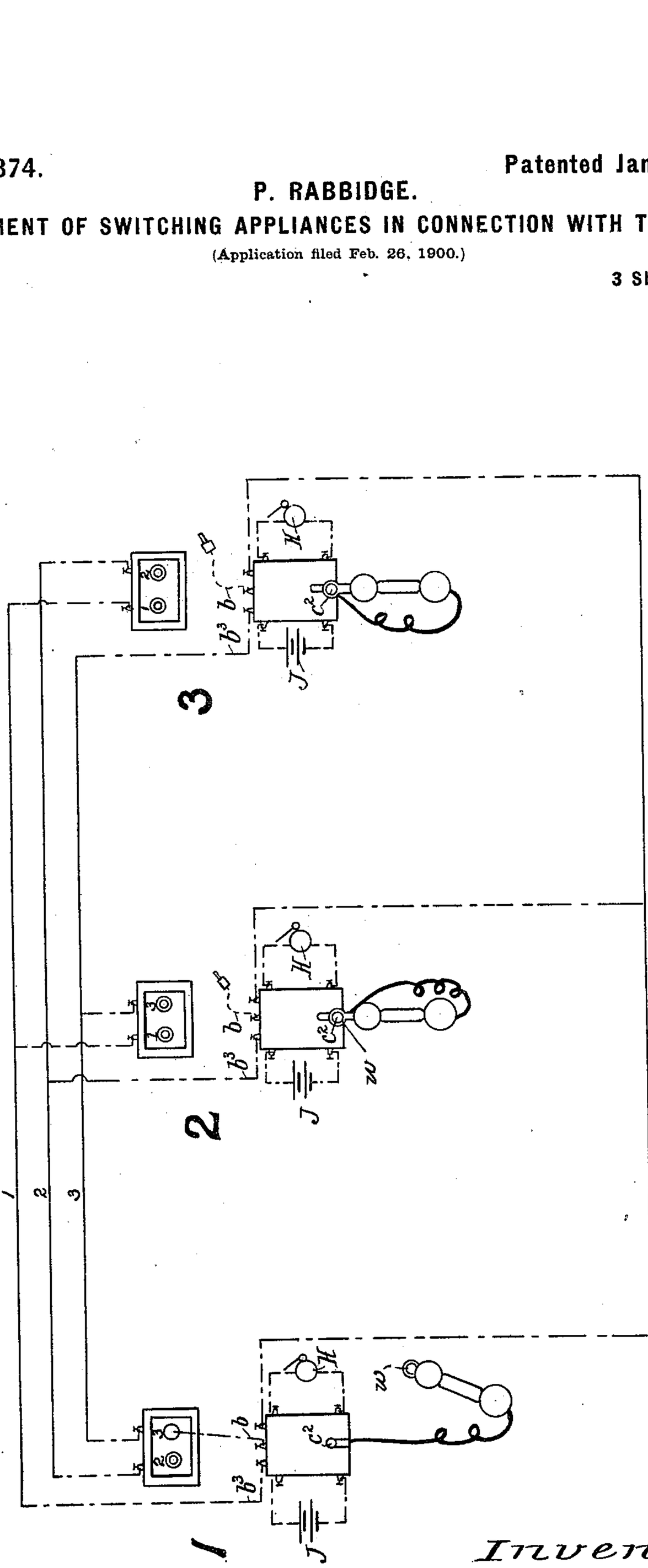
No. 666,874. Patented Jan. 29, 1901.

P. RABBIDGE.

ARRANGEMENT OF SWITCHING APPLIANCES IN CONNECTION WITH TELEPHONES.

(Application filed Feb. 26, 1900.)

(No Model.) 3 Sheets—Sheet 1.



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(No Model.) 3 Sheets—Sheet 2.

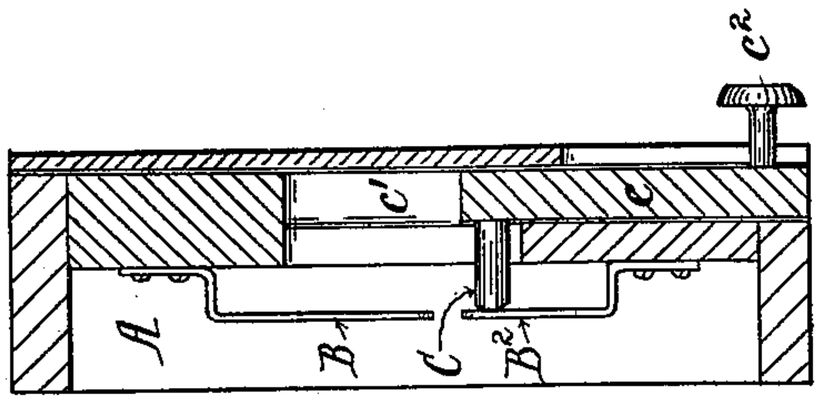

FIG.3

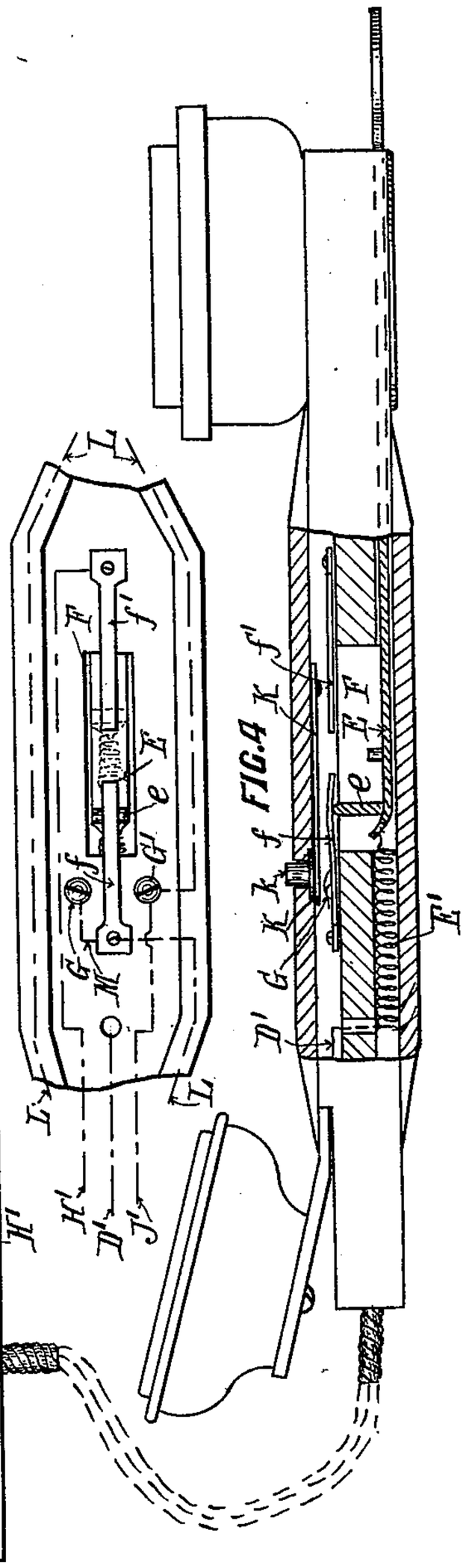

FIG.5 FIG.4

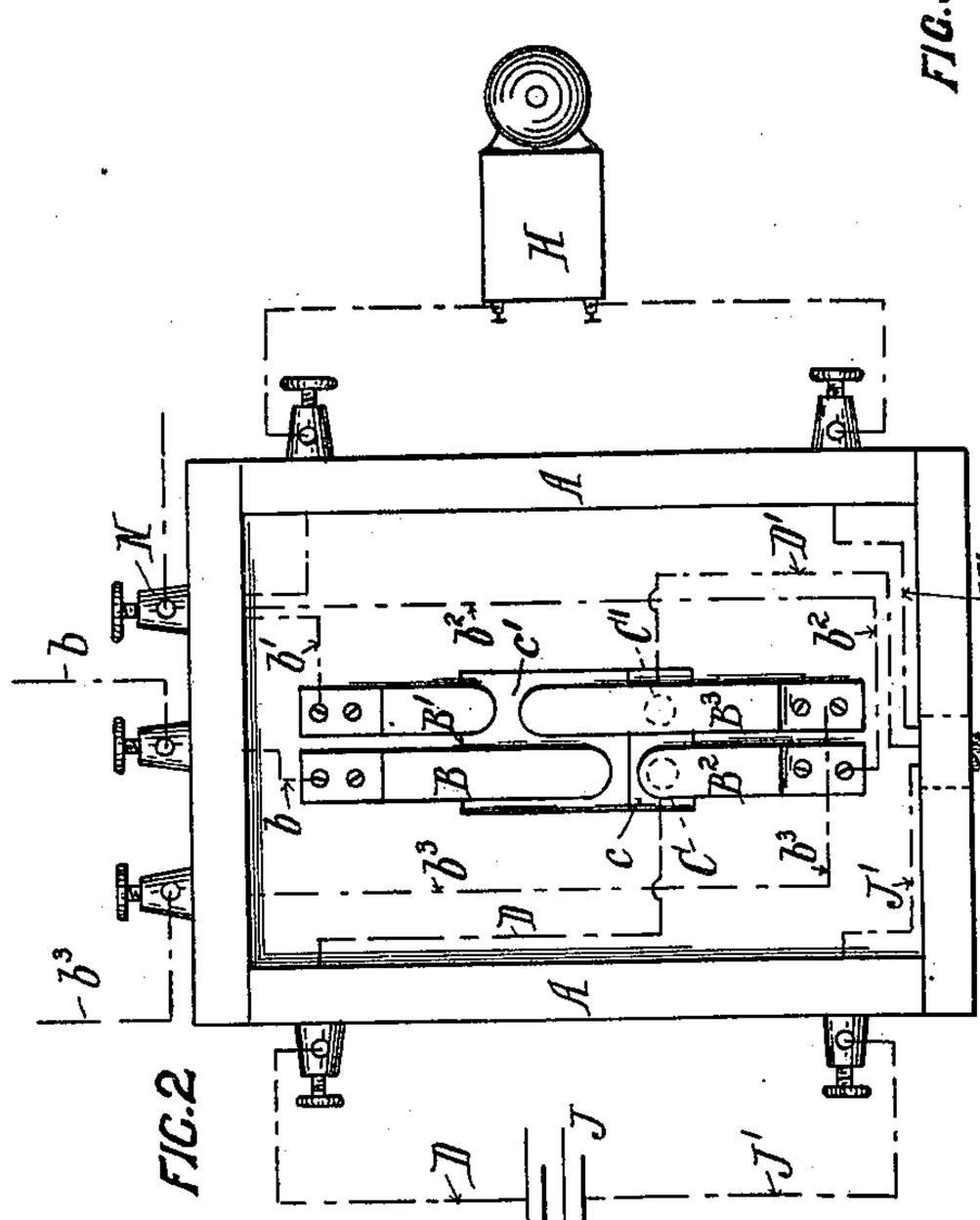

FIG.2

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FIG. 6

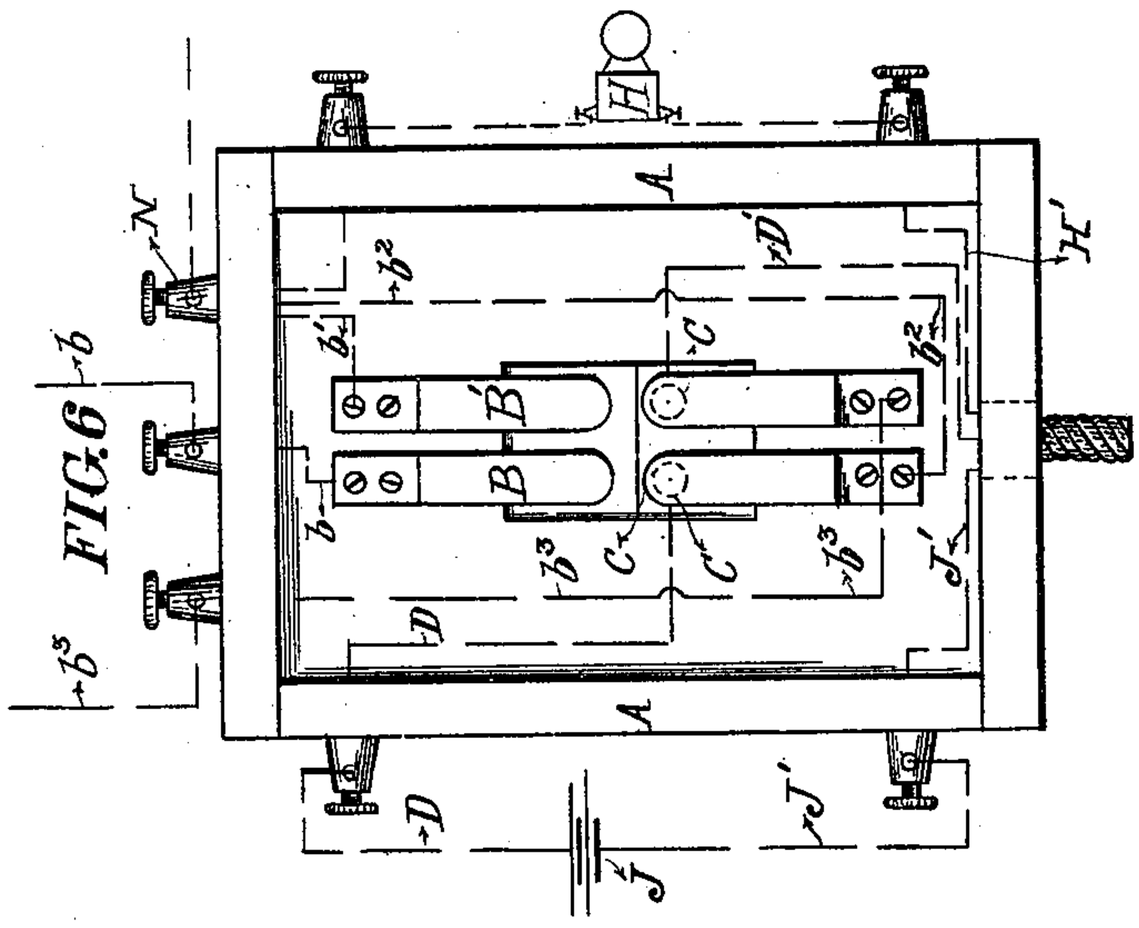
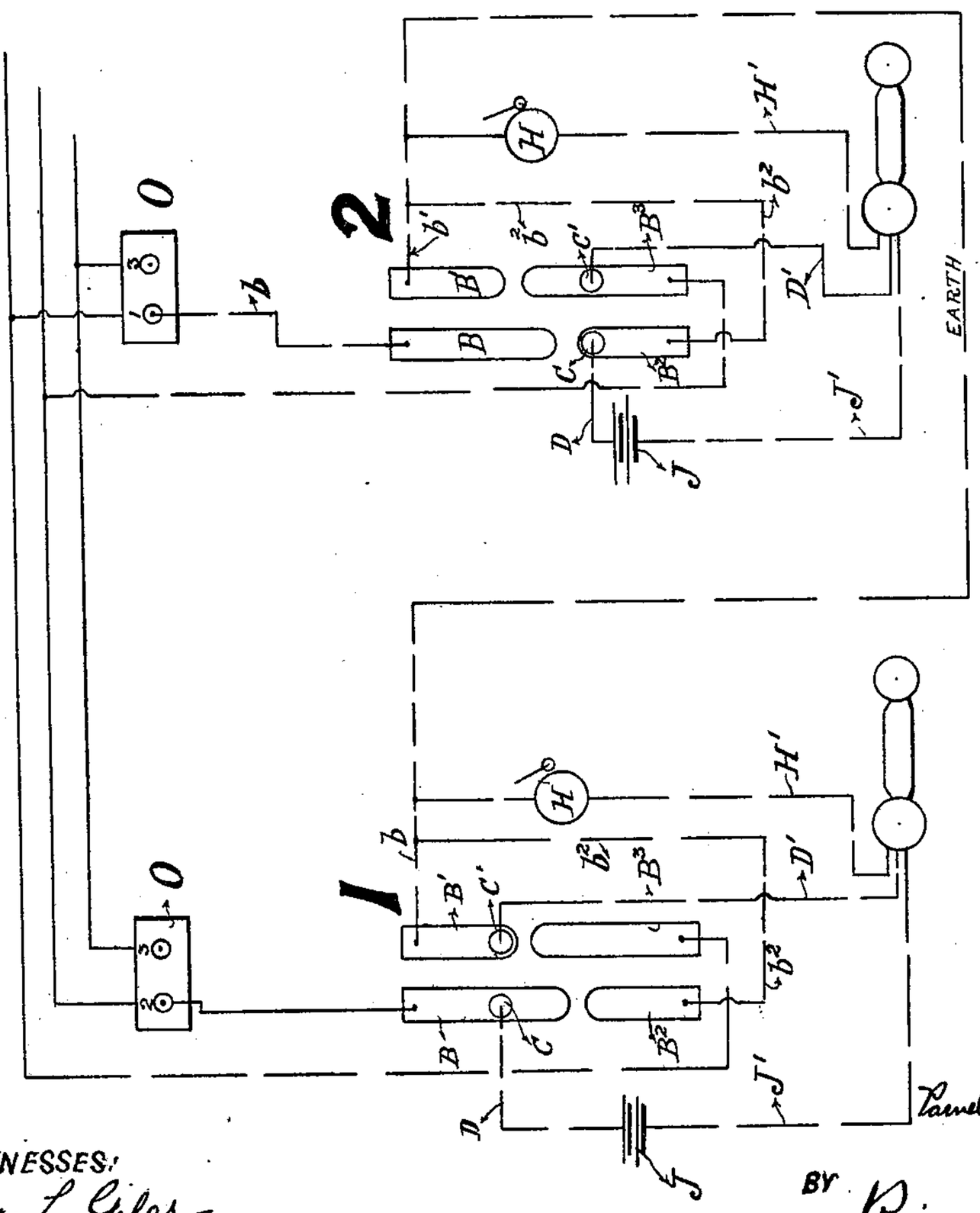


FIG. 7



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ARRANGEMENT OF SWITCHING APPLIANCES IN CONNECTION WITH TELEPHONES.

SPECIFICATION forming part of Letters Patent No. 666,874, dated January 29, 1901.

Application filed February 26, 1900. Serial No. 6,619. (No model.)

To all whom it may concern:

Be it known that I, PARNELL RABBIDGE, a subject of the Queen of Great Britain and Ireland, and a resident of Sydney, in the county of Cumberland and Colony of New South Wales, have invented a certain new and Improved Arrangement of Switching Appliances for Use with Telephones, of which the following is a specification.

This invention has been devised for use in connection with private or domestic systems of telephonic intercommunication. Hitherto when conversation is being carried on between any two points of the system it has been usual for a third person stationed at any intermediate point in the system to be able to switch into their line and overhear the conversation thus carried on. It has also been usual hitherto after the instruments have been used for conversational purposes for the selecting-switches employed to be returned to their normal position by special operations performed by the operators.

The objects of this invention are, first, to provide means whereby a "secret" system of intercommunication between any two points of a system of telephonic connections may be obtained without the possibility of the conversation between such two points being overheard at any other point in the system, and, second, to provide means whereby the telephonic instruments after they have been used for conversational purposes may be automatically restored to a position in which they may be able to receive a call from any of the other stations connected therewith.

The special feature of the invention consists in the employment of a particular form of switching appliance that is introduced into the circuit between the selecting-switchboard and the instrument. This switching appliance is so arranged and constructed that when a certain portion of the appliance is in its lowest position the station to which it is connected may receive a call from any one of the other stations of the system. When in its highest position, a call may be sent from the station to which it is connected to any one of the other stations, and when placed in its middle position at each of two stations connected with each other conversation between such stations may be carried on without being overheard at any of the other stations of the system. This switching appliance is also so constructed that when a conversation is finished and the telephonic instrument at the calling station is hung upon its hook the switch is automatically replaced in a position for receiving a call from any of the other stations.

I will describe the invention in relation to a form of instrument that is operated by means of a gravity-switch contained within inself.

In order that the invention may be thoroughly understood, reference is made to the accompanying sheet of drawings, in which—

Figure 1 is a diagrammatic view of the circuits and switches used in connection with a system that is operated from three stations. Fig. 2 is a back elevation of the special form of switching appliances used in connection with this invention. Fig. 3 is a transverse vertical section of the same. Fig. 4 is a side elevation, partly in section, of one form of telephonic instrument that may be used in connection with this invention. Fig. 5 is a part plan of the same with the top cover removed. Fig. 6 is a modified form of the appliance shown in Fig. 2. Fig. 7 is a diagrammatic view of the circuits of the switching appliances and general working circuits of two stations, the different circuits being shown in position for conversation between the two stations.

Referring now to Figs. 2 and 3, A is a box or cover, in which are contained the switching appliances hereinbefore referred to. These switching appliances consist of four spring-metal connecting-pieces B B′ B^2 B^3, secured to the box. Behind these connecting-pieces and impinging against them are two studs C C′, which are connected to a sliding block *c*, which slides up and down in a groove *c′* in the front of the box. To the front of the sliding block is attached a hook or knob c^2. By sliding the block up and down in its groove the studs C C′ may be brought, respectively, into contact with either the connecting-pieces B and B′, B and B^3, or B^2 and B^3. The stud C is connected through the wire D with one pole of the battery J, used for working the telephones. The other stud C′ is connected through the wire D′ with the

telephonic instrument. The four connecting-pieces B B′ B^2 B^3 are connected by means of the wires b b' b^2 b^3, respectively, as follows: B is connected with the line-selector plug, B′ with earth, B^2 with earth, and B^3 with the home-line wire, as shown in Fig. 7.

The telephonic instrument shown in Figs. 4 and 5 consists of the ordinary form of combined receiver and transmitter, but provided with an automatic switch in the handle, by which the call bell or instrument may be placed in or out of circuit. This switch consists of a long narrow piece of metal E, that is let into the back of the instrument and projects out beyond the receiver end. This end is provided with an eye w, which is made large enough to fit over the hook or knob c^2 of the switching appliance A. The other end of the metal piece E is secured by means of a helical spring E′ to the frame of the instrument. Secured to and near this end of the metal rod E is a projecting piece e, which projects upward through a slot F in the handle of the instrument. At each end of the slot F is placed a spring contact-piece f f', with which the projecting piece e of the metal rod E will form a metallic connection when the rod is pulled out or drawn in. When the instrument is hung by means of the eye at the end of the rod E upon the hook or knob c^2, the rod E will be drawn out, so that the projecting piece e will form contact with the spring contact-piece f'. When the weight of the instrument is taken off the hook, the spring E′ will draw back the metal rod E, so that the projecting piece e will form contact with the spring contact-piece f. Placed near one end of the slot F and on each side of the spring contact-piece f are metal knobs G G′, the purposes of which will be hereinafter explained. Placed above these two knobs is a spring-plate K, which may be pressed downward by means of the button k, so as to impinge upon both knobs and connect them together.

The telephonic instrument is connected with the switching appliances A in the following manner: The wire D′, leading from the stud C′, is connected to the helical spring E′ and through it to the metal rod E. The wire H′, leading from the bell H, is connected to the contact-piece f'. The metal knob G′ is connected by means of the wire J′ with the other pole of the battery J to that to which the rod C is connected. From the contact-piece f a wire L is led and passes through both poles of the transmitter, then through the receiver, and back to the knob G′. A wire M also connects the spring contact-piece f with the knob G.

The manner of working the appliances is as follows: Referring to Fig. 1, in which No. 1 station is shown as calling up No. 3 station, the operator will remove his instrument from the hook C^2, as shown in the diagram, when the spring-switch within it will be drawn down and make contact with the spring-piece f, as shown in Figs. 4 and 5. He will then place the plug connected to the wire b of the switching appliance A in the hole connected with No. 3 wire and push the knob c^2 and sliding block c up to their highest position; when the studs C and C′ will form contact with the connecting-pieces B and B′, respectively. He will then press down the spring-push k and plate K in the instrument, Fig. 4, and connect the two knobs G and G′ together. This will have the effect of sending the current from the negative pole of the battery through the wire J′ to the knob G′, from whence it will travel across the spring-plate K to the knob G, through the wire M, to the contact-piece f, from there to the projection e of the metal piece E, through the spring E′, wire D′, to the stud C′, through the connecting-piece B′, and wire b' to the earth terminal N. The current from the positive pole of the battery will travel through the wire D to the stud C through the contact-piece B and wire b and its plug to the wire No. 3, and will enter the corresponding switching appliance at No. 3 station through the wire b^3 to the connecting-piece B^3, and from thence through the rod C′, (the instrument of No. 3 being hung upon its hook and the metal piece E being drawn out,) wire D′, connected with it, to the spring E′ and metal piece E, to the spring contact-piece f', through the wire H′ to the bell H, (causing it to sound,) and then to the earth terminal N. When the operator at No. 3 station removes his instrument from the hook, (the hook or knob c^2 being left in its lowest position,) the metal piece E will be drawn into the position shown in Figs. 3 and 4 and the current passing in from the positive pole of No. 1 station will take the following course: through the wire b^3, connecting-piece B^3, rod C′, wire D′, spring E′, metal piece E to the spring contact-piece f, from thence through the transmitter and receiver by means of the wire L to the knob G′ and through the wire J′ to the negative pole of the battery, while the current from the positive pole of his battery will pass through the wire D, connecting-piece B^2, and wire b^2 to the earth terminal N. The operator at No. 1 station will remove the pressure from the spring-push k, and the current from his battery will then be divided and pass through his instrument in the same manner as the current passes through the instrument at No. 3 station. It will thus be noted that the batteries at Nos. 1 and 3 stations are placed in series with each other. Both instruments will now be in a position for conversation. When the conversation has been finished, the instruments will be hung upon their respective hooks and the metal piece E drawn out. The weight of the instrument at No. 1 station will have the effect of drawing down the sliding block c, and with it the studs C and C′, so that they may assume their normal position (shown in Figs. 2 and 3) and the instrument be placed so that a call may be received. It will thus be

seen that the act of restoring the switches to positions such that a call may be received from any one of the stations in the system of connections is entirely automatic, being dependent only on the instruments being placed back upon their hooks. Should it be desired to carry on a private conversation between stations 1 and 3—*i. e.*, to so arrange the circuits that a person at No. 2 station could not switch his instrument into the circuit and so overhear the conversation—the following operations will be carried out: The operator at No. 3 station will place his switch-plug in the No. 1 hole of his line-selector. Both the operators at Nos. 1 and 3 stations will place the knob or hook c^2 of their respective switching appliances at half-way up the slot c'. The studs C and C′ will thus be brought respectively into contact with the connecting-pieces B and B^3 of each instrument. This will have the effect of cutting out the earth circuit and substituting for it a metallic circuit. The current will then pass in the following manner: Starting from the positive pole of No. 1 battery it will pass through the wire D, connecting-piece B, wire *b* to the line-selector, along No. 3 wire to No. 3 station, where it will enter through b^3 and pass from thence through the connecting-piece B^3, stud C′, and wire D′ through the instrument, as before described, out to the negative pole of No. 3 battery. The current from the positive pole of No. 3 battery will then follow the same relative course as that taken by the current from No. 1 battery, passing along No. 1 wire, and will connect with the negative pole of that battery.

Although I have described this invention as used in conjunction with a form of telephonic instrument in which the gravity-switch is employed, it is evident that the switching appliances may be adapted for use with any class of telephones. The different relative connections would, however, have to be made in the manner that has been herein set forth should any other form of instrument be employed.

It is obvious that the contact-pieces B B′ B^2 B^3, instead of being made of the lengths shown in the drawings, Fig. 2, may be made all of one length, as shown in Fig. 6, in which case the switch would not be applicable to secret communication, as there would be no intermediate position.

The form of switching appliance that has been shown in the drawings is of such construction as to be specially applicable to the class of work desired; but any other switching appliance that is constructed upon the same principle for the purpose of doing similar work might be adopted, the actual form of the appliance being of less moment than that it should fulfil the conditions described.

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

1. In combination in a telephone system, a line-selector plug, a connecting-piece B in connection with said plug, a connecting-piece B′ connected to earth, a connecting-piece B^2 connected to earth, a connecting-piece B^3, a home-line wire to which said piece B^3 is connected, a block carrying contacts C C′, a battery and the telephonic instrument and bell to which the said contacts C, C′ are respectively connected, the connecting-pieces B, B^2 and the connecting-pieces B′ B^3 being arranged to be engaged by the contacts C, C′, respectively as the block is moved, substantially as described.

2. In combination in a telephone system, a line-selector plug, a connecting-piece B in connection with said plug, a connecting-piece B′ connected to earth, a connecting-piece B^2 connected to earth, a connecting-piece B^3, a home-line wire to which said piece B^3 is connected, a block carrying contacts C C′, a battery and the telephonic instrument and bell to which the said contacts C, C′ are respectively connected, the connecting-pieces B, B^2 and the connecting-pieces B′ B^3 being arranged to be engaged by the contacts C, C′, respectively as the block is moved, said block being arranged to be lowered to normal position with its contacts engaging the connecting-pieces B^2, B^3 when the telephonic instrument is hung up, substantially as described.

3. In combination in a telephonic system, the connecting-pieces B, B′ arranged side by side, the connecting-pieces B^2, B^3, arranged side by side, said pieces B and B^3 having portions side by side, a sliding block having contacts C C′ to engage either the pieces B, B′, B B^3, or B^2 B^3, a selector-plug connected to the piece B, the piece B′ being connected to earth, the piece B^2 being connected to earth, the home-line wire connected to the piece B^3, the battery and the telephonic instrument and bell connected respectively to the contacts C C′, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

PARNELL RABBIDGE.

Witnesses:
JAS. T. HUNTER,
R. W. EWERS.