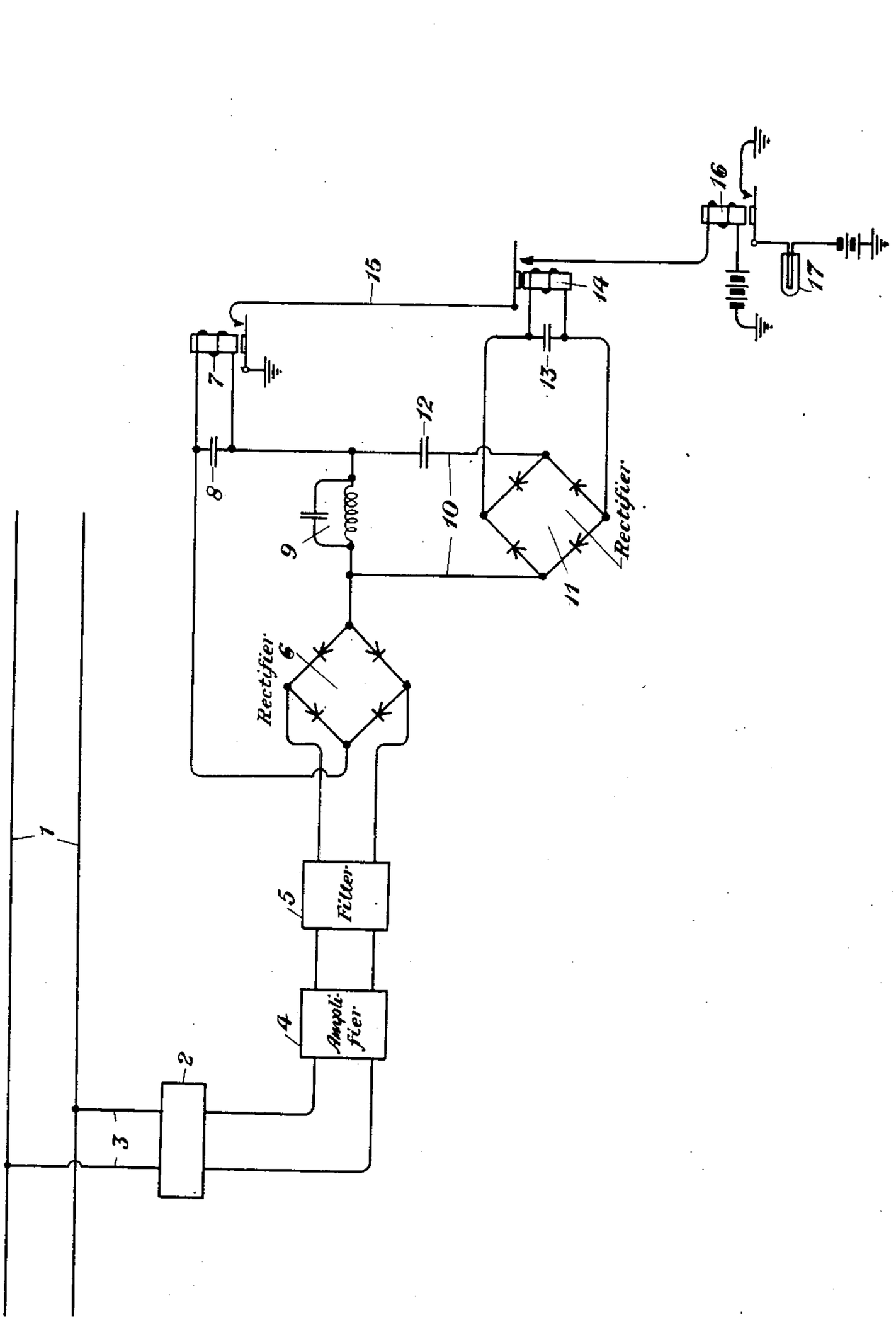
Jan. 15, 1929.

1,698,770

R. S. OHL

SIGNALING CIRCUITS

Filed Dec. 1, 1927



INVENTOR.
R. S. Ohl

BY

ATTORNEY

Patented Jan. 15, 1929. 1,698,770

UNITED STATES PATENT OFFICE.

RUSSELL S. OHL, OF LITTLE SILVER, NEW JERSEY, ASSIGNOR TO AMERICAN TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION OF NEW YORK.

SIGNALING CIRCUITS.

Application filed December 1, 1927. Serial No. 237,114.

This invention relates to transmission lines and more particularly to improvements in signaling arrangements associated therewith.

One of the primary objects of the invention consists in providing signaling arrangements which will afford a high degree of selectivity and at the same time afford safeguards against false operation. The method of operation comprises transmitting over a transmission line to a signaling circuit an alternating current modulated by a signaling frequency and passing this current through a rectifier. The output of the rectifier will include a direct current component and an alternating component. The direct current component will be utilized to operate a direct current relay and the alternating current component will be transmitted through a second rectifier. The direct current component in the output of the second rectifier will be utilized to operate a second relay. The signaling circuit will be under the joint control of both of these relays so that the signaling arrangements will only operate upon the operation of both relays. Other features and objects 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 figure of which is shown a circuit diagram embodying a preferred form of the invention.

In the drawing is shown a transmission line 1 over which signaling currents are being transmitted. For purposes of illustration it may be assumed that the signaling current comprises a current of 1,000 cycles modulated with a signaling frequency of 135 cycles. Other frequencies, however, might equally well be utilized. Bridged across line 1 at a desirable point would be a signaling circuit 3. In order that the signaling circuit may not take too much energy from the line 1 a device 2 is included in circuit 3 so that the circuit 3 will present a high impedance as seen from the line. In order to increase the amplitude of the signaling current which passes through the loss network 2 and in order to provide a high degree of selectivity an amplifier 4 and a filter 5 is provided. The filter will be tuned to approximately the signaling frequency of 1,000 cycles but is designed to pass the signaling frequency of 1,000 cycles plus or minus the 135 cycle side frequencies and the amplifier is so made that its highest amplification is around this limit. The output of the amplifier filter arrangement is connected to the rectifier arrangement 6. This rectifier may, if desired, be of the full wave contact variety and is preferably arranged in bridge form as shown. The rectified component of the modulated signaling current transmitted from line 1 will now appear in the output circuit of rectifier 6 as a direct current component, a 135 cycle component and harmonics of 1,000 and 135 cycles. The direct current component and the 135 cycle component are the only ones of interest and the direct current component is utilized to operate the relay 7. The output circuit of rectifier 6 includes a condenser 8 to shunt the alternating current components around the relay 7. The output circuit of rectifier 6 also includes the tuned circuit arrangement 9 tuned to the particular modulating frequency utilized, such as 135 cycles. Connected to the terminals of this tuned circuit 9 is a circuit 10 leading to another rectifier 11, which may be similar in construction to rectifier 6. Due to the tuned circuit 9 the 135 cycle component in the output of rectifier 6 will now be transmitted to the rectifier 11. The output of rectifier 11 will be composed of a direct current component and alternating current components. The direct current component is utilized to operate the relay 14. A condenser 13 is provided to shunt the alternating current components around relay 14. A blocking condenser 12 is inserted in circuit 10 to prevent the direct current component in the output circuit of rectifier 6 from affecting relay 14. When relays 7 and 14 are both operated a circuit 15 will be closed and will operate relay 16. The operation of relay 16 will in turn close a circuit for a signaling device, such as the lamp 17.

While the invention has been disclosed in certain specific arrangements 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. The method of signaling which comprises transmitting a carrier modulated with a signaling frequency, subjecting said transmitted current to double rectification, utilizing the direct current component of each rec-

tification to operate separate responsive devices, and controlling a signaling circuit jointly by said separate responsive devices.

2. The method of signaling which comprises transmitting a carrier modulated with a signaling frequency, rectifying said transmitted current, utilizing the direct current component of rectification to operate a responsive device, selecting the alternating current component of said rectification, rectifying said selected component, utilizing the direct current component of said second rectification to operate a responsive device, and controlling signaling means by said responsive devices.

3. A transmission line, a signaling circuit associated therewith, rectifying means in said signaling circuit, a direct current relay in the output of said rectifying means, a selective circuit in the output of said rectifying means, a second rectifying means connected to said selective circuit, a direct current relay in the output of said second rectifying means, and signaling means controlled jointly by said relays.

In testimony whereof, I have signed my name to this specification this 29th day of November, 1927.

RUSSELL S. OHL.