Dec. 13, 1932. C. C. CASH 1,890,561

TELEPHONE CIRCUIT

Filed Dec. 17, 1931

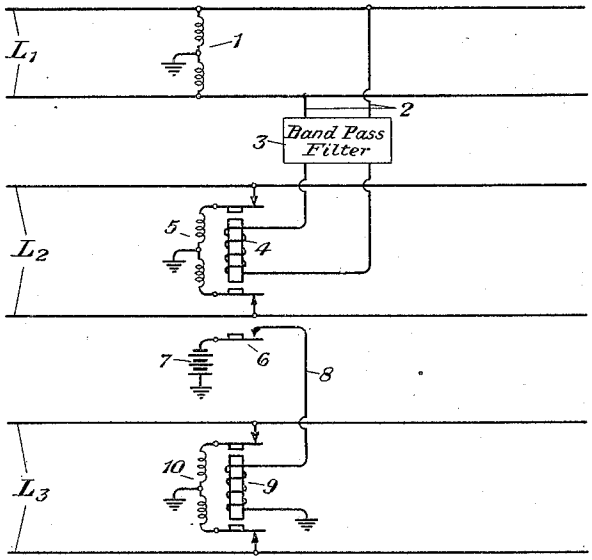


Fig. 1

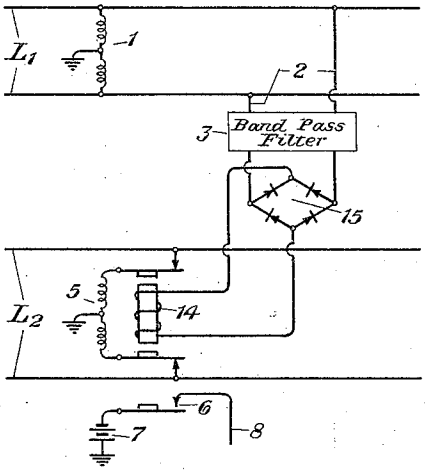


Fig. 2

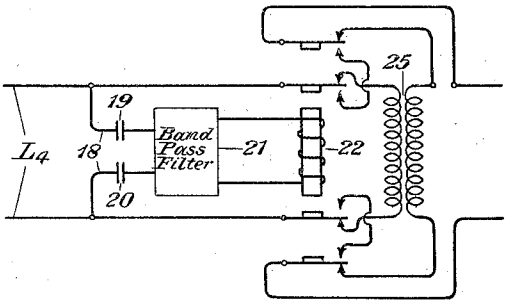


Fig. 3

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UNITED STATES PATENT OFFICE

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TELEPHONE CIRCUIT

Application filed December 17, 1931. Serial No. 581,753.

This invention relates to telephone systems, and more particularly to means for preparing the lines of such systems, which may have protective or remedial devices connected thereto, for the application of direct current for testing purposes.

A telephone circuit under certain conditions might have various remedial or protective devices connected thereto such, for example, as drainage coils or transformers. The connection of drainage coils to the telephone line might be desirable to shunt to ground induced currents of relatively low frequency, such as in the neighborhood of 60 cycles, and transformers might be utilized to isolate sections of the line for various purposes. A telephone line of this type is not adapted for the application of direct current thereto for testing purposes because of the remedial or protective devices associated therewith. Accordingly it is one of the primary objects of this invention to provide arrangements for so connecting such remedial or protective devices to a line that they can readily be disconnected therefrom, when it is desired to conduct testing operations thereon with direct current. Other objects and features of the invention will appear more fully from the detailed description thereof hereinafter given.

The invention may be more fully understood from the following description, together with the accompanying drawing in the Figures 1, 2 and 3 of which the invention is illustrated. Figure 1 is a circuit diagram showing how a protective device, such as a drainage coil, might be disconnected from a line when desired. Fig. 2 is a modification of Fig. 1. In Fig. 3 is shown a means for including in or excluding from a line a remedial device, such as a transformer. Similar reference characters have been utilized to denote like parts in all of the figures.

In Fig. 1 are shown a group of transmission lines L_1, L_2 and L_3. These lines might have remedial or protective devices connected thereto such as the drainage coils 1, 5 and 10. The drainage coils 5 and 10 are connected to lines L_2 and L_3 over the contacts of relays 4 and 9, respectively. The line L_1 may be used as a control circuit. If it should be desired to apply direct current to lines L_2 or L_3 for the purpose of conducting tests thereon, a control current would be sent over a metallic circuit comprising the line L_1. This current might have a frequency of the order of 135 cycles. This current would not be shunted to ground by the drainage coil 1 as this coil is designed to shunt to ground longitudinal currents of relatively low frequencies, such for example, as 60-cycles. The control current would be transmitted over circuit 2 and through the band-pass filter 3 and would operate the relay 4. This would disconnect the drainage coil 5 from the line L_2 and prepare it for the application of direct current for testing purposes. The operation of relay 4 would also close the following circuit: from battery 7, armature and contact 6 of relay 4, conductor 8, winding of relay 9 to ground. This would operate relay 9 and disconnect the drainage coil 10 from line L_3 and thus prepare line L_3 for the application thereto of direct current for testing purposes. Other contacts might be provided for the relay 5 to disconnect other drainage coils from other lines if desired. The band-pass filter 3 will prevent the arrangements from functioning on currents other than the control frequency. It is desirable to have the control circuit L_1, over which the 135-cycle control currents are transmitted, equipped with apparatus such as drainage coil 1. If the drainage coil 1 were omitted from line L_1, it is possible that 60-cycle induced currents might break down the protector blocks at the central office and this would result in the transmission of oscillatory currents over the line L_1. Those oscillatory currents might have frequencies within the range of the band-pass filter 3 and hence cause false operation of the equipment. The provision of the drainage coil 1 in the control circuit will prevent the breaking down of the protector blocks and the false operation of the apparatus attendant thereon. The band-pass filter 3 obviously prevents the false operation of the apparatus on voice currents or the 60-cycle induced currents.

In Fig. 2 is shown a modification of the

arrangements of Fig. 1. Similar reference characters have been utilized to denote like parts in both figures. In Fig. 2 a direct current relay 14 is substituted for the alternating current relay 4 of Fig. 1. A rectifier 15, which might be of the copper oxide variety, is connected between relay 14 and the band-pass filter 3. The drainage coil 5 is connected to line L_2 over the contacts of relay 14. As the operation is substantially similar to that of Fig. 1, no further description thereof will be given.

In Fig. 3 is shown a telephone line L_4 in which is included a transformer 25. Obviously it would be desirable to disconnect the transformer 25 from the line if direct current were to be applied thereto for testing purposes. Accordingly, a circuit 18 is bridged across the line between the central office and the transformer. This circuit would include a band-pass filter 21 transmitting a band of frequencies in the neighborhood of 135 cycles. The circuit 18 would also include a relay 22. The windings of transformer 25 are connected to line L_4 over the break contacts of this relay. When 135-cycle current is transmitted over the line, the relay will operate and the line L_4 will be completed directly over the make contacts of relay 22 and the transformer windings will be excluded from the line. In order that the direct currents applied to the line L_4 for testing purposes may not affect circuit 18, the condensers 19 and 20 are included therein. Further circuits, such as 18, with relays, such as 22, might be included in the line. Under such conditions the application of control current to the line would disconnect other transformers, or translating devices such as drainage coils, from the line.

While the invention has been disclosed as embodied in certain specific forms which are deemed desirable, it is understood that it is capable of embodiment in many and other widely varied forms without departing from the spirit of the invention as defined by the appended claims.

What is claimed is:

1. A telephone system comprising a line in which a translating device is connected, a circuit bridged across said line selective for a certain band of frequencies, relay means in said selective circuit, a second telephone line, and a translating device connected in said second telephone over the contacts of said relay.

2. A telephone system comprising a line, a drainage coil connected across said line and designed to shunt out currents of relatively low frequencies, a circuit bridged across said line, a band pass filter in said circuit designed to pass a band of frequencies above the relatively low frequencies shunted by said drainage coil, a relay connected to said circuit, a second telephone line, and a drainage coil connected across said second telephone line over the contacts of said relay.

3. A telephone system comprising a line across which a protective device is connected, a circuit bridged across said line selective for a certain band of frequencies, relay means in said selective circuit, a second telephone line, a protective device connected across said second telephone line over the contacts of said relay, a second relay controlled by said first relay, a third telephone line, and a protective device connected across said third telephone line over the contacts of said second relay.

4. A telephone system comprising a line across which a protective device is connected, a circuit connected across said line selective for a certain band of frequencies, rectifying means in said selective circuit, relay means controlled by the output of said rectifying means, a second telephone line, and a protective device connected across said second telephone line over the contacts of said relay means.

5. A telephone system comprising a line, a circuit selective for a certain band of frequencies connected across said line, a relay in said selective circuit, a transformer having its windings connected in circuit in said line when said relay is not operated and disconnected therefrom when said relay is operated, and means operative when said relay is operated for directly connecting together the sections of said line previously connected to said transformer windings.

In testimony whereof, I have signed my name to this specification this 15th day of December, 1931.

CLAUDE C. CASH.