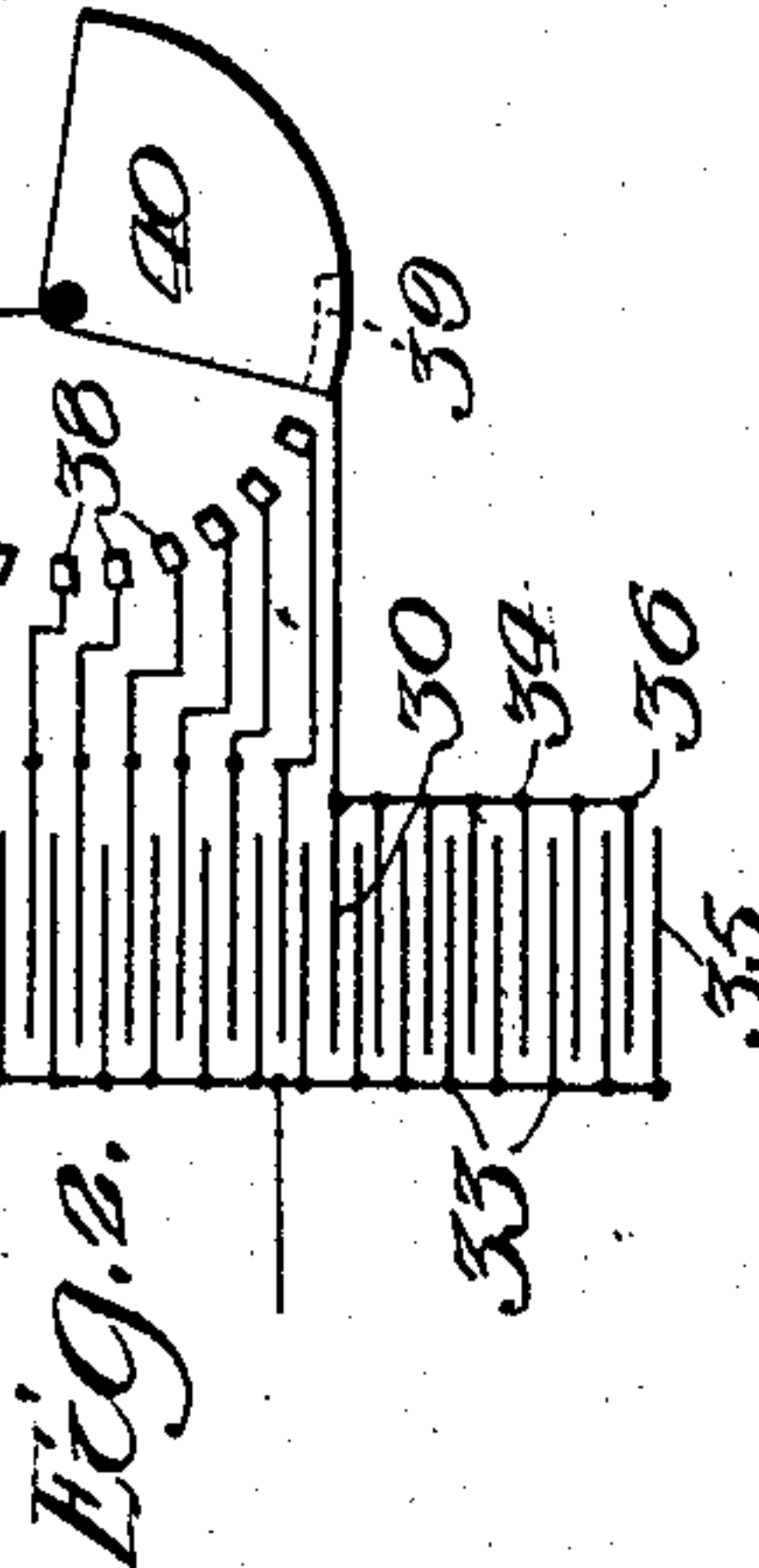
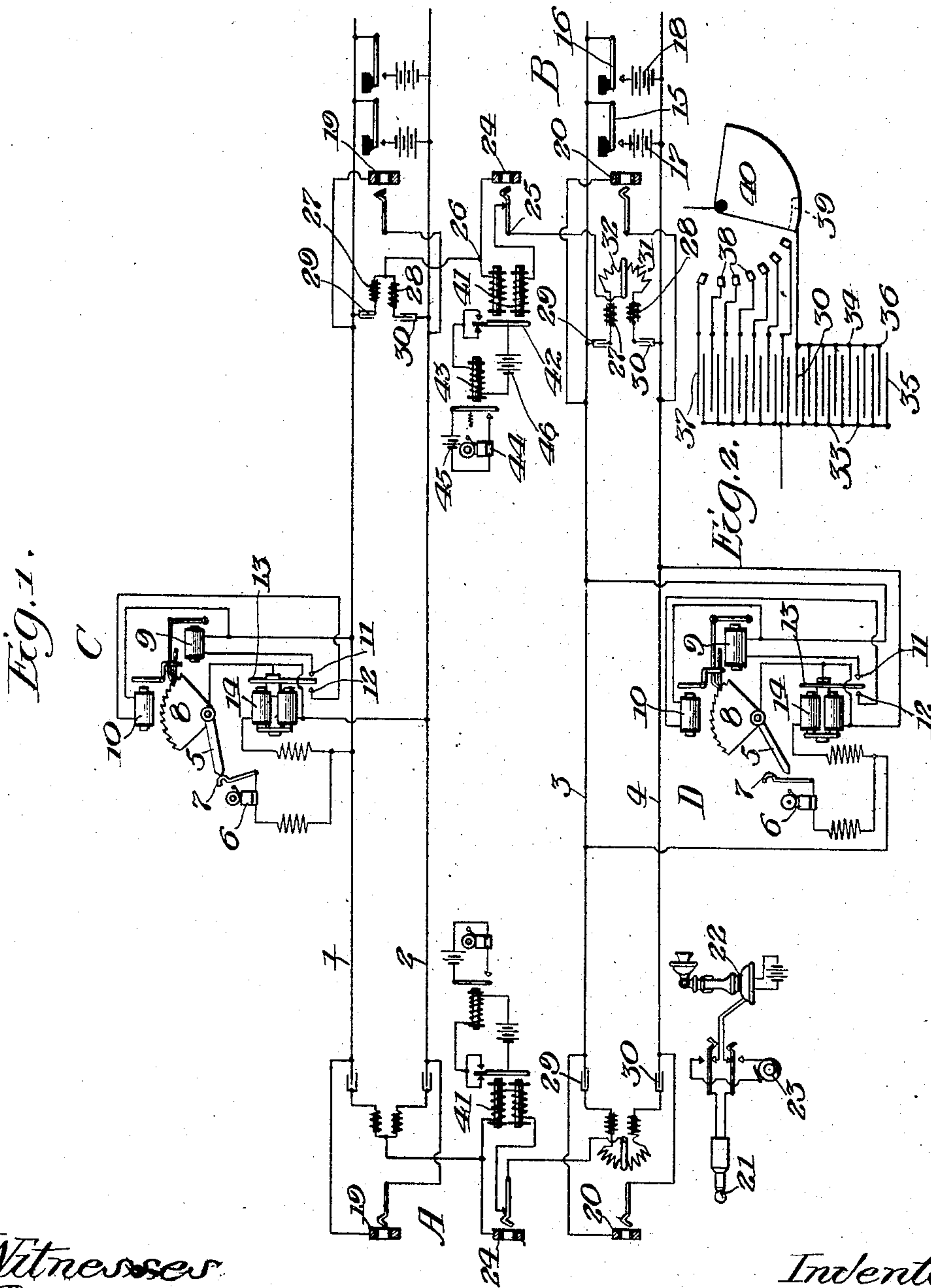


H. O. RUGH.
TELEPHONE SYSTEM.
APPLICATION FILED MAY 16, 1910.

998,040.

Patented July 18, 1911.



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TELEPHONE SYSTEM.

998,040.

Specification of Letters Patent. Patented July 18, 1911.

Application filed May 16, 1910. Serial No. 561,689.

To all whom it may concern:

Be it known that I, HARRY O. RUGH, a citizen of the United States, residing at Sandwich, in the county of Dekalb and State of Illinois, have invented a certain new and useful Improvement in Telephone Systems, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to telephone systems, and has for its object the arrangement of a plurality of telephone circuits in such manner that, for instance, three operative talking circuits can be obtained from two metallic telephone circuits.

My invention contemplates new arrangements of parts to accomplish this result, and at the same time provides facilities for making adjustments which have been found necessary in practice to make systems of this kind operative, and which adjustments have hitherto been very difficult of attainment and been frequently impossible.

The improved adjusting features are described and claimed in my co-pending application, Serial No. 539,165, filed Jan. 20, 1910, the claims herein being limited to the system itself.

I will describe my invention in detail by reference to the accompanying drawing illustrating the preferred embodiment thereof, in which:

Figure 1 diagrammatically shows a system in accordance with my invention, and: Fig. 2 shows a detail view of adjusting means employed.

In Fig. 1, I show two metallic telephone circuits consisting respectively of the circuit composed of the line wires 1 and 2, and a circuit composed of the line wires 3 and 4. These line wires connect station A with the station B, and it is designed that each metallic circuit shall accommodate calling devices at a plurality of substations, which calling devices are indicated for but one station on each circuit, they being similar in the various circuits, said stations being C and D. The only difference at the various substations consists in placing an arm 5 in a different annular position in order to selectively call signals 6, under the control thereof. Each signal is associated with a contact element 7, under the control of step-by-step mechanism 8, which step-by-step

mechanism is adapted for progressive forward movement through the magnet 9 and adapted to be restored by the magnet 10, which magnets are associated with contact elements 11 and 12, respectively, under the control of the armature 13 of the relay 14, which relay 14 is selectively operated by currents of different polarity as impressed on the line wires by keys 15 and 16, respectively, thus to place the armature 13 in contact-making position with either element 11 or element 12, thereby to step-up the element 8 to its proper position through the agency of current in batteries 17 and 18, and to release said element. Each of the line circuits 1, 2 and 3, 4 ends in jacks 19 and 20, respectively; at their opposite ends, which are adapted to be engaged by a plug 21 acting in connection with a telephone set 22, and a high frequency ringing generator 23, as will be apparent. Thus, telephonic communication can be had over the two respective metallic circuits, and means are provided for selectively calling telephones distributed throughout said metallic circuits. I further contemplate means whereby a third telephone circuit can be established over the four line wires without interfering with the two metallic circuits above mentioned, and this third circuit ends in jacks 24, 24, the two terminals of said circuits 25 and 26 being connected respectively to neutral points of impedance provided with the circuits 1, 2 and 3, 4. The terminal 26 is connected to the neutral point of impedances 27 and 28, which, together with condensers 29 and 30, are bridged across the line wires of circuit 1, 2 as shown. The terminal 25 is connected to a switch arm 32 movable over an adjustable resistance 31, interposed between impedance coils 27 and 28, thereby more accurately to select the neutral point.

Besides the necessity of selecting the neutral point, which may be found necessary in both circuits, I provide condensers 30, which are adjustable in order to properly adjust the capacity to the minutest detail. This I accomplish by the construction more clearly shown in Fig. 2, in which I have shown the condenser 30 as consisting of two electrodes 33 and 34, the electrode 33 being preferably formed of leaves 35, all permanently connected to the electrode 33. The electrode 34 has a plurality of leaves 36, permanently connected to the said electrode,

and a further plurality of leaves 37 terminating from contact plates 38. The electrode 30 further terminates in a contact plate 39. I employ a rotatable quadrant 40, which is adapted to add more or less of the leaves 37 to the electrode 34, to thereby increase or decrease the capacity of said condenser 30. By thus being enabled to adjust within the limits of the capacity of one leaf, I secure results which I have hitherto found impossible in the adjustment of circuits such as above outlined.

The signaling circuit at the stations A and B comprises a relay 41 connected as shown having an armature 42 which occupies normally one of two alternative positions depending upon the polarity of the current through the said relay 41. The armature 42 thus normally closes the circuit through relay 43 and battery 46. This circuit being closed, the armature of relay 43 is attracted to open the circuit normally through the signal 44 and battery 45, when alternating or similar currents traverse the relay 41. The armature 42 in its travel from one alternative position to the other momentarily interrupts the circuit of the relay 43, thereby permitting its armature to retract in accordance with these impulses, thereby to periodically close circuit through the signal 44 and battery 45 to operate said signal when such vibratory or similar currents are impressed on the circuit including the relay 41.

While I have herein shown and particularly described the preferred embodiment of my invention, I do not desire to limit myself to the precise construction and arrangement as herein set forth, but

Having thus described my invention, what

I claim as new and desire to secure by Letters Patent is:

1. A telephone system consisting of two metallic line circuits, a bridge across each end of each circuit consisting of a condenser, two impedance coils, and a condenser, in the order named, means for connecting a telephone at each extremity of said circuits to the neutral point of the corresponding bridges, means for adjusting the capacity of one of said condensers, and a signal-receiving device for each telephone, consisting of a relay having an armature provided with electrically connected front and back contacts, a relay and battery associated with said contacts and armature, and a local signal under the control of said last-mentioned relay.

2. A telephone system consisting of two metallic line circuits, a bridge across each end of each circuit consisting of a condenser, two impedance coils, and a condenser, in the order named, means for connecting a telephone at each extremity of said circuits to the neutral point of the corresponding bridges, and a signal-receiving device for each telephone, consisting of a relay having an armature provided with electrically connected front and back contacts, a relay and battery associated with said contacts and armature, and a local signal under the control of said last mentioned relay.

In witness whereof, I hereunto subscribe my name this twentieth day of April A. D., 1910.

HARRY O. RUGH

Witnesses:

MAX W. ZABEL,
HAZEL JONES.