

J. B. TAYLOR.  
TELEPHONE SYSTEM.  
APPLICATION FILED MAY 3, 1909.

962,800.

Patented June 28, 1910.

Fig. 1

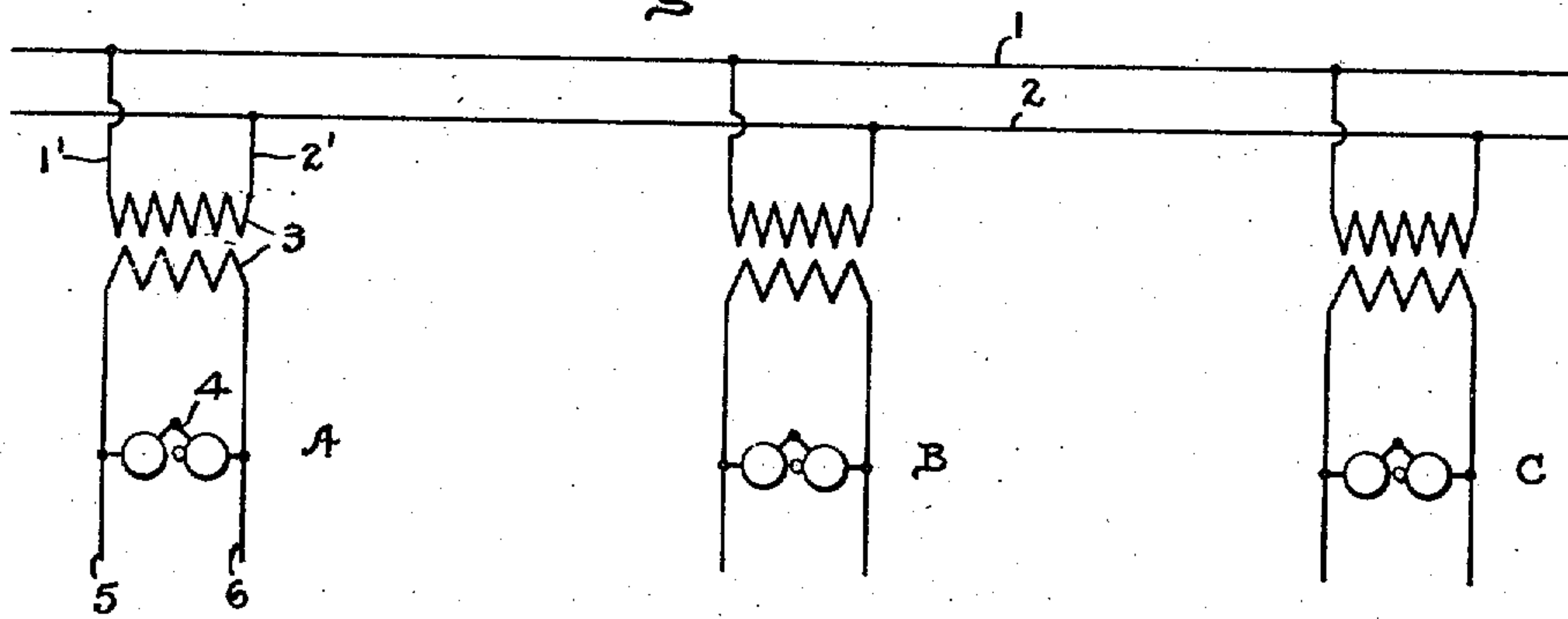
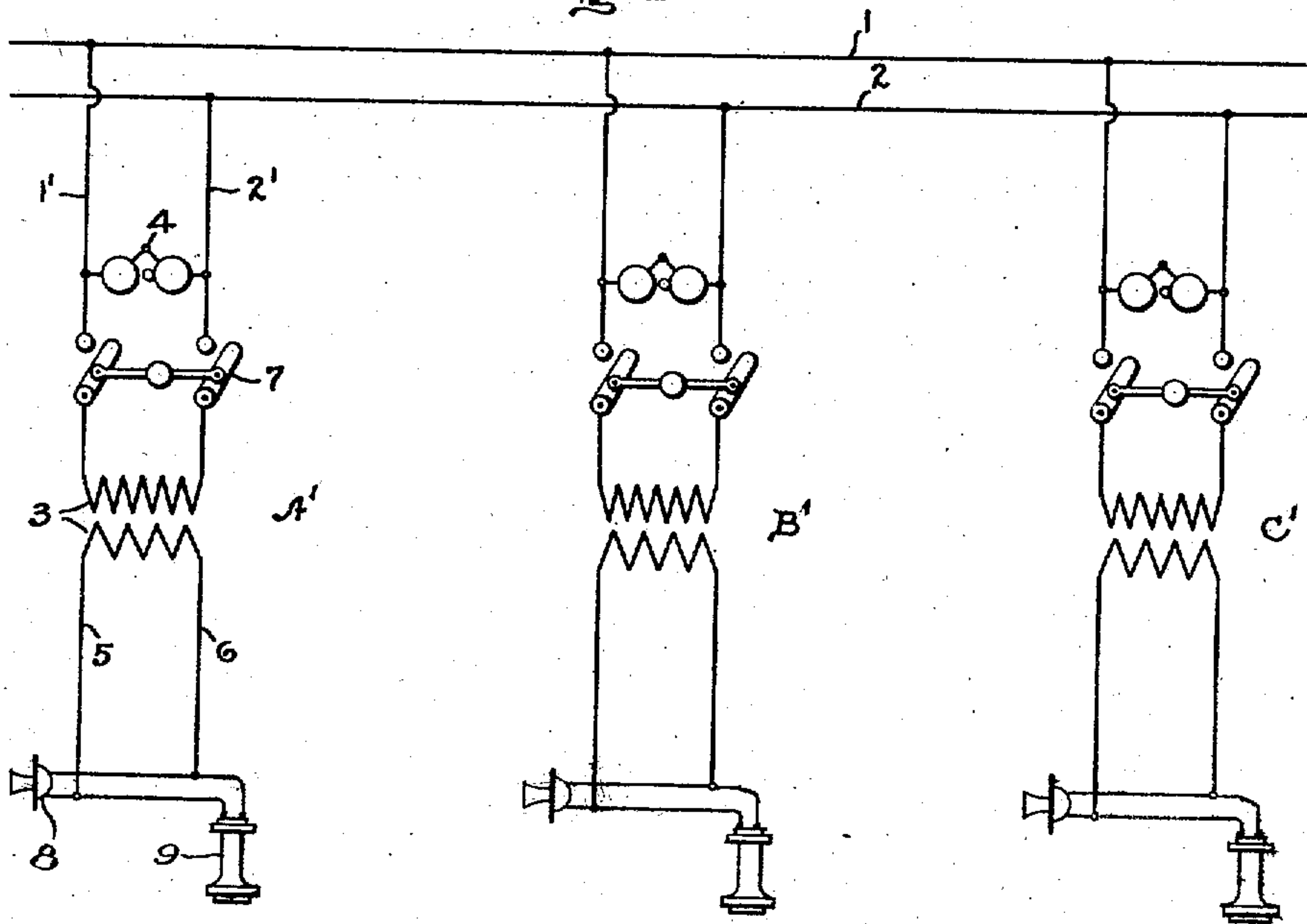


Fig. 2



Witnesses:  
Earl S. Klock  
J. Ellis Allen.

Inventor:  
John B. Taylor.  
by *Alfred H. Davis*  
Att'y.

# UNITED STATES PATENT OFFICE.

JOHN B. TAYLOR, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## TELEPHONE SYSTEM.

962,800.

Specification of Letters Patent. Patented June 28, 1910.

Application filed May 3, 1909. Serial No. 493,551.

### *To all whom it may concern:*

Be it known that, I, JOHN B. TAYLOR, a citizen of the United States, residing at Schenectady, county of Schenectady, and State of New York, have invented certain new and useful Improvements in Telephone Systems, of which the following is a specification.

My invention relates to telephone systems, and has for its object an improvement in the operation of such systems.

At the present time electrical energy is frequently transmitted for long distances by means of conductors operated at a high voltage and carried on suitable poles or towers. In many instances these transmission lines are adjacent to telephone circuits, and it has been found that frequently they induce upon such circuits a high voltage which may subject persons using the telephone apparatus to shocks which are not only annoying, but at times dangerous. In order to avoid these high-voltage shocks, it has been the custom to employ upon such telephone circuits high-voltage repeating coils, or telephone transformers which have two windings insulated from each other, one winding being connected to the telephone circuit and the other to the instruments. With such an arrangement those using the instruments will be protected from any high voltage which may be induced upon the telephone circuit, as the secondary winding of these transformers will be at a different potential from that of the telephone circuit. When a considerable number of such repeating coils or telephone transformers are used, however, difficulty is at times experienced in properly ringing the telephone bells or signal apparatus employed to give notice that it is desired to send a telephonic communication. This difficulty arises from the fact that the magnetos or telephone generators, which may be used, while of sufficient capacity to operate some bells and transformers may not be of capacity to provide a current sufficient for magnetizing a number of such transformers and also for ringing the bells,—that is to say, that when many of these transformers

are used too great a load may be put upon the line for the capacity of the telephone generators, and considerable annoyance experienced through the improper ringing of such bells.

The object of my invention then is to provide an improved method of operating a telephone system which may be subjected to a high voltage and employ repeating coils or transformers, and still obtain a satisfactory operation of the bells or other devices used for signaling purposes. I accomplish this object by permanently connecting the bells across the telephone circuit and providing connections such that the repeating coils or transformers are normally cut out of circuit, but are connected to the circuit in any particular station which desires to send or receive messages.

For a further understanding of my invention reference may be had to the accompanying drawing, where—

Figure 1 shows the connections commonly used for a telephone system operated with repeating coils or transformers, and Fig. 2 shows the connections for a telephone system operated in accordance with my new invention.

Referring first to Fig. 1, 1 and 2 are the conductors of a telephone circuit. This circuit is shown as supplying three telephone stations, A, B and C, each of which may be used for the receiving and transmitting of messages. Conductors 1 and 2 may be adjacent to a high-voltage electric circuit, but such circuit has not been shown in the drawing. 3 is a transformer having two separate windings insulated from each other in a suitable manner. One of these windings is connected to the telephone circuit by conductors 1', 2', and the other winding is connected to conductors 5 and 6. A bell or signal apparatus 4 is shown connected to conductors 5 and 6. Conductors 5 and 6 are connected to the usual receiving and transmitting apparatus indicated diagrammatically at 9 and 8 in any of the manners well understood by those skilled in the art. In operating such a system, if it is desired, for example, to send a message from the



station A, the sender will proceed in the usual manner, and when calling up another station the telephone generator or magneto in his station will have not only to carry the load of the bells or signal apparatus in stations B, C, etc., but would also have to carry the load of the transformers in these stations, and thus may have to carry a load in excess of its normal load where a number of such transformers are used, and frequently due to this fact the bells cannot be properly operated.

In Fig. 2 I have shown connections for a telephone system, in accordance with my invention,—1 and 2 representing the conductors of the circuit. Three stations, A', B' and C', are shown, and transformers 3 are shown for each station. Instead of these transformers being connected directly to the circuit, they are connected by means of switches 7 through conductors 1', 2' to the circuit. Bell 4 is shown as connected permanently across the circuit by connecting it (the bell) to conductors 1', 2'. Conductors 5 and 6 are connected to the receiving and transmitting instruments at the station in a manner similar to that described for Fig. 1, but bell 4 is not directly connected to the circuit containing the receiving and transmitting instruments, as shown by the drawing. The operation of such a system will then be as follows: Normally switches 7 will be open. If it is desired to send a message from any station, such as A', for example, the sender closes his switch 7 and sends a bell ringing signal by his magneto or telephone generator in the usual manner. This will cause the bells in the various stations to ring in the usual manner, as they are connected across the circuit. The magneto or telephone generator, however, will not be overloaded, as in Fig. 1, with more than its normal load when such a signal is sent, because the transformers 3 are not normally in circuit in the various telephone stations, and, therefore, the magnetos or telephone generators do not have to energize these transformers. When a signal is sent, a person in any station, such as C', may close his switch 7 and thus connect his receiving and transmitting apparatus to the telephone circuit, after which messages may be sent and received in the usual way between these stations.

While I have shown all the stations as provided with cut-out switches 7, it will be obvious that for some of the stations such switches may be omitted if too great a load be not imposed thereby on the magnetos.

The advantages of my new method of operating such a system are that, as explained above, the magnetos or telephone generators are not required to carry an extraordinary load, and, therefore, will operate the bells

or signaling devices in a satisfactory manner. A further advantage is that the repeating coils or transformers are cut out of circuit normally, and hence, if it is desired to handle the receiving or transmitting apparatus, it may be done with perfect safety. The bell, which is that portion of the telephone apparatus requiring the least attention, may be placed in any desired locality and suitably insulated for high voltage. The switch 7 I have shown as a double-pole switch operated by hand. It will be obvious, however, to those skilled in the art that the switch may, if desired, be automatically operated when the receiver is taken off the hook, so that the operation of connecting the relay to the line would not require any additional operations to those required at the present time.

While I have shown a certain arrangement and connections for the carrying out of my invention, I do not limit myself to this arrangement or connection, but seek in the appended claims to cover all such arrangements and connections as will be obvious to those skilled in the art, and will be within the scope of my invention.

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

1. The combination in a telephone system of receiving and transmitting apparatus, a transmission circuit, a switch, a transformer having one winding connected to the receiving and transmitting apparatus and a second winding connected through the switch to the transmission circuit, and a bell connected across the circuit between it and the switch. 95
2. The combination in a telephone system of receiving and transmitting apparatus, a transmission circuit, a two-pole switch, a highly insulated transformer having one winding connected to the receiving and transmitting apparatus and the terminals of the other winding connected through the switch to the transmission circuit, and a bell connected across the circuit between the circuit and the switch. 105
3. The combination in a telephone system of a transformer, a transmission circuit, receiving and transmitting apparatus connected to said circuit through, and protected by, the transformer, means for connecting the transformer to and disconnecting it from the circuit, and a bell permanently connected across the circuit. 115
4. The combination in a telephone system of a transformer having two windings, receiving and transmitting apparatus connected to one winding, a transmission circuit, means for connecting the other winding to and disconnecting it from the circuit, and a bell permanently connected across the circuit. 120

5. The combination in a telephone system of a transformer having two separate windings insulated from each other by a high-voltage insulation, receiving and transmitting apparatus connected to one of the transformer windings, a transmission circuit, a two-pole switch connecting the other transformer winding to and disconnecting it from

the circuit, and a bell permanently connected across the circuit.

In witness whereof, I have hereunto set my hand this 1st day of May, 1909.

JOHN B. TAYLOR.

Witnesses:

BENJAMIN B. HULL,  
HELEN ORFORD.