

No. 782,419.

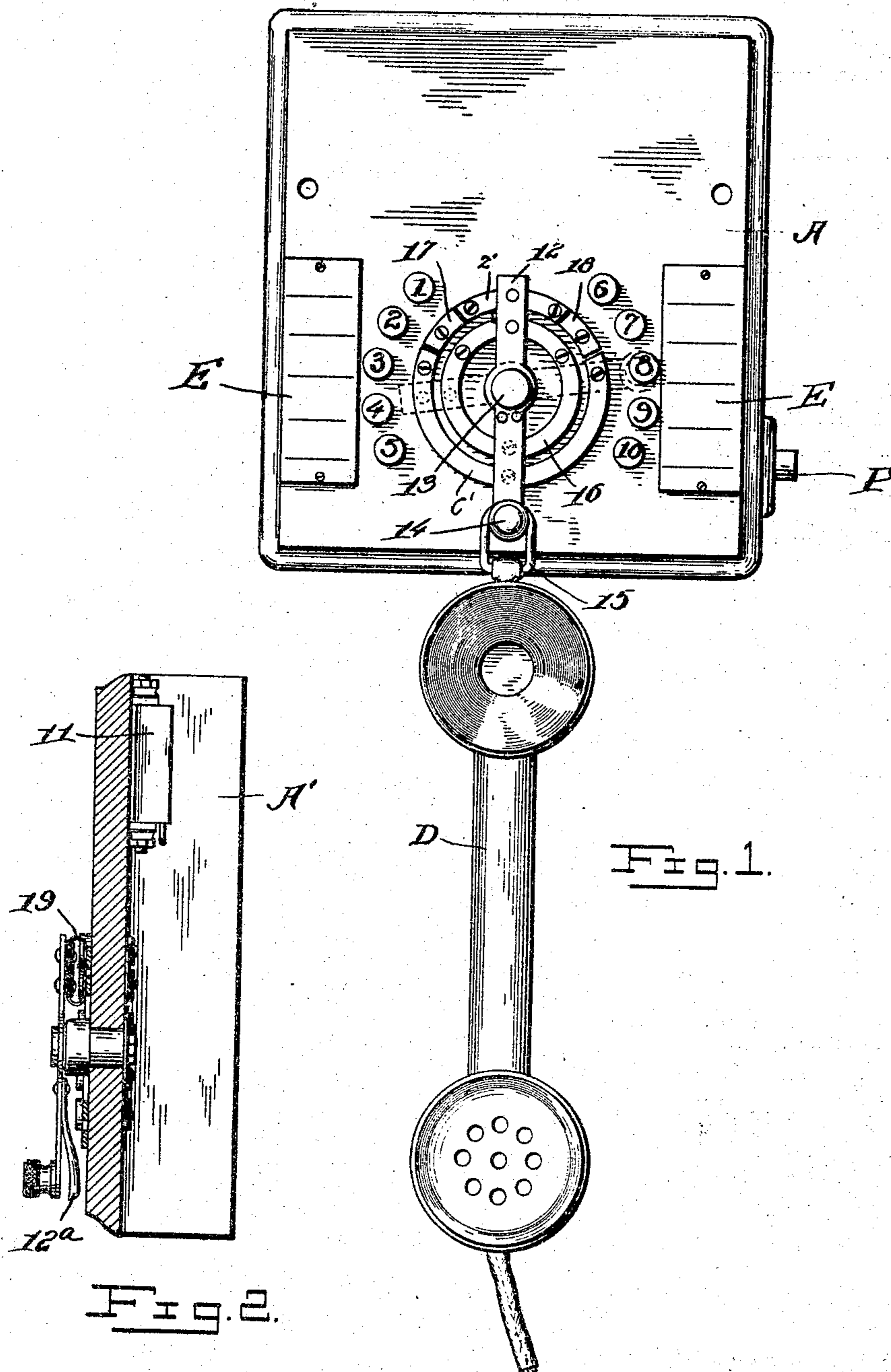
PATENTED FEB. 14, 1905.

W. H. ROSE.

INTERCOMMUNICATING TELEPHONE SWITCH.

APPLICATION FILED NOV. 21, 1904.

2 SHEETS—SHEET 1.



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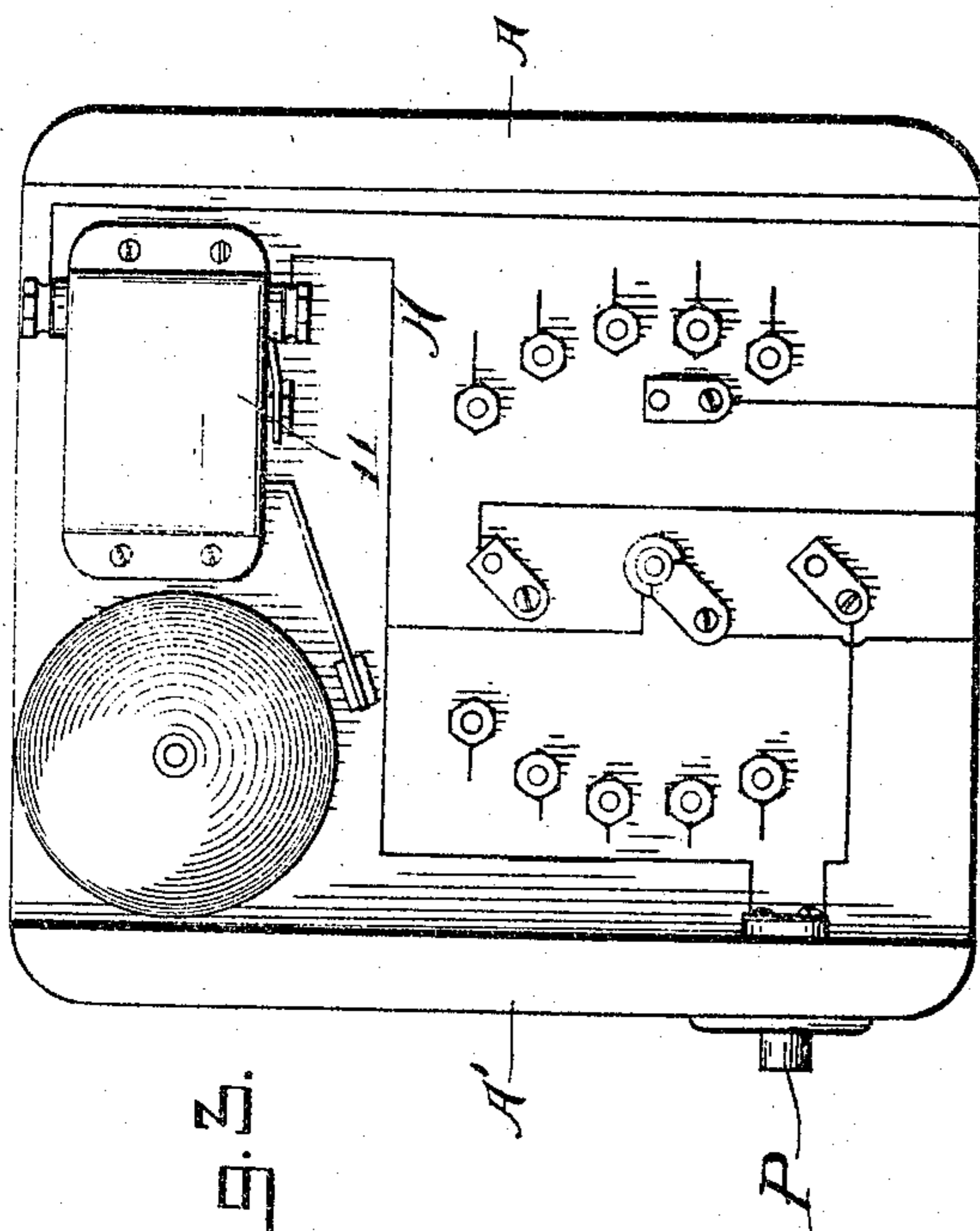
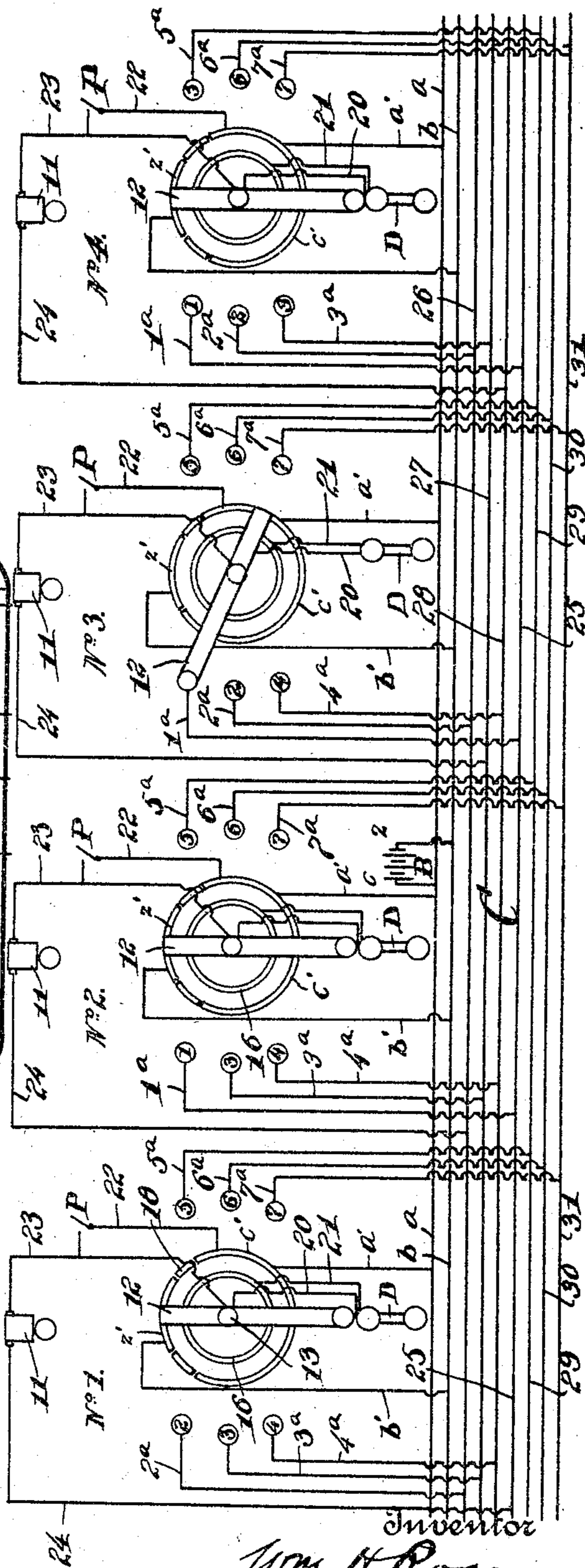


Fig. 3.

Fig. 4.



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INTERCOMMUNICATING TELEPHONE-SWITCH.

SPECIFICATION forming part of Letters Patent No. 782,419, dated February 14, 1905.

Application filed November 21, 1904. Serial No. 233,711.

To all whom it may concern:

Be it known that I, WILLIAM H. ROSE, a citizen of the United States, residing at Catonsville, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Intercommunicating Telephone-Switches, of which the following is a specification.

This invention comprises improvements in intercommunicating telephone systems; and it relates particularly to the switching mechanism for connecting the telephone at the calling-station with any other station upon the line and for insuring the return of the switch to normal position when the instrument is hung up and out of use, so that the station can be called from any other station in the system.

In the accompanying drawings, Figure 1 is a front view of one of the switchboards with the combined receiver and transmitter suspended from the switch-lever. Fig. 2 is a central vertical section through the switchboard shown in Fig. 1. Fig. 3 is a rear view of the switchboard. Fig. 4 is a diagram showing the connections between several stations in a system.

Referring to Figs. 1, 2, and 3 of the drawings, A indicates a suitable base, of wood or other insulating material, adapted to be secured to a wall or other vertical surface. This base is supported at a short distance from the wall by side flanges A' in order to provide room for a bell or buzzer 11, which is secured to the base A. The switch, as shown, consists of a lever 12, pivoted near its center upon a pivot-screw 13 and provided at one end with a knob 14, which serves as a finger-piece to turn the lever and also as a support or hook upon which a combined receiving and transmitting instrument D is suspended by means of a loop 15 at one end of the instrument. The longer arm of the lever carries a spring-finger 12^a, which is mechanically and electrically connected to the lever and adapted to engage a series of contact-buttons or line-terminals arranged concentric with the axis of the lever. As shown in Fig. 1, there are five such buttons (numbered 1 to 5, inclusive) at the left side of the base and five contact-buttons (numbered 6 to 10, inclusive) at the right side

of the base, these buttons being arranged in arcs of a circle. A contact-ring 16, which may for convenience be termed a "neutral" contact piece or ring, is arranged concentric with the axis of the lever, and in a circle between the ring and contact-buttons are arranged a short segmental battery-terminal ε' and a longer segmental battery-terminal c' , the former being arranged at the upper side of the circle. The strips ε' and c' are, as will be hereinafter explained, permanently connected to the opposite poles of the battery which operates the system. Between the ends of the strips ε' and c' are arranged short segments 17 and 18, which may be made of insulating material or metal, the segments in the latter case being separated from the segments ε' and c' . The lever 12 carries a spring bridge-piece 19, which is insulated from the lever and adapted to bear upon the ring 16 and also upon the segments of the outer ring. This device or bridge-piece 19 normally connects the segment ε' electrically to the ring 16 when the instrument is upon the hook and the lever in the vertical position shown in full lines in Fig. 1. When the lever is moved into a position where the spring-finger 12^a engages any one of the contact-buttons, the bridge-piece connects the ring 16 with the segment c' . The segments 17 and 18 merely serve as supports for the bridge-piece to slide upon in passing from the contact-segment ε' to the contact-segment c' , and vice versa. The ends of the contact-segments are separated by such distances that the bridge-piece will be entirely off of one segment before passing onto the other. Adjacent to the line-terminal buttons, which are numbered to indicate the numbers of the stations on the line, are arranged index plates or cards E, upon which the names of the parties or places where the phones are located may be written. A push-button P is arranged in one of the side flanges of the base.

In the diagram Fig. 4 four stations are shown and indicated as No. 1, No. 2, No. 3, No. 4, the switch-arm at station No. 3 being in position for communicating with station No. 1. Referring to the diagram, B indicates the battery which furnishes current for operating the system, and C indicates the wires of

a cable connecting the various stations. The longer contact-segments or battery-terminals c' at the several stations are permanently connected by wires a' to a battery-wire a , which is connected to one pole c of the battery. The shorter contact-segments z' are permanently connected by conductors b' to a battery-wire b , which latter is connected to the opposite pole z of the battery. At each station the terminal wires 20 21 of the combined receiver and transmitter are connected to the contact-lever 12 and the contact-ring 16, respectively. One push-button terminal is connected by a wire 22 to the segment c' of the switch, and the other terminal, as shown, is connected to a conductor 23, leading from the contact-lever 12 to one terminal of the bell. The switch-lever of the calling-station is connected, through the bell-magnets at the calling-station, to one contact-button at each of the other stations in the system. Thus the lever at station No. 1 is connected by a conductor 23 to one terminal of the bell-magnet at that station, and the other terminal of the bell-magnet is connected by a conductor 24 to a line-wire 25. Branch conductors 1^a connect the line-wire 25 to the contact-buttons 1 at the several stations, which are indexed to indicate station No. 1. The contact-lever at station No. 2 is connected, through the bell-magnets at that station, by conductors 23 and 24 to a line-wire 26, having branches 2^a , leading to the contact-buttons 2 at each of the other stations. All of the stations in the system are similarly connected together, the lever at station No. 3 being connected, through the bell at that station, line-wire 27, and branches 3^a , to buttons or terminals 3 at all the other stations, the lever at station No. 4 being connected, through line-wire 28 and branch wires 4^a , to the buttons 4 of the other stations, and the levers of stations 5, 6, and 7 (not shown) being connected, through wires 29, 30, and 31 and branches 5^a , 6^a , and 7^a , respectively, to buttons 5, 6, and 7, respectively, at all the other stations. In the diagram used for illustration only six contact-buttons or line-terminals are shown at each station, the system being arranged for seven stations, each of which may communicate with six others; but it will be understood that the system may be extended by adding one terminal button to each switch-board for each instrument added to the system.

The operation is as follows: The switch-levers are all held normally in their vertical positions by the gravity of the instruments, which are suspended from them. In their normal positions the bridge-pieces 19 connect all the segments z' , which form the switch-board-terminals for one side of the battery, to the contact-rings 16; but as there is then no electrical connection between any of the rings 16 and the segments c' , which form the opposite terminals of the battery, no current can pass through the system. When an operator

at station No. 3, for instance, desires to communicate with station No. 1, he removes the instrument from the lever and then turns the lever until the contact-finger on the long arm of the lever rests upon the line-terminal or button No. 1, as indicated at station No. 3 in the diagram. This movement of the lever causes the bridge-piece upon the lever to leave the segment z' and to engage the segment c' , thus connecting the ring 16 at that station electrically with the segment c' . The circuit is then complete from the pole c of the battery through main battery-wire a and through station No. 3 via wire a' , segment c' , the bridge-piece on the lever to contact-ring 16, thence by wires 21 and 20 through the instrument D to the switch-lever 12, thence through terminal button 1 and branch wire 1^a to the line-wire 25, which is connected by wires 24 and 23 at station No. 1 through the bell-magnets to the switch-lever at the latter station. The circuit at station No. 1 is continued from the contact-lever through the instrument D by wires 20 and 21 to the contact-ring 16, and thence through the bridge-piece on the lever to the segment z' , which is connected to the pole z of the battery through branch wire b' and main battery-wire b . After moving the lever into the position shown at station No. 3 the operator presses the push-button P, thus connecting the segment c' directly with the lever 12 through wires 22 and 23, forming a shunt around the instrument D at station No. 3. The current passing through this shunt-circuit will ring the bell at station No. 1. After the call has been made the release of the push-button opens the shunt and the resistance of the coils of the instruments at both stations reduces the current to such an extent that the bell will not operate. Conversation may then be carried on between the stations.

As will be seen by tracing out the circuits, any station in the system may be communicated with by turning the lever at the calling-station onto the button indicating the station to be called. Whether the switch-levers be turned to the right or left from their normal positions, when the instruments are replaced upon the hooks the levers will be returned to their normal positions and no current is consumed in the system except when some of the instruments are in use.

What I claim, and desire to secure by Letters Patent, is—

1. In a telephone system, switches arranged at the several stations, each switch comprising a pivoted lever, a neutral contact-piece and two battery-terminal contact-pieces concentrically arranged around the pivotal axis of the lever, a bridge-piece, movable with the lever, connecting said neutral contact-piece with one of said battery-terminals in the normal position of the lever and adapted to connect the other battery-terminal to said neutral contact-piece when the lever is moved from normal position,

and a series of line contact-terminals arranged at one or both sides of the lever, when the latter is in normal position.

2. In a telephone system, switches arranged at the several stations, each switch comprising a pivoted lever, a neutral contact-piece and two battery-terminal contact-pieces concentrically arranged around the pivotal axis of the lever, a bridge-piece, movable with the lever, connecting said neutral contact-piece with one of said battery-terminals in the normal position of the lever and adapted to connect the other battery-terminal to said neutral contact-piece when the lever is moved from normal position, a series of line contact-terminals arranged at one or both sides of the lever, when the latter is in normal position and a combined receiver and transmitter adapted to hang on the lever and holding the latter in normal position.

3. In an intercommunicating telephone system, a pole-changing switch comprising two battery-terminal contact-pieces, a neutral contact-piece, a lever having an insulated bridge-piece adapted to connect either battery-terminal independently with the neutral contact-piece, a combined receiving and transmitting instrument normally supported by the lever and holding the latter in position with the bridge-piece connecting one battery-terminal with the neutral contact-piece, and a series of line contact-terminals arranged to be engaged by the lever when the lever and bridge-piece are moved to connect the other battery-terminal with the neutral contact-piece.

4. In a telephone system, a series of interconnected stations, each station having a pole-changing switch comprising two battery-terminals, a neutral contact-piece, a lever having an insulated bridge-piece adapted to connect either battery-terminal to said neutral contact-piece and normally connecting one of said battery-terminals to the neutral contact-piece, a normally open switch or push-button connected between the lever and the opposite terminal of the battery, a combined receiver and transmitter having its terminal wires connected to the lever and neutral contact-piece respectively, and line-terminals arranged to be engaged by said lever when the latter is moved from its normal position, each line-terminal being electrically connected to a lever at some other station in the system through a call-bell or buzzer at the latter station.

5. In a telephone system pole-changing switches arranged at the several stations, each switch comprising two terminal contact-pieces connected to opposite poles of the current source, an annular contact-piece adjacent to said terminals, a movable bridge-piece for connecting said terminals with the annular contact-piece, and a lever operatively connected to, but insulated from said bridge-piece, in combination with a combined receiving and transmitting instrument arranged at each sta-

tion adapted to be supported by the lever and having its terminal wires connected to said lever and said annular contact-piece respectively.

6. In a telephone system, pole-changing switches arranged at the several stations, each switch comprising two terminal contact-pieces connected to opposite poles of the current source, an annular contact-piece adjacent to said terminals, a movable bridge-piece for connecting said terminals with the annular contact-piece, a lever operatively connected to, but insulated from said bridge-piece, in combination with a combined receiving and transmitting instrument arranged at each station adapted to be supported by the lever and having its terminal wires connected to said lever and said annular contact-piece respectively, and one or more line contact-pieces arranged to be engaged by said lever when moved from normal position.

7. In a telephone system, a pole-changing switch comprising a lever, two battery-terminals extending partly around the pivotal axis of the lever, an annular contact-piece, and a bridge-piece secured to, but insulated from said lever and adapted to connect said terminals with the annular contact-piece, successively, in combination with a telephone instrument adapted to hang on the lever and having its terminal wires connected to the lever and annular contact-piece respectively.

8. In a telephone system, a pole-changing switch comprising a lever, two battery-terminals extending partly around the pivotal axis of the lever, an annular contact-piece, and a bridge-piece secured to, but insulated from said lever and adapted to connect said terminals with the annular contact-piece, successively, in combination with a telephone instrument adapted to hang on the lever and having its terminal wires connected to the lever and annular contact-piece respectively and one or more line-terminals adjacent to the reversing-switch and adapted to be engaged by said lever when the latter is moved from normal position.

9. In a telephone system a pole-changing switch comprising a pivoted lever, a short segmental battery-terminal and a longer segmental battery-terminal arranged around the pivotal axis of the lever, a ring contact-piece substantially concentric with said terminals and an insulated bridge-piece secured to said lever, in combination with a telephone instrument adapted to hang upon the lever and hold the latter with the bridge-piece connecting the ring with the short battery-terminal, and a series of line-terminals arranged in position to be engaged by the lever when the latter is moved from normal position.

10. In a telephone system a pole-changing switch comprising a pivoted lever, a short segmental battery-terminal and a longer segmental battery-terminal arranged around the piv-

otal axis of the lever, a ring contact-piece substantially concentric with said terminals and an insulated bridge-piece secured to said lever, in combination with a telephone instru-
5 ment adapted to hang upon the lever and hold the latter with the bridge-piece connecting the ring with short battery-terminal, and a series of line-terminals arranged at each side of the lever in position to be engaged by the

lever when the latter is moved in either direc- 10
tion from the normal.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. ROSE.

Witnesses:

BERNARD A. SCHMITZ,
ABRAHAM OETTINGER.