(No Model.)

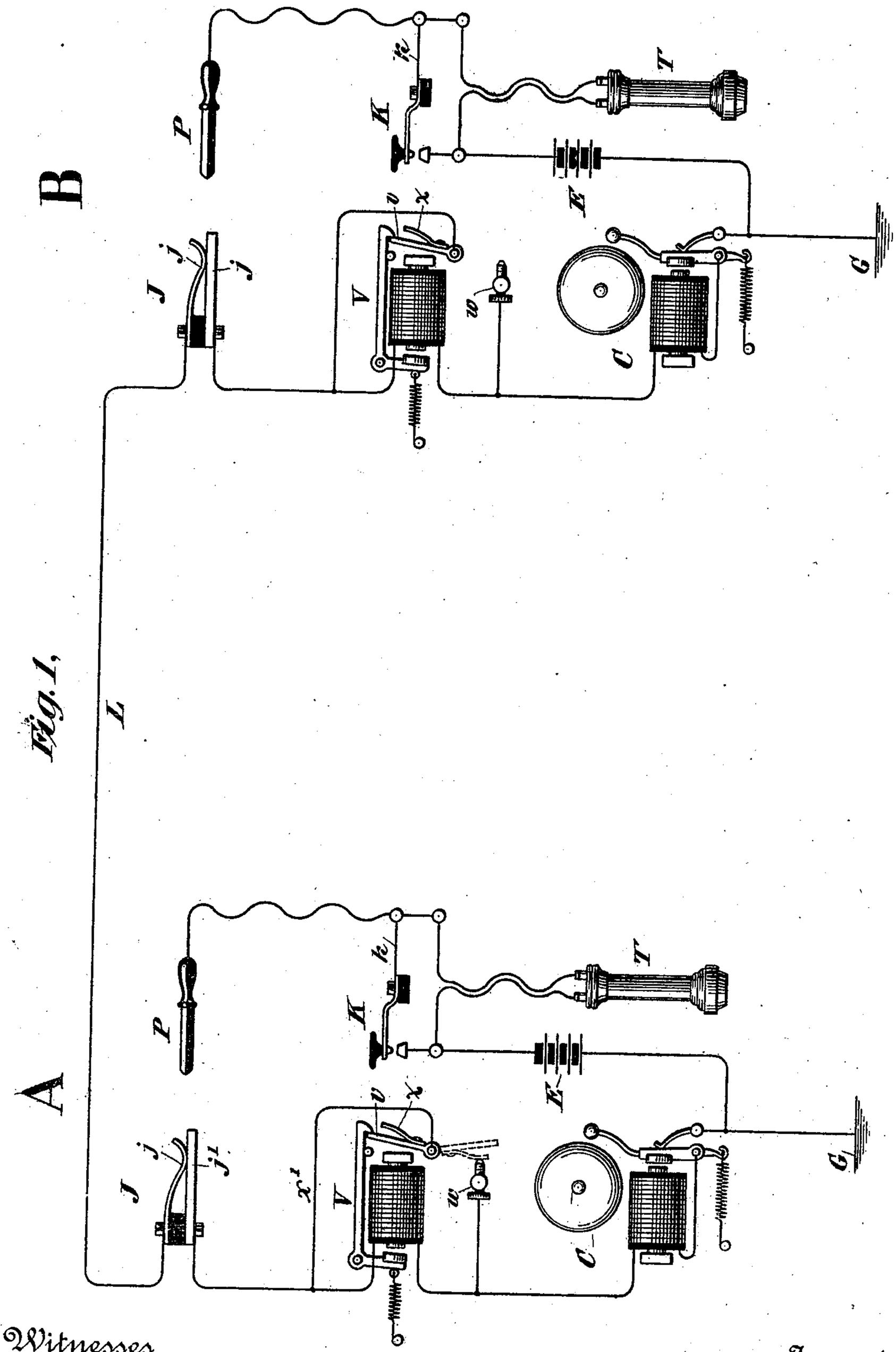
3 Sheets—Sheet 1.

F. R. COLVIN.

SYSTEM OF TELEPHONIC INTERCOMMUNICATION.

No. 502,091. Patented July 25, 1893.

Fig. 1,



Witnesses
C. E. Ashley
H. W. Lloyd.

Inventor
Frank R. Colvin,
By his Attorney
Franklin L. Pope

(No Model.)

3 Sheets—Sheet 2.

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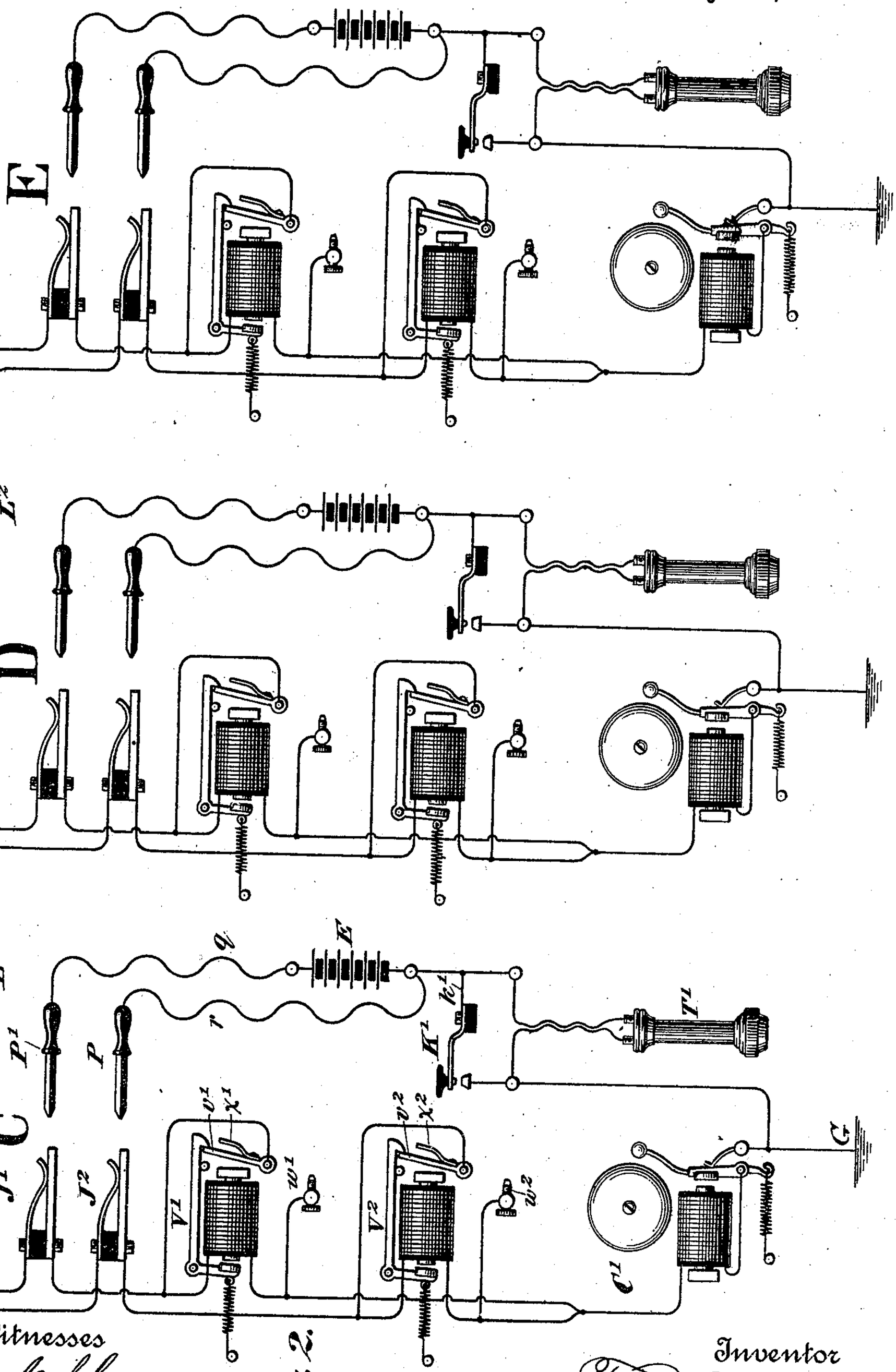

Fig. 2.

Witnesses
C. E. Ashley
Caroline E. Davidson

Inventor
Frank R. Colvin,
By his Attorney
Franklin L. Pope

(No Model.) 3 Sheets—Sheet 3.

F. R. COLVIN.

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Fig. 4.

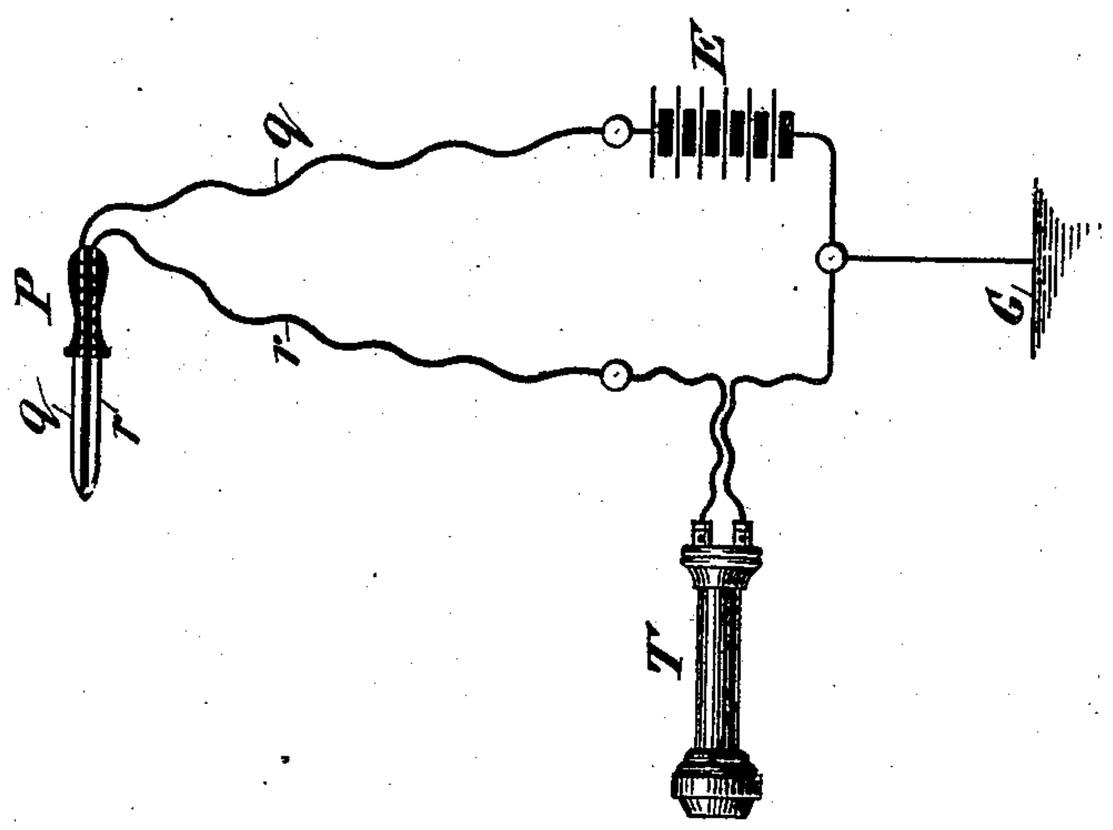
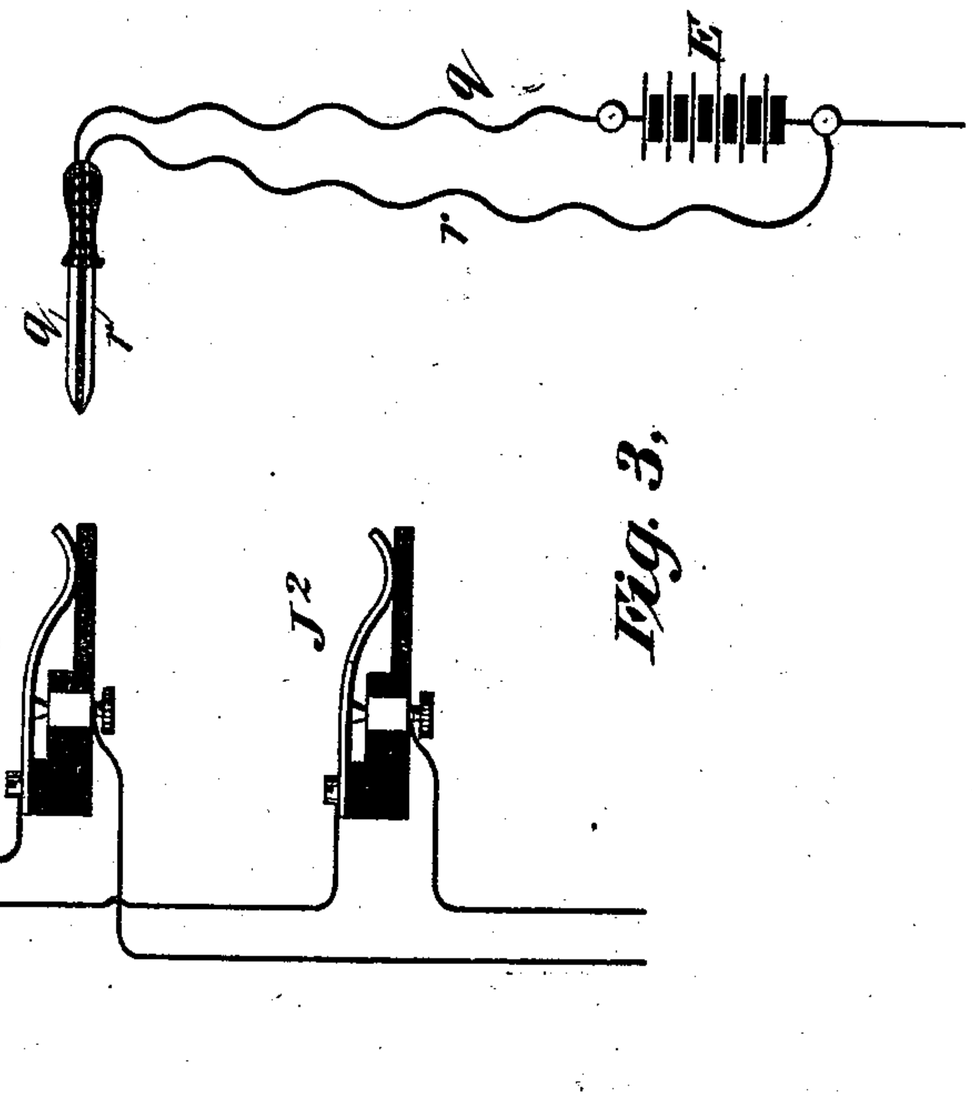


Fig. 3.



Witnesses
C. E. Ashley
H. W. Lloyd.

Inventor
Frank R. Colvin,
By his Attorney
Franklin L. Pope

UNITED STATES PATENT OFFICE.

FRANK R. COLVIN, OF NEW YORK, N. Y.

SYSTEM OF TELEPHONIC INTERCOMMUNICATION.

SPECIFICATION forming part of Letters Patent No. 502,091, dated July 25, 1893.

Application filed October 15, 1892. Serial No. 448,958. (No model.)

To all whom it may concern:

Be it known that I, FRANK R. COLVIN, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Systems of Telephonic Intercommunication, of which the following is a specification.

My invention relates more especially to a system of telephonic intercommunication between a plurality of stations, in which provision is made whereby each station may at will place itself in direct communication with any one of the other stations in the system, or with any one of a certain predetermined number less than the whole number of such stations, and this without the possibility of the conversation being intercepted or overheard by a person at any other stations than those in correspondence.

My invention is especially intended to meet the requirements of large manufacturing and mercantile establishments and the like, which are necessarily divided into many departments, between which a means of rapid and convenient communication is especially desirable, but it is equally adapted for use in hotels, on shipboard, and under other circumstances and conditions of like general nature.

In the accompanying drawings, which are diagrammatical representations of my improved system, Figure 1 represents such system in its most elementary form, having two stations only in connection. Fig. 2 illustrates the organization of a system having any required number of stations greater than two. Figs. 3 and 4 are modifications in the details of the system.

Referring first to Fig. 1, L is the line connecting two stations respectively designated as station A and station B. As the apparatus at each station is a duplicate of that at the other, it will suffice to describe in the first instance, the apparatus at station A only. Entering the station, the line L first passes to a spring-jack J of ordinary and well-known construction, consisting of a metallic spring *j* normally pressing against, and in electrical contact with, a metal plate *j'*. V is a visual signal of the type known as an "electric drop-shutter," comprising an electro-magnet, which when energized, releases a shutter *v* which drops by gravity into a position to display an arbitrary designating character or number. This shutter carries a contact *x*, which when the shutter has fallen, touches the stop *w* and thus closes a shunt circuit *x'* which cuts out the electro-magnet by the action of which the shutter has been caused to drop. The electro-magnet of the visual signal V, together with a self-interrupting electro-magnetic bell or buzzer C, serving as an audible signal or call, are placed in series with each other in the branch of the circuit between the spring-jack J and the ground or (in case a metallic circuit is used) the return wire. In another parallel branch at the same station, which is also permanently connected with the ground or return at G, is a telephone T and a battery or other equivalent source of electricity E. This branch is normally open, but terminates in a flexible cord and connecting plug P. The latter may be constructed as shown in the figure, the only essential requisite being that it shall be so arranged that when inserted into the spring-jack J it shall interrupt the normal connection of the line L with the signaling devices V and C, and establish in lieu thereof another connection with the telephone T and battery E, through the normally open branch. The telephone T is bridged by a normally open shunt *k*, which may be closed at will by means of a press-button or key K.

The mode of operation of the apparatus is as follows:—If, for example, a person at station A wishes to converse with a person at station B, he inserts his plug P into the spring-jack J of the line L leading to that station, and then closes the key or press-button K. This last named operation removes the resistance of the telephone T from the circuit, and therefore makes the current from the battery E strong enough to actuate the drop-shutter V at the distant station B, which falls down, cutting out the resistance of its own actuating electro-magnet in the manner hereinbefore described, and thus further strengthening the current, so that it is now able to actuate the call apparatus C. The person at station B, hearing the call, and furthermore seeing, by the indication of the shutter, from which line the call has pro-

ceeded (especially in case there may be more than one line) inserts his plug P into his corresponding spring-jack J and thus places himself in circuit for conversation. It is immaterial whether a single telephone T is employed both for speaking and for hearing, or whether a separate transmitter and receiver are used. The last named arrangement will, in most cases, be found more convenient than the other.

In Fig. 2 three stations are shown, designated respectively as stations C, D and E. Stations C and D are directly connected by line L′, D and E by line L^2, and C and E by line L^3. At each station, the respective lines coming from the other two stations are equipped with independent spring-jacks as J′ and J^2 and visual signals, as V′ and V^2. The call as C′ is common to all the lines entering the station. When there are more than two stations in the system, as will usually be the case, two plugs P and P′ are employed, or a single plug may be employed, constructed as shown at P in Fig. 3, with two contact-surfaces *q* and *r* insulated from each other, and connected by separate wires with the earth or return circuit through the telephone T′. In the wire *q* Figs. 2 or 3, is inserted the battery or other source of electricity E. In this arrangement any one person wishing to call another, as for instance, if the person at C wished to communicate with the person at D, the former inserts his plug P′ in the appropriate spring-jack J′, taking care, in case the double plug of Fig. 3 is used, that the face *q* is toward the line side of the spring-jack. The person responding, will use the wire *r* either by the plug P, or the face *r* of the double plugs of Fig. 3. Thus any liability to inconvenience from accidental opposition of polarity of batteries may be avoided.

In Fig. 4, the magneto-telephone T for sending and receiving is inserted in the branch *r*. In this case the key K may be dispensed with, and the call given by the insertion of the plug P with the face *q* directed toward the line.

In a system of this kind, it is obvious that the connecting lines may be so arranged as to provide for mutual communication between the whole number of stations, or only a portion of them, as required. Provision may be made whereby one station may call any number of stations, and be capable of being called by a fewer number, or if desired, by none. No preliminary conversation is necessary in as much as the dropping of the shutter of any particular line shows at once from whence the call proceeds. In case a call is received at any station during the absence of the attendant, the fact is at once apparent upon his return by the position of the indicating drop. The sound of the call at the remote station may be heard in the telephone at the calling station, thus enabling the caller to know that the call is operating correctly.

I claim as my invention—

1. In a telephonic system, the combination with a source of electricity E of a telephone T and a normally open shunt *k*, of a line wire L, a plug P whereby said source of electricity may be connected with said line at will, and a key K for closing said shunt when a calling current is to be sent through the line.

2. In a telephonic system, the combination with a source of electricity E, a telephone T, and a calling key K placed in shunt relation to said telephone, of an electro-magnetic call C, an electro-magnetic visual signal V, and a shunt *x′* bridging the helix of said visual signal which shunt is automatically closed when said signal is displayed.

3. The combination of an electro-magnet, a visual signal which is released from its concealed position by the attraction of said magnet, a circuit-closer which is actuated by said signal when in its displayed position, and a shunt circuit which when closed by the action of said circuit-closer bridges or short circuits said electro-magnet.

4. In a telephonic system, comprising three or more stations, the combination with the ground or return conductor G, of independent lines L′ L^2 L^3 extending from each station to one or more of the other stations; branches normally connecting each entering line with the ground or return G at each station; a visual signal V and a call C (either or both) actuated by electro-magnetism in each of said branches; a normally open branch permanently connected to the ground or return G at each station, in which is included a telephone T and a calling key K in shunt relation to each other, and two parallel terminals for each such normally open branch, only one of which includes a source of electricity E but either of which may be placed in connection with the line L at will.

In testimony whereof I have hereunto subscribed my name this 14th day of October, A. D. 1892.

FRANK R. COLVIN.

Witnesses:

CAROLINE E. DAVIDSON,

JESSIE B. KAY.