

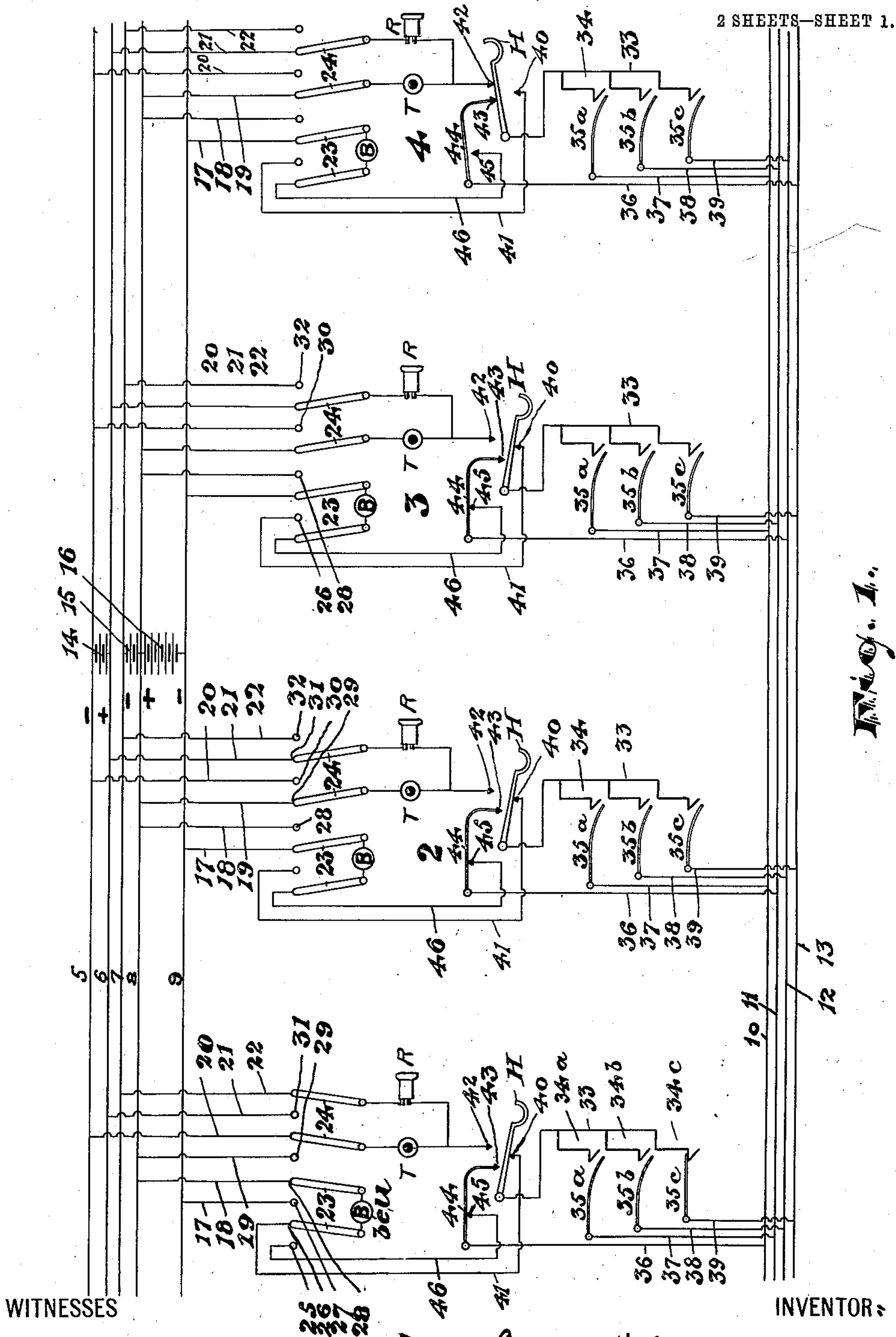
No. 849,850.

PATENTED APR. 9, 1907.

L. F. MÜLLER.
TELEPHONE SYSTEM.

APPLICATION FILED AUG. 7, 1905.

2 SHEETS—SHEET 1.



WITNESSES
Ralph Lancaster
Russell M. Everett

INVENTOR:
Leopold F. Müller
BY
Charles H. Peck

ATTORNEY.

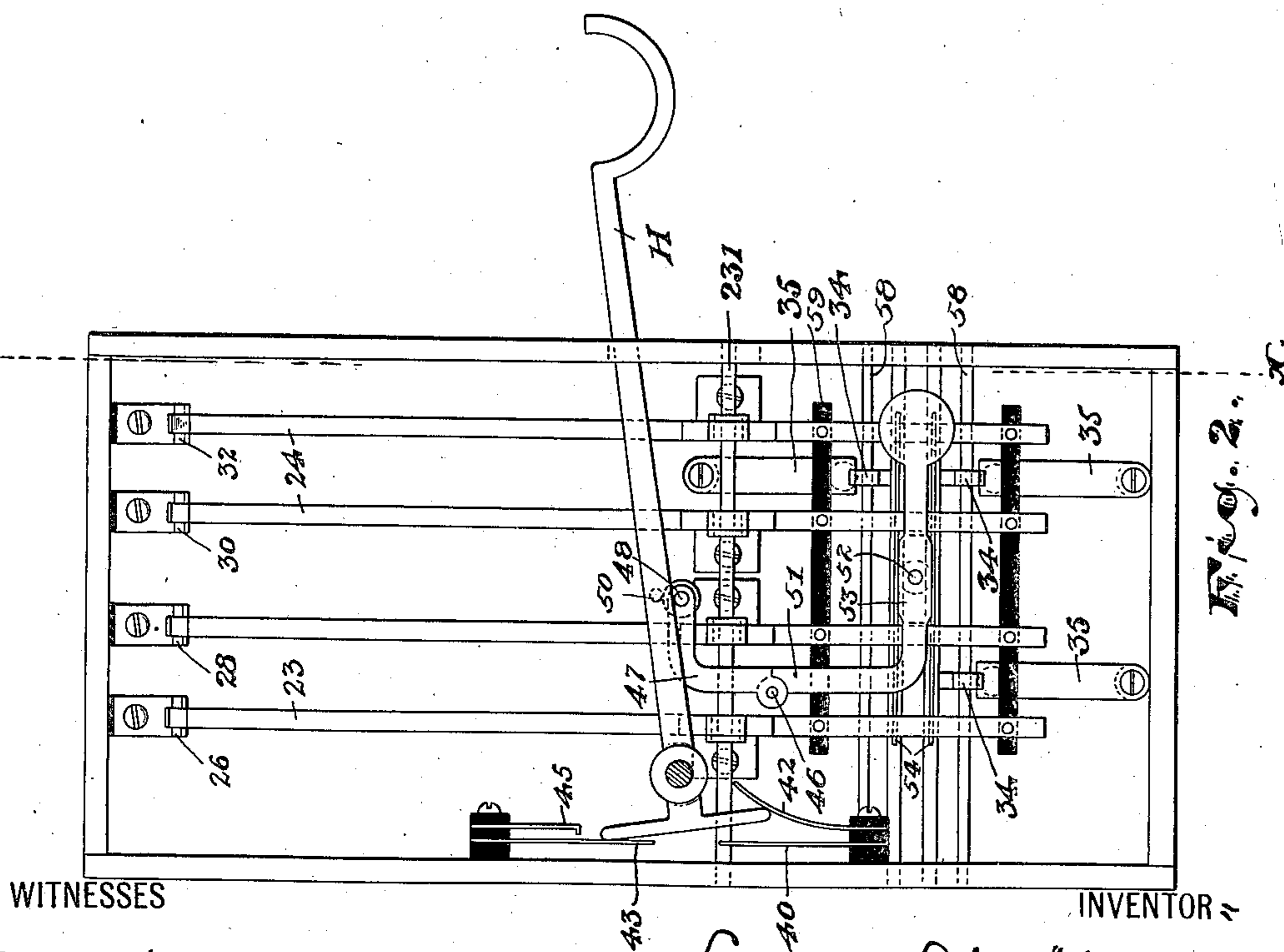
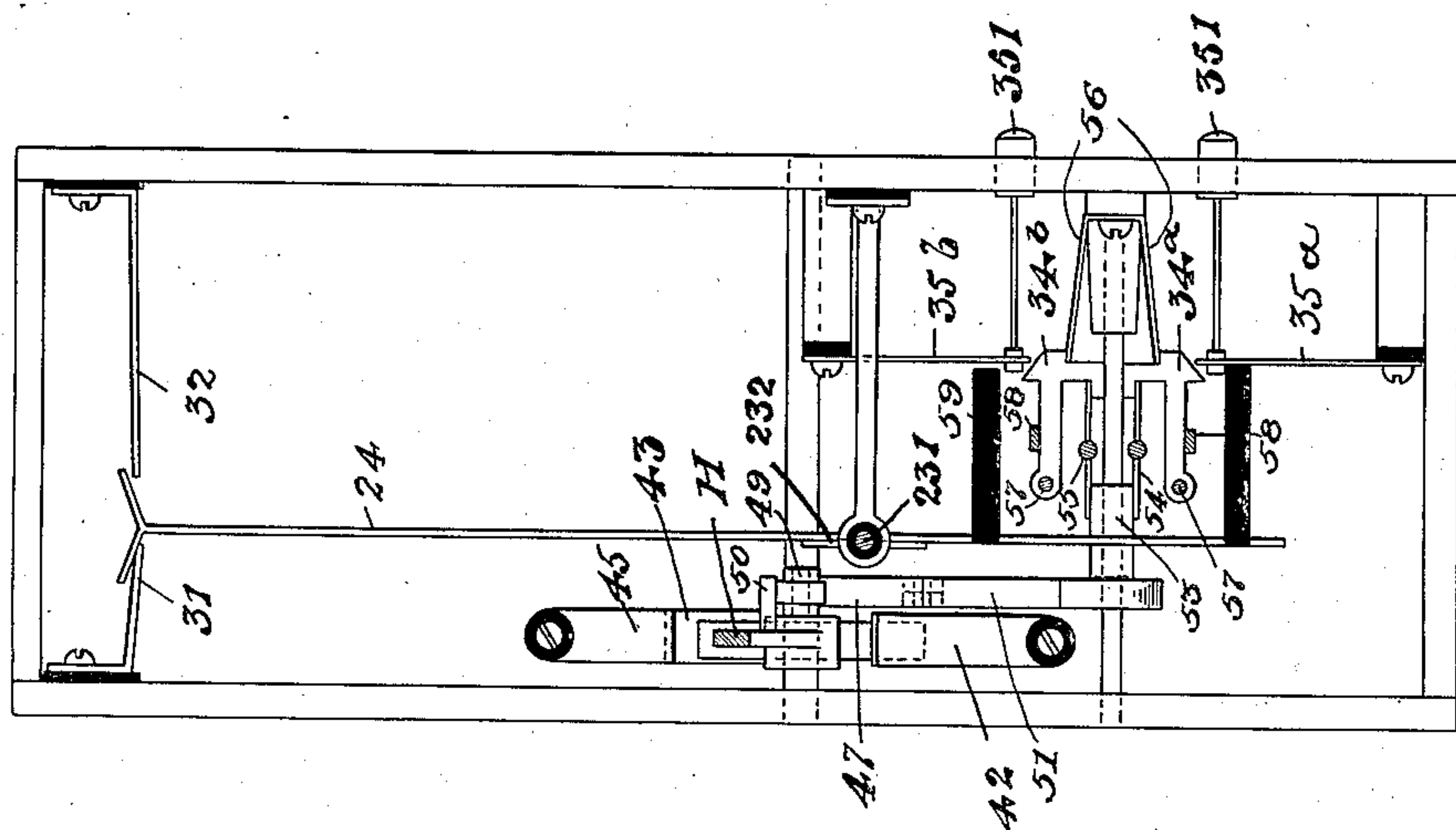
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ATTORNEY.

UNITED STATES PATENT OFFICE.

LEOPOLD F. MÜLLER, OF PASSAIC, NEW JERSEY.

TELEPHONE SYSTEM.

No. 849,850.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed August 7, 1905. Serial No. 272,971.

To all whom it may concern:

Be it known that I, LEOPOLD F. MÜLLER, a subject of the Emperor of Germany, residing at Passaic, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Telephone Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of electric telephonic systems in which a number of stations are employed and by which a calling party at either of said stations can make a connection with any one of the other stations without the intervention or aid of a central office.

The objects of the present improvements are to prevent short-circuiting of currents, and consequently prevent interference with a proper communication between stations, especially where said stations are distant from one another, to avoid the production and use of induced currents and the disadvantages arising therefrom, and to secure other advantages and results, some of which may be hereinafter referred to in connection with the description of the working parts.

The invention consists in the improved telephone system and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several figures, Figure 1 is a diagrammatic view of my improved system. Fig. 2 is a front view of a local-station box and contents, showing certain of the improvements in detail, the front board being removed; and Fig. 3 is a section of the same at line *x*.

In said drawings, 1, 2, 3, and 4 represent four stations, the number in practice being greater or less, as circumstances may render desirable. These are usually constructed and the parts therein are arranged electrically connected and operated in uniform manner.

In station 1 the bell-circuit is shown closed

to occasion the ringing of the bell B, while in station 4 the transmitter-hook is shown raised into closed contact with the terminals of the transmitter and receiver wires ready for talking. 5, 6, 7, 8, and 9 are constant and unvarying line-wires on which the stations are disposed, and 10, 11, 12, and 13 are line-wires which vary in number in correspondence with the number of stations thereon and with which the several stations 1 2 3 4 are connected, the battery 14 being disposed on the positive and negative wires 6 and 5 and the batteries 15 and 16 being stationed on the wires 7, 8, and 9. The wires 7 and 9 are negative wires and cooperate with the one positive wire 8. In connection with the line-wires 5, 6, 7, 8, and 9 are at each station branch wires 17 18 19 20 21 22, extending to and having terminals at the switches 23 24 of the bell B and the transmitter T and receiver R.

For convenience of specific reference the terminals of the wires referred to and to be referred to engaged by the switches 23 24 are marked, respectively, 25 26 27 28 29 31 32.

The receiver-hook H of each station is in permanent connection with a local wire 33, having thereon a series of normally open hand-operable contacts 34, adapted to connect with springs or other terminals 35 on branches 37 38 39 of the line-wires 10 11 12 13. Said springs are operated by push-buttons or other hand-operated devices. Said hook H when supporting the receiver R is in normal contact with a terminal 40 of another wire 41, extending to the bell-switch terminal 26, but when relieved of the weight of the receiver said hook, actuated automatically by a spring or other usual means, (not shown,) rises into closed contact with the terminal 42, in connection, as usual, with transmitter T and receiver R and with the contact 43 of a spring 44 on a branch wire 36, connecting at station 1 with the line-wire 10, at station 2 with the line-wire 11, at station 3 with the line-wire 12, and at station 4 with the line-wire 13, and should the stations be multiplied to an extent greater than shown then these line-wires are accordingly multiplied.

In connection normally with the spring 44 is a terminal 45 of a wire 46, leading to a terminal contact 25, adapted to be engaged by the bell-switch 23.

Under normal conditions, or when the receiver is suspended from its hook, or, similarly,

when a station is not in immediate use, the parts are as illustrated by stations 2 and 3, the circuit connections of the stations being open.

5 Upon pushing against the button or hand-operable device 351 of a station—such, for example, as shown in Fig. 3—to close the contact spring or terminal 35 against the contact-terminal 34 the four contact-switches at that
10 station are automatically and together moved from their contact with the terminals 25 27 29 31, as will readily be understood upon reference to Figs. 2 and 3, into engagement with the terminals 26, 28, 30, and 32, thus establish-
15 ing a closed bell-circuit between the calling and called station, so that the bells or calling-signals are caused to ring continuously until the receiver of the desired distant station is removed from the hook, when both bells stop
20 ringing, thus notifying the calling party that the party called is ready to talk. Thus, in closing the contacts or terminals 34^c 35^c, for example, and by the automatic movement of the terminals of the switch or switches 23 24
25 from the positive pole of battery 16 the current passes over line-wire 8 to branch 18 of the closed station, thence through one arm or connection of the switch 23 to the bell, thence to the other arm of said switch to local
30 wire 41, to terminal 40, in normal contact with the hook H, thence through said hook and local wire 33 to the closed terminals or contacts 34^c 35^c to the local branch wire 39 and line-wire 13 to station 4, in connection
35 with said wire 13, where it flows through wire 36 to spring 44, terminal contact 45, normally in connection therewith; local wire 46, arm-switch 23, bell B, second arm of the bell-switch to branch-wire 17, line-wire 9, to the
40 negative pole of the battery 16. Thus the bells of stations 1 and 4 continue ringing until the circuit thus established is opened by the raising of the receiver-hook, and by preconcerted plan the hook raised is at the called
45 station, so that the caller is notified of the presence of the person called by the cessation of the ringing at his own station, as above indicated.

The removal of the receiver R from the
50 hook H at the called station permits the automatic raising of said hook in any ordinary manner, so that the bells cease ringing and the talking-circuit is automatically closed at said called station. To this end the hook
55 enters into closed contact with the terminals 42 and 43, as shown at station 4. To complete the talking-circuit, the receiver at the calling-station is also removed from the hook. Tracing the course of the current from the
60 negative pole of battery 14, said current passes through wire 5 and branch wire 20 at station 1 to or from one arm of the transmitter and receiver switch 24, through transmitter T, and terminal 42, now in contact
65 with the hook H, next through wire 33, ter-

minals 34 35, and wire 39 of station 1, and through line-wire 13, connecting with station 4, and finally through local branch wire 36, spring 44, terminal 43, hook H, terminal 42, receiver R, arm of switch 24, branch 21, line-
70 wire 6, and the positive end of battery 14.

Beginning with the negative pole of the battery 15, the path of the electrical current is traced over wire 7, branch wire 22, arm of the switch 24, to the receiver R, and terminal
75 42, hook H, wires 33, terminals 34 35, and branch wire 36, station 4, spring 44, hook H, transmitter T, one arm of switch 24, branch wire 19, to the positive pole of the battery 15. Thus the back and forth transmission of
80 sound-vibrations are transmitted from the transmitter of one station to the receiver of the other station, and vice versa, as will be readily understood.

By replacing the receivers on their hooks
85 the contacts of 34^c and 35^c, for example, are interrupted automatically and by means of a spring (not shown) on the shaft 231, bearing on the oscillating terminals or contacts of the switch or switches 23 24, said terminals are
90 brought back to their normal engagement with the terminals 25 27 29 31, as will be understood upon reference to Figs. 2 and 3.

The operation of each call-box is the same, and the hook-arm H, while shown in Fig. 2
95 raised, is much lower when the receiver is in place, and in that case the pin 50 on the hook-arm is below the roller 49 instead of above it. Thus when the upper button 351 is pushed in the terminal 34^b is thrown around on its
100 axis 57 to allow the end of the spring 35^b to engage it. This action also causes the bar to be operated to throw the switch 24 over in contact with the terminal 32. The locked engagement between the terminal 34^b and
105 the spring 35^b is insured by the springs 56. Now when the receiver is taken off the hook and it rides up the pin 50 will ride over the roller 49 by reason of its being on the end of an arm 47, pivoted at 46. When the op-
110 erator is through talking and hangs the receiver back on the hook, the pin 50 engages the roller 49 and the arm 47 abuts on the arm 51 and both arms are oscillated on the pivot 52. On this pivot the arm 51 has an
115 enlarged flattened portion 53, that fits in between the leaves 54, that are engaged on the pivots 55. This tilting of the flattened portion spreads one end of these plates 54 and necessarily draws toward one another the
120 other ends, and these carrying with them the terminals 34^a and 34^b, swinging on their pivotal pins 57, allow the springs 35^a and 35^b to assume their normal positions and the terminals 34^a and 34^b resume their normal
125 engagement with the stop-strips 58. The release of the springs 35^a and 35^b also allow the return of the switch 24 to its normal position by means of the coiled spring 232, which is wound around the axis 231.
130

Having thus described the invention, what I claim as new is—

1. A telephone system comprising a pair of line-wires connected to a battery, a pair of batteries having a positive wire in common, a pair of negative wires connected to the pair of batteries, a series of stations, each station containing a signal, a transmitter and a receiver, the signal being connected to one of the last-mentioned negative wires, the transmitter to the common positive wire, and the receiver to one of the line-wires and a series of line-wires connecting the stations.

2. A telephone system comprising a pair of line-wires connected to a battery, a pair of batteries having a positive wire in common, a pair of negative wires connected to the pair of batteries, a series of stations, each station containing a signal, a transmitter and a receiver, a switch to connect the signal with one of the last-mentioned negative wires, or the common positive wire, a switch to connect the transmitter with the common positive wire or one of the line-wires, and a switch to connect the receiver with one of the line-wires or the other negative of the wires of the

pair of batteries and a series of line-wires connecting the stations.

3. A telephone system comprising a pair of line-wires connected to a battery, a pair of batteries having a positive wire in common, a pair of negative wires connected to the pair of batteries, a series of stations, each station containing a signal, a transmitter and a receiver, a switch to connect the signal with one of the last-mentioned negative wires, or the common positive wire, a switch to connect the transmitter with the common positive wire or one of the line-wires, a switch to connect the receiver with one of the line-wires or the other negative of the wires of the pair of batteries, and means for operating the switches in unison and a series of line-wires connecting the stations.

In testimony that I claim the foregoing I have hereunto set my hand this 31st day of July, 1905.

LEOPOLD F. MÜLLER.

Witnesses:

CHARLES H. PELL,
RUSSELL M. EVERETT.