

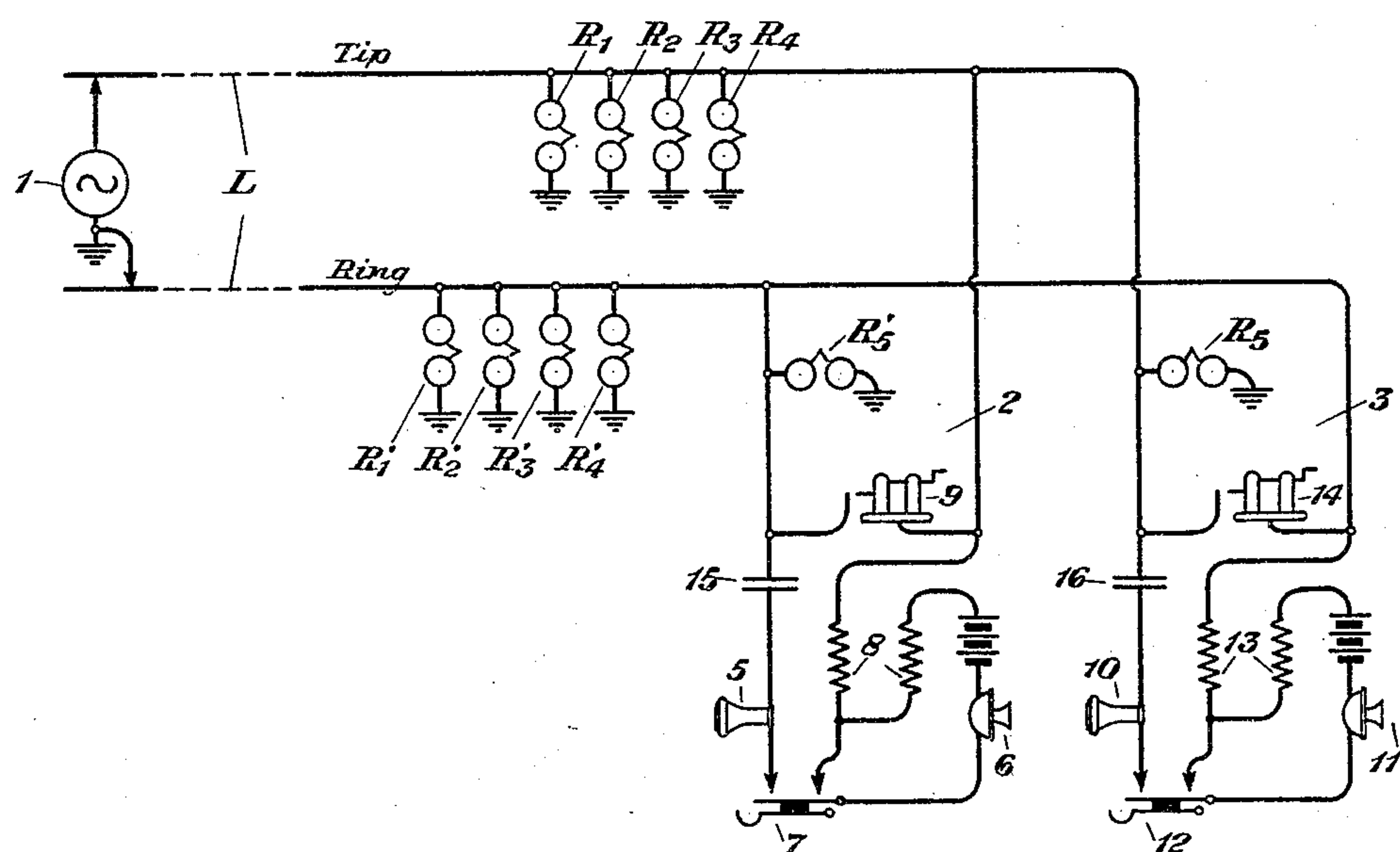
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PARTY TELEPHONE SIGNALING ARRANGEMENT

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PARTY TELEPHONE SIGNALING ARRANGEMENT

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This invention relates to telephone systems and more particularly to signaling arrangements for use on party lines in such systems.

The ringing or signaling arrangements of the invention are particularly applicable to the type of telephone lines known as divided ringing magneto party lines, such for example as two-party selective lines, four-party semi-selective lines, and ten-party lines with five stations on either side of the line signaled by five different codes. One of the primary objects of the ringing arrangements of the invention is to provide for improved ringing margins, or in other words greater sensitivity, in the ringing apparatus at the subscribers' stations while at the same time preventing false operation of the ringers on cross ringing currents. The arrangements of the invention also make it possible to extend the maximum subscriber's loop circuits. Other objects and features of the invention will appear more fully from the detailed description of the invention hereinafter given.

In party telephone lines of the type to which the invention is particularly applicable one of the chief causes of narrow ringing margins or limitations in maximum subscriber's loops at party line stations thereon, which are rung over one side of the line to ground, is the necessity for decreasing the sensitivity of the station ringers to avoid their false operation on cross ringing currents. This cross ringing or false operation is liable to occur when a subscriber takes his receiver from the hook during the period when ringing current is applied to the line. The subscriber's set is bridged across the line and, when the receiver is removed from the hook, provides a path for the ringing current applied to one side of the line over the other side of the line to ground at the office. If the loop is comparatively long, the current flowing through the resistance of the line will cause a difference in potential across the ringers on the side of the line which it is not intended to ring. To prevent false operation of these ringers on this drop in potential, it has heretofore been necessary to increase their biasing spring tensions which reduces their sensitivity to regular ringing current. This

is avoided in the arrangements of the invention by inserting in the talking conductors of the subscriber's set a device, such as a condenser, having a relatively high impedance to the ringing currents and a low impedance to talking currents. In this manner the ringing current which might flow over the return side of the line to ground is reduced and the difference in potential across the ringers on the return side of the line is reduced. This practically eliminates the need for biasing the ringers against cross ringing and permits the ringers to be given a very sensitive adjustment.

The invention may be more fully understood from the following description together with the accompanying drawing in the figure, of which is illustrated a preferred form of the invention.

In the drawing the invention is shown as applied to a party line of the divided ringing magneto type. The party line L is connected at a central office to ringing apparatus designated 1, whereby ringing current may be applied either to the tip or ring side of the line. This ringing current may be either alternating current, pulsating current or superimposed ringing current, and the signals will be sent out in different codes. Connected to the party line L are shown two subscriber stations, 2 and 3. Station 2 comprises a telephone receiver 5, a transmitter 6, a switch hook 7, the usual induction coil 8, ringing apparatus 9, and ringing responsive apparatus R_5' which is connected to ground and the ring side of the line. Station 3 comprises a telephone receiver 10 and transmitter 11, a switch hook 12, induction coil 13, ringing apparatus 14 and ringing responsive apparatus R_5 connected to ground and the tip side of the line. Connected to the tip side of the line are shown the ringing responsive devices R_1 , R_2 , R_3 and R_4 . These ringing responsive devices are similar to the ringer R_5 and would be associated with separate subscriber sets not shown. Associated with the ring side of the line are the ringing responsive devices R_1' , R_2' , R_3' and R_4' . These ringing responsive devices are similar to the ringing respon-

sive device R_5' and would be connected with different subscriber sets not shown.

If it should be desired to ring one of the subscriber sets, such for example as the one including the ringing responsive device R_1 , ringing current would be applied at the central office to the tip side of the line by the ringer 1 and a code signal would be sent over the tip side of the line and through the responsive device R_1 to ground. If while ringing current was thus being applied to the line one of the subscribers, such for example as the subscriber at station 3, should remove his receiver from the switch hook, a circuit would be closed through the subscriber's set and over the ring side of the line to ground at the ringer 1 in the central office. If the line L was comparatively short, a short circuit would exist around the ringing responsive devices R_1' to R_5' and they would not be affected. However, if the line L was comparatively long, the resistance of the line would cause a difference in potential to exist across these ringers connected to the ring side of the line. Heretofore, to prevent false operation of these ringers on this drop in potential, it has been necessary to increase biasing spring tensions which reduce their sensitivity to regular ringing current. Accordingly, in the arrangement of this invention there is provided in each subscriber's set in series with the induction coil and receiver thereof condensers, such as 15 and 16. These condensers have a relatively high impedance to ringing current, and a relatively low impedance to talking current. This raises the impedance of the subscriber's set to ringing current compared to sets without this condenser when the receiver is removed from the hook during the application of ringing current to the line, so that the current flowing over the return side of the line to ground is reduced and the difference in potential across the ringers on the return side of the line is lowered. This practically eliminates the need for biasing the ringers against cross ringing and permits the ringers to be given a very sensitive adjustment and the maximum length of the loop to be increased.

While the invention has been discussed as embodied in certain specific forms that are desirable, it is understood that it is applicable to other types of lines and is capable of embodiment in many and other widely varied forms without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. A party telephone line having a plurality of signal responsive devices connected to each side of said line and ground, means for applying signaling current to said line, a subscriber's telephone set bridged across said line, and means operatively included in said subscriber's set when the receiver there-

of is removed from the hook having a relatively high impedance to said signaling current and a low impedance to currents used for talking purposes.

2. In a telephone system a magneto divided ringing party line, a subscriber's set bridged across said line, and means included in said subscriber's set when the receiver of said subscriber's set is removed from the hook thereof for preventing cross ringing difficulties during the application of signaling current to the line, said means comprising a device in the circuit of said subscriber's set having a relatively high impedance for signaling currents and a low impedance for currents used for talking purposes.

3. In a telephone system a magneto divided ringing party line, a plurality of signal responsive devices connected to each side of said line and ground, a subscriber's set bridged across said line, and a condenser operatively connected in series with the receiver and induction coil of said subscriber's set when the receiver thereof is removed from the hook having a relatively high impedance to signaling currents applied to said line and a low impedance to currents used for talking purposes.

4. In a telephone system a magneto divided ringing party line, a plurality of subscribers' sets bridged across said line, each of said subscribers' sets having grounded signal responsive devices connected to either the tip or ring side of said line, means for applying signaling current to said line, and condensers operatively in each of said subscribers' sets when the receiver thereof is removed from the hook having a relatively high impedance to the signaling currents applied to said line and a low impedance to currents used for talking purposes.

In testimony whereof, I have signed my name to this specification this 9th day of April, 1931.

WILLIAM H. EDWARDS.