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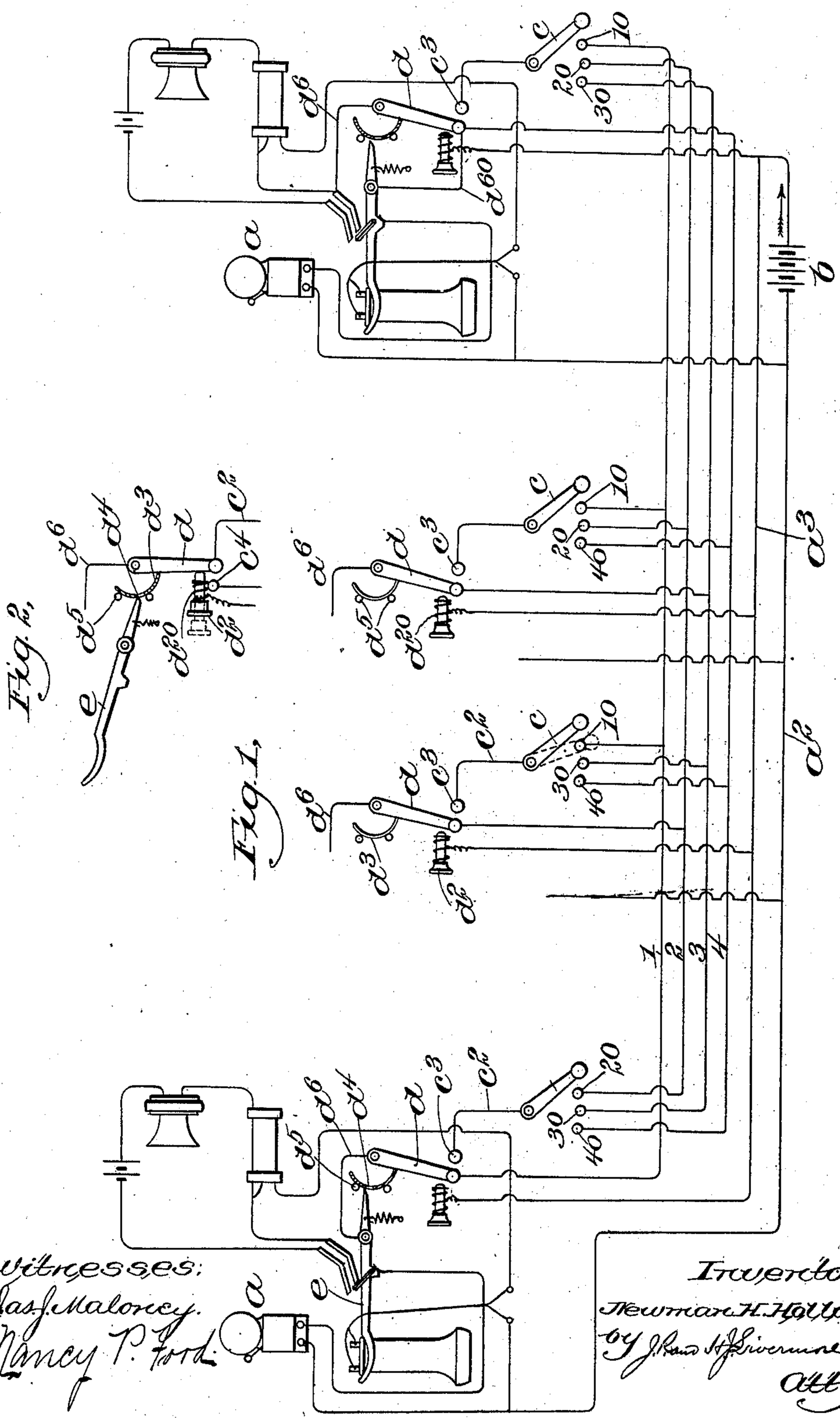
N. H. HOLLAND.

INTERCOMMUNICATING TELEPHONE SYSTEM.

(Application filed Nov. 12, 1900.)

(No Model.)



UNITED STATES PATENT OFFICE.

NEWMAN H. HOLLAND, OF BROOKLINE, MASSACHUSETTS, ASSIGNOR TO THE HOLTZER-CABOT ELECTRIC COMPANY, OF SAME PLACE.

INTERCOMMUNICATING TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 670,022, dated March 19, 1901.

Application filed November 12, 1900. Serial No. 36,213. (No model.)

To all whom it may concern:

Be it known that I, NEWMAN H. HOLLAND, a citizen of Canada, residing in Brookline, county of Norfolk, and State of Massachusetts, have invented an Improvement in Intercommunicating Telephone Systems, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The present invention relates to an intercommunicating telephone system of that class in which a number of stations are connected in such a manner that any party on the system can call any other party without the intervention of a central office.

In the system in which the invention is embodied there is a connecting-wire peculiar to each instrument leading to the source of current used for signaling and a common return-wire for all, and each instrument is provided with a selective switch or controller, whereby the wire leading to any other instrument desired may be connected through the signaling device at said instrument with said source of current, the circuit being completed through said common return-wire, so that the signaling-current produces a signal at the desired instrument without affecting the signaling device at any other instrument, the said selective controller also connecting the instruments for conversation.

It is the object of the present invention to arrange the system so that each instrument is at all times in condition to be connected for both signaling and conversation with the instrument of the party calling and no other, regardless of the position of the selecting device at the called instrument, so that if after an instrument has been used the said selecting device is not restored to its normal position the said instrument will still be in condition to receive incoming currents, but will not be connected through its own selective device, so that the user cannot through carelessness or neglect be prevented from receiving a signal and connection, if another party desires to call him up, while the station indicated by his own selective device cannot interfere. To this end the instrument embodying the invention is provided with signal-sending and signal-receiving circuits independent of each other and a circuit-controller independent of the selective controlling device, which is in the signal-sending circuit, the said circuit-controller being automatically arranged to break the signal-sending circuit independently of the selective device when the user has finished his conversation, the movement of the gravity-hook being conveniently employed for the automatic operation.

The signal-receiving circuit may, if desired, be permanently closed or may be broken when the signal-sending circuit is in use to avoid possible confusion, and the same automatic switch which breaks the signal-sending circuit may, as herein shown, be employed to close the signal-receiving circuit, which is broken by the user when he sends a signal. The terms "signal-receiving" and "signal-sending" are used for convenience to describe the circuits over which the signals are received at each instrument and the circuits over which signals are sent from each instrument, respectively, the circuits thus described being only local circuits at the several instruments and not including the entire circuits in use when signals are being sent from one instrument to another.

Figure 1 is a diagram of a system embodying the invention, and Fig. 2 a detail showing the automatic restoring device for the supplemental circuit-controller.

Each instrument is provided with a signaling device *a*, herein shown as an ordinary vibrating electric bell, which is adapted to be connected for signaling purposes in the circuit of a suitable source of energy, as a battery *b*, one terminal of which is connected by a common return-wire a^2 with one terminal of each signaling device, while the other terminal of said battery is adapted to be selectively connected with the other terminal of any one of said signaling devices.

To complete the signaling-circuit, each station is provided with a circuit-wire peculiar to itself, the said wires being herein indicated by the numerals 1, 2, 3, and 4, and each wire is provided at every station, except that to which it belongs, with a terminal contact, the several terminal contacts of the wire 1 being

indicated by the numeral 10 and those of the wire 2 by the numeral 20, &c. At each station there is a selective switch member *c*, adapted to connect a conductor c^2 (the signal-sending-circuit conductor) with any one of the said terminals, the said conductor c^2 being adapted, as will hereinafter be described, to be connected to a conductor leading from the battery *b*.

In accordance with the present invention the signal-sending circuit, or that which is completed by the switch *c* at any station prior to sending a signal therefrom, is normally broken, while the signal-receiving circuit is normally closed, irrespective of the selective device *c*, so that a signal can be received without regard to the position of said selective device, there being at the same time no interference possible if the selective device is in an abnormal position, since the circuit controlled thereby is open at another point. To this end the conductor c^2 at each instrument is provided with a switch-terminal c^3, adapted to be connected through a switch member *d* with the conductor a^3, said switch member *d* being normally in a position to break the circuit at the terminal c^3. In order to send out a signal, therefore, it is necessary first to operate the selective member *c*, which connects the conductor c^2 with the individual wire desired, and subsequently to operate the switch member *d* to complete the circuit. Assuming, for example, that the subscriber at station 2 desires to call the subscriber at station 1, he will first move his selecting device *c* into contact with the terminal 10, as indicated in dotted lines, and then operate the switch member *d*, which is shown as provided with a push-button d^2 for the purpose, the said push-button being connected with the conductor a^3, so as to connect the conductor c^2 through the switch member *d* with said conductor a^3, as indicated in Fig. 2. Starting, therefore, with the battery, (the arrow indicating the starting direction,) the circuit may be traced through the conductor a^3 to the push-button d^2 at station No. 2, switch member *d* at said station to conductor c^2, switch member *c* to conductor 1, and thence through the switch member *d* at station No. 1 (which member is in its normal position at station No. 1) to the gravity-hook which is connected to one terminal of the signaling device, and through said signaling device and the common return-conductor a^2 back to the battery.

The normal positions of the switch members *d* are those shown in full lines in Fig. 1, it being obvious, therefore, that the signal-sending circuit at every station is normally broken, so that, so far as relates to incoming signals, (which are received over the independent signal-receiving circuit,) it is immaterial what may be the position of the selective device *c*.

In order to preserve the normal condition of the switch member *d* at each station, said member is arranged to be automatically restored to its normal position when the subscriber has finished using his telephone. This may be conveniently accomplished by causing the said switch member to coöperate with the gravity-hook *e*, so that it will be mechanically restored when the receiver is hung up. As herein shown, the said member *d* is provided with an engaging member d^3, adapted to coöperate with the end of the gravity-hook *e*, the said engaging member having an engaging shoulder d^4, which is adapted to become connected with the end of the gravity-hook *e* when the said hook is up and the member *d* in contact with the terminal c^3, as best shown in Fig. 2. The said engaging member d^3 is in the form of a flat spring bearing against pins or projections d^5 so arranged as to cause the said spring to curve under tension toward the end of the hook *e*, and the engaging portion d^4 is afforded by an opening in the said spring so positioned that after the member *d* has been moved into contact with the terminal c^3 and the receiver removed the end of the hook will pass along the spring, which yields until the end of said hook reaches the opening d^4, the stress of the spring then causing the same to move toward the hook, so that the end of said hook extends into the opening and into engagement with the shoulder. When, therefore, the receiver is hung up, the rocking of the gravity-hook will move the member d^3, and with it the member *d*, which is thus restored to contact with the terminal c^4. The switch member *d* also controls the telephone-circuits, said switch member normally standing on a contact c^4 at the end of the conductor peculiar to the instrument where it is located. The current which operates the signal at any instrument, therefore, will pass through the conductor belonging to said instrument and the switch member *d* to a conductor d^6, which is connected with the telephone-circuit when the receiver is lifted. As indicated at station 1, the said conductor d^6 is connected with the gravity-hook *e*, through which it connects with the telephone-circuit when the receiver is taken from the hook, the same conductor also forming a part of the signal-receiving circuit, which circuit is therefore broken when the instrument is in use. This construction, however, is not essential, since the signal-receiving circuit may be permanently connected with the signaling device, as through a conductor d^{60}, (see station No. 4,) in which case the conductor d^6 may be directly connected with the telephone-circuit instead of through the gravity-hook circuit. When the switch member *d* is pushed over upon the contact c^3, (the selective device *c* having been previously moved to the desired position,) the telephone-circuit, as well as the signaling-circuit, is completed through the said member *d*.

In order that the signaling-circuit may be broken as soon as the signal is given without restoring the switch member *d*, which would

break the telephone-circuit, the push-button d^2 is shown as provided with a spring d^{20}, so that it will move back out of engagement with the switch member d as soon as released, as indicated in dotted lines, Fig. 2.

It is not intended to limit the invention to the specific construction shown and described, since modifications may be made without departing from the invention.

I claim—

1. In an intercommunicating telephone system, a signal-sending circuit provided with a selective controlling device; a switch in said signal-sending circuit independent of said selective controlling device; means for automatically operating said switch to break said signal-sending circuit when conversation is finished; and a signal-receiving circuit independent of said signal-sending circuit.

2. In an intercommunicating telephone system, a signal-sending circuit at each instrument provided with a selective controlling device; a signal-receiving circuit at each instrument independent of said signal-sending circuit; and means independent of said selective controlling device for closing either of said circuits, as set forth.

3. In an intercommunicating telephone system, a signal-sending circuit provided with a selective controlling device; a signal-receiving circuit independent of said signal-sending circuit; means for closing said signal-sending circuit preparatory to sending a signal; and an automatic device for breaking the said signal-sending circuit when conversation is finished.

4. In an intercommunicating telephone system, a signal-sending circuit provided with a selective controlling device; a signal-receiving circuit independent of said signal-sending circuit; a manually-operated switch for closing said signal-sending circuit; and means for connecting the instrument in the signal-receiving circuit and breaking the signal-sending circuit in response to the movement of the gravity-hook when the receiver is hung up.

5. In an intercommunicating telephone system, a signal-sending circuit provided with a selective controlling device; a signal-receiving circuit independent of said signal-sending circuit; a switch for closing said signal-sending circuit; a device for operating said switch and electrically connecting the contact member thereof with one side of the signal-sending circuit; means for automatically restoring said device when released to break the signal-sending circuit without restoring the switch; and means for restoring the switch in response to the movement of the gravity-hook when the receiver is hung up.

6. In an intercommunicating telephone system, a normally-closed circuit peculiar to each station, and an independent circuit at each station provided with a selecting-switch, said independent circuit being normally broken at a point other than that controlled by the selecting-switch; and means for closing the said independent circuit at such point to send a signal.

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

NEWMAN H. HOLLAND.

Witnesses:

NANCY P. FORD,

HENRY J. LIVERMORE.