soldered upon the magnet and is provided with a fastening 41 for a purpose to be hereinafter described. Immediately above the armature 38 is a yoke 42, provided with an adjustable weight 43 and with a contact 44. By adjusting the weight 43 at different points upon the yoke 42 the armature can be rendered still more sensitive, and the weight may be made upon either side, according to the polarity of the armature. The polarity of the armature 38 is different upon the circuit-closers placed at different stations, or, if preferred, the current is directed through the coils of the magnets 36 in opposite directions at the different stations. The object is at one of the stations to render the armature 38 responsive to currents of a particular direction, but not responsive to currents of the opposite direction, whereas at another station the armature is responsive only to currents of the opposite direction. Suppose now that in the circuit-closer shown an appropriate current causes the left-hand portion of the armature 38 to descend toward the magnet and its opposite end to ascend. This closes the contact consisting of the members 44 and 45, completing the local circuit through wire 48, magnet 39, pivot 37, and contacts 44 45, thus sounding the alarm. If now some party upon the line sends currents in the opposite direction from those actuating the armature, as just described, it will be noted that there will be no tendency to close the contacts 44 and 45. To prevent alternating currents from affecting the armature in a circuit-closer intended only for currents of a particular direction, the arm 55, which is rigidly secured to the yoke and to the armature, dips into a vessel 56, containing liquid, and is secured to the piston 58 in the cylinder 57, this arrangement constituting a dash-pot. The dash-pot prevents any abrupt movement of the armature due to the momentary impulses of the currents, but does not prevent movements of the armature when the currents flow successively in the same direction for a little period. The fastening 41 upon the arm 55 normally allows the spring 40 to retain the arm in the position indicated when the weight 43 is in the center of the yoke or is removed entirely from the yoke.

If desired, the modification shown in Figs. 3 and 4 may be used, in which a yoke 59 circumscribes a ball 60, which serves as a weight. Insulated bosses 61 62 press spring-arms 63 into engagement with contacts 64, thus completing the circuit through the drop, so that the passage of a current in the proper direction causes the right-hand end of the yoke 59 to fall, thus rolling the ball to the then lower end of the yoke 59, as shown. There it will remain until a current is sent through the magnets 36 in the opposite direction, when the right-hand end of the yoke 59 will rise and the left-hand end will fall, the ball 60 now rolling to the left.

There are a number of other combinations of distant switching by substantially the same apparatus and which it is not necessary to describe.

It will be observed that the automatic circuit-closer D can be made responsive to direct currents in two directions, but not to alternating currents. In other words, this circuit-closer may be adapted to be actuated by either of the contacts 18 or 20, but is not responsive to contact 19, which is used solely to actuate ordinary magneto-bells operated by alternating currents. By means of this arrangement the amount of ringing is reduced to a minimum, and by improvising different signals—such as one, two, or three rings—the number of instruments which can be used upon a party-line without material interference with each other may be multiplied considerably.

Of course the ordinary polarized bells may be used at divers of the stations, and as the structure and operation of these bells are well known it is not deemed necessary to enter a description of them. Suffice it to say that such bells when used are responsive only to the alternating currents generated in the usual manner and that to actuate these bells the switch member 17 is closed upon the stationary contact 19.

My telephone call system can be used upon party-lines of almost any description, and the number of stations employed may range anywhere from two or three to a dozen or more.

It will be understood, of course, that the magnets 36 are of high resistance, so as to prevent the calling apparatus from closing the main talking-circuit, and that the generator-coils are so wound as to generate a current of great strength, so that a small fraction—say one-twentieth—of the energy of the generator-current is sufficient to ring an individual bell.

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

1. A telephone call system comprising a line, mechanism for producing currents of different character upon said line, open-circuit alarms, local sources of electricity for energizing the same, polarized magnetic members, armatures for the same, yokes mounted upon said armatures, contacts connected with said yokes and said alarms, weights mounted upon said yokes and movable at will for engaging and disengaging said contacts, and automatic mechanism for rendering said armatures sluggish in action.

2. A telephone call system comprising a line, mechanism for producing currents of different character upon said line, open-circuit electric alarms, local sources of electricity for energizing the same, polarized magnetic members, armatures for the same, yokes mounted upon said armatures, contacts connected with said yokes and said alarms, arms rigidly secured to said yokes and said armatures, weights mounted upon said yokes and movable at will for connecting and disconnecting said contacts, dash-pots connected with said arms for rendering said armatures sluggish, and springs connected with said arms for rendering the movements of the same elastic.

3. A telephone call system, comprising a line, mechanism for producing currents of different character upon said line, open-circuit signals, local sources of electricity for energizing the same, polarized magnetic members, pivoted armatures for the same, weight-supports rigidly connected with said armatures, contacts connected with said supports and said signals, weights carried by said supports, arms rigidly connected with said armatures at the pivot portion and extending therefrom, vessels adapted to contain liquid and provided with horizontally-arranged cylinders, and pistons mounted loosely in said cylinders and connected with the said arms, as set forth.

4. A telephone call system, comprising a line, mechanism for producing currents of different character upon said line, an open-circuit alarm, a local source of electricity for energizing the same, a polarized magnetic member, a pivoted armature for the same, a yoke above said armature and rigid therewith, contacts connected with said yoke and said alarm, a weight adjustably carried by the yoke, an arm extending downward from the center of said armature and rigid therewith, a vessel adapted to contain liquid, a cylinder arranged horizontally in said vessel and open at one end, a piston movable in said cylinder, the said arm having its lower end extending at right angles to the body of the arm and connected with the said piston and a spring connected with the said arm as and for the purposes set forth.

5. In a telephone call system, a line, mechanism for producing currents of different character upon said line, a local signal-circuit, means for controlling the same and comprising a polarized magnetic member having a movable armature responsive to one of said currents, a yoke located above the armature and rigid therewith, the said yoke being arranged to complete the local circuit by the movement of the armature, an arm extending downward from the armature, and a dash-pot having its piston connected with the end of said arm, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELMER A. TERPENING.

Witnesses:

HARRY A. REHERD,

C. G. LINNELL.