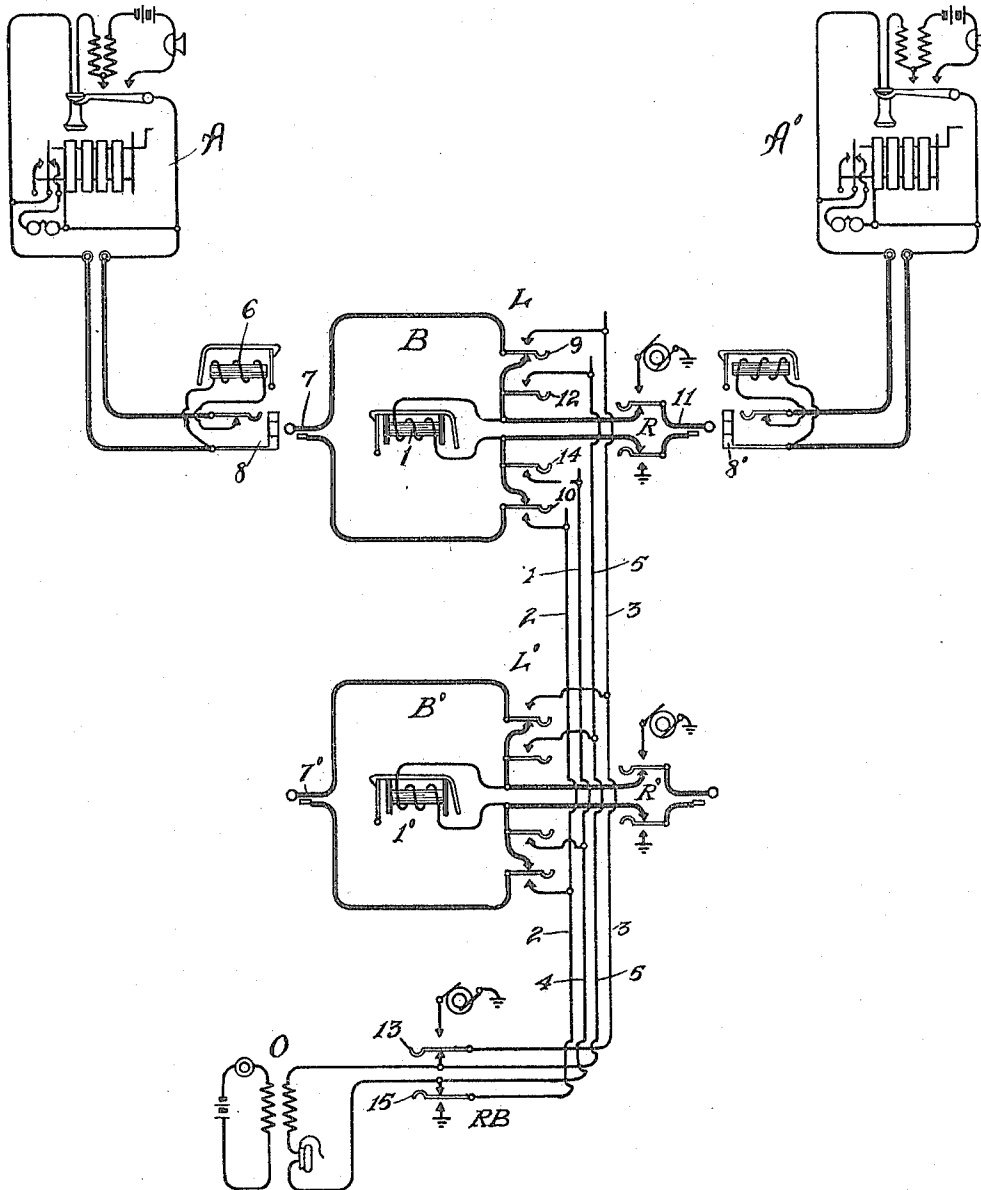


J. S. ALLEN.
TELEPHONE SIGNALING SYSTEM.
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1,196,323.

Patented Aug. 29, 1916.



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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH S. ALLEN, a citizen of the United States of America, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Telephone Signaling Systems, of which the following is a specification.

My invention has to do with signaling systems for telephone exchanges and is directed more particularly to an improved circuit arrangement whereby a single ring-back is provided for a plurality of operator's cord or link circuits, an object of my invention being to provide an improved structure of the above character in which it is unnecessary to withdraw the calling plug from a jack when the ring-back signal is applied.

In the accompanying drawing I have illustrated a preferred embodiment of my invention and I have shown calling and called telephone substations A and A¹ respectively, link circuits B and B¹ and a common operator's telephone O.

I have preferably embodied my invention in a simple magneto cord circuit B provided with a bridged disconnect drop 1 and combined listening and ringing keys L and R respectively. In general practice a plurality of cord circuits are provided for each operator's position and I have shown two such cord circuits B and B¹ and the common operator's telephone O. The telephone O may be connected to any of the associated cord circuits B by the actuation of a listening key L, and ringing current applied by a ringing key R. A common ring-back key RB is also provided whereby the operator is enabled to connect ring-back leads 2, 3, to the answering end of the cord circuit, the operation of key RB also disconnecting the operator's telephone so that the ring-back current cannot be applied to the common calling-end talking conductors 4, 5. The operation is such that when the ring-back signal is used the operator actuates the listening key L¹ of the cord circuit to which the signal is to be applied and also operates the master or common ring-back key RB, the actuation of key L¹ serving to connect the ring-back leads 2, 3, and also interrupt the connection between the answering and calling ends of the cord.

In the operation of the system illustrated, in establishing a connection between calling and called lines, a subscriber at the calling substation A operates his line signal 6 in the usual manner and the operator inserts an answering plug 7 in the jack 8 of the calling line. The listening key L is now operated, connecting the common conductors 2, 3 through alternate contacts 9, 10, to the talking strands leading to the answering end of the cord circuit. Finding that connection is desired with the line of substation A¹, the operator restores the listening key L and then inserts the calling plug 11 into a jack 8¹ of the called line and actuates the ringing key R to signal the called substation A¹ in the usual manner.

In connection with toll service, the calling subscriber is usually told to replace his receiver until he is again called and assuming that this has been done in the connection described the operator connects the ring-back circuit to operate the call-bell at the calling substation A. To do this the operator actuates both the common ring-back key RB and the key L of the connecting cord circuit B whereby current is connected through alternate contacts 13, 15 to the common ring-back conductors 2, 3, alternate contacts 9, 10 to the calling line thereby operating the bell at substation A. The operator now restores keys L and RB whereby ringing current is disconnected and a conversational circuit established between calling and called lines over the heavily marked conductors.

It will be noted that when the ring-back signal is applied, due to the interruption of normal contacts 9, 10 of key L, the calling end of the cord circuit is disconnected from the answering end and therefore the application of the ring-back signal does not affect the called line.

Should the operator desire to listen in or converse with either of the substations A or A¹ during the connection, she will actuate the listening key L of the connecting cord circuit B and as before described, telephone O is connected to the answering end by the conductors 2, 3, and to the calling end of the cord circuit by means of the conductors 4, 5. Therefore, when the listening key L is actuated during a connection between two lines, the talking circuit for these two con-

nected lines includes the conductors 2, 3 and 4, 5. That is, the talking circuit of the link circuit is traced from the tip of plug 11, alternate contact 12, conductor 5, normal contact 13, conductor 3 to alternate contact 9, and tip 7. The sleeve talking connection is traced from the sleeve contact of plug 11, alternate contact 14, conductor 4, normal contact 15, conductor 2 to alternate contact 10 and the sleeve of plug 7. It will be seen from this that when the listening key is actuated during a connection, the talking circuit between substations is through the contacts of the ring-back key RB, and the operator's telephone O is connected in bridge of the cord talking conductors so that the operator may converse with both subscribers.

In reference to cord circuit B¹, the operation is of course the same as cord circuit B, the like parts of the cord circuits being indicated by like reference characters and the exponent prime added to the characters of cord circuit B¹.

In illustrating my invention I have chosen to embody it in a simple telephone system but I contemplate using it in various other systems and therefore I do not desire to be limited to the exact structure as shown and described but aim to cover all that which comes within the spirit and scope of the appended claims.

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

1. A telephone system comprising telephone lines, link circuits having terminals for uniting said lines, a listening key for each of said link circuits, a common ring back key, and circuit connections whereby the actuation of a listening key to connect an operator's telephone and said common key to connect ringing current will connect said ringing current to one end only of the associated link circuit.

2. A telephone system comprising telephone lines, link circuits uniting said lines in pairs for conversational purposes, a listening key for each of said link circuits, a common ring-back key, and circuit connections whereby the actuation of any of said listening keys to connect an operator's telephone and said common key to connect ringing current will connect said ringing current to the calling line only of the lines connected by the associated link circuit.

3. A signaling system including link circuits having answering and calling terminals, a listening key for each of said link circuits solely for connecting the operator's telephone with its associated link circuit, a key common to said link circuits, means whereby the actuation of a listening key and the common key will connect ringing current to the answering terminal of a link

circuit, and means including contacts controlled by said keys to prevent such ringing current from traversing the calling terminal of a link circuit.

4. A signaling system comprising telephone lines, link circuits having answering and calling terminals for interconnecting said lines, a listening key for each of said link circuits, solely for connecting an operator's telephone with its associated link circuit, a key common to said link circuits, means whereby the actuation of a listening key and the common key will connect ringing current to the answering terminal of the link circuit, and means to prevent such ringing current from effecting a called line at the calling terminal of a connecting link circuit.

5. A signaling system comprising telephone lines, link circuits having answering and calling terminals for interconnecting said lines, a listening key for each of said link circuits, a key common to said link circuits, means whereby the actuation of a listening key and the common key will connect ringing current to the answering terminal of the link circuit, and contacts controlled by said common key for disuniting the answering and calling terminals.

6. A signaling system comprising link circuits having answering and calling terminals, a listening key for each of said link circuits, a key common to said link circuits, circuit connections whereby the actuation of a listening key and the common key will connect ringing current to the calling terminals of the associated link circuit, and connections whereby the actuation of said individual key will disunite the answering and calling ends of said link circuit and connect an operator's telephone to both ends of said link circuit.

7. A telephone system comprising link circuits having answering and calling terminals, a key for each of said link circuits, an operator's telephone and means whereby the actuation of one of said keys will connect said telephone to the associated link circuit, a key common to said link circuits, circuit connections whereby the actuation of a link circuit key and the common key will connect ringing current to one terminal of the associated link circuit, and connections whereby the actuation of said individual key will disunite the answering and calling ends of said link circuit and connect the said operator's telephone to both terminals of the link circuit.

8. A telephone system comprising link circuits having answering and calling terminals, a pair of talking conductors uniting each pair of said terminals, an operator's telephone, a listening key for each of said link circuits, a common ring back key, circuit connections whereby the operation of a

listening key will disunite the ends of the associated link circuit conductors and connect said ends through contacts of said ring-back key, and means whereby when one of said listening keys is actuated the actuation of said ring-back key will connect ringing current to one end only of the associated link circuit.

9. A signaling system including link circuits provided with answering and calling terminals therefor, a key for each of said link circuits, a key common to said link circuits and adapted to be included in circuit connections extending between the answering and calling terminals of one of said link circuits, means whereby the actuation of a link circuit key and the common key will connect ringing current to the answering terminal of a link circuit, and means including said keys for preventing ringing current from passing to the calling terminal of a link circuit.

10. A signaling system including telephone lines, link circuits provided with answering and calling terminals for interconnecting said lines, a key for each of said link circuits, a key associated with an operator's telephone and common to said link circuits, means for operating one of the said link keys and said common key whereby ringing current is transmitted to the answering terminal of one of said link circuits, and means controlled by the said common key for preventing such ringing current from traversing the calling terminal of said link circuit.

11. In a telephone system a plurality of telephone lines, link circuits provided with

answering and calling terminals for interconnecting said lines, a key for each of said link circuits, a key common to all of said link circuits, means for operating a link circuit key whereby the normal connection between the answering terminal and calling terminal of its associated link circuit is disunited and a second path established between said terminals including contacts of said common key, and means for then operating said common key whereby the second established path between said terminals is interrupted and ringing current is transmitted to the answering terminal of said link circuit.

12. A signaling system comprising a plurality of telephone lines, link circuits provided with answering and calling terminals for interconnecting said telephone lines, a key for each of said link circuits, a key common to all of said link circuits, means for operating a link circuit key whereby the normal connection between the answering and the calling terminals of a link circuit are disunited and a new path is established between said terminals including contacts of said common key, and means for operating a link circuit key and said common key whereby ringing current is transmitted to the answering terminal of said link circuit.

Signed by me at Chicago, county of Cook, and State of Illinois, in the presence of two witnesses.

JOSEPH S. ALLEN.

Witnesses:

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