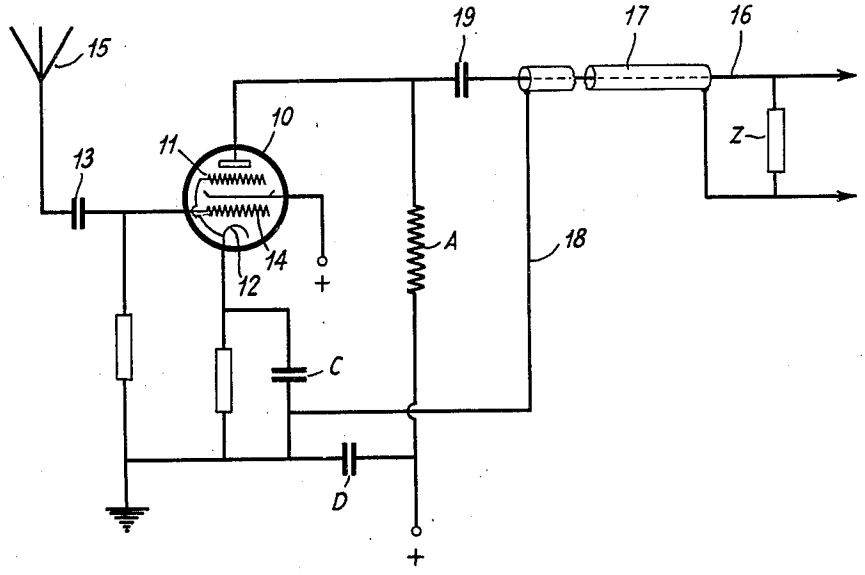
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APERIODIC COUPLING DEVICE

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APERIODIC COUPLING DEVICE

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4 Claims. (Cl. 178—44)

It is known in the prior art to connect between antenna and a shielded lead, for instance, for joint reception, an aperiodic amplifier. It is common practice to interpose between the said amplifier and the transmission cable a transformer in order to step up the low resistance of the cable. However, with amplifiers of this kind it is possible to transmit only a limited wave band range without a change of connections of the transformer.

According to this invention a tube of high mutual conductance, with whose input electrodes the antenna is connected, works directly upon the feeder cable which at its other end terminates in an ohmic resistance, the latter being equal to the characteristic impedance of the cable, or nearly so.

By the use of such a simple amplifier it is readily feasible to amplify a wave band from 15–30,000 meters without any change of connections so that several receivers operating on widely different wavelengths can be supplied from the common aerial with signal potential. These receivers are suitably uncoupled from each other by the use of high-ohm voltage dividers or by tube stages, and these also may be built in a way as here disclosed.

If the transmission cable has a characteristic or surge impedance of 150 ohms, then the receiver end of the cable terminates in a resistance of 150 ohms, with the result that the terminal resistance appears at the input end as if no cable existed. When the dimensions are chosen as just indicated, standing waves and the incidental fluctuations or fading in reception at certain points of the wave band will be avoided.

According to the drawing, the plate circuit of the tube 10 in addition to the surge or characteristic impedance of the line and represented by Z, contains a resistance A which serves for the supply of the plate potential and which has a value that is a multiple of impedance Z, say, ten times higher, with the result that it plays no part in comparison with impedance Z.

If the mutual conductance value of the tube is 10 milliamperes per volt, and tubes of this kind are known in recent manufacture, then, for a line characteristic impedance of 150 ohms there is secured an amplification of $10.150:1000=1.5$. Actually, however, the gain insured with the amplifier is higher seeing that the full antenna voltage operates at the grid, whereas, in case of direct connection of the feeder cable or downlead with the aerial, because of the high inner resistance of the antenna and the low resistance of the cable, the cable potential would be very low.

The condenser C must be chosen very large inasmuch as the outer resistance is very low, with the result that anti-regeneration for the low frequencies is liable to happen.

In order that the external resistance and thus also the amplification may be made as high as feasible, a cable having a high characteristic impedance is preferably used, that is to say, a low-capacity cable. As shown the amplifier tube 10 is of the pentode type the outer grid 11 being connected with its cathode 12. A condenser 13 has one side connected to the control grid 14 and its other side connected to the antenna 15 for transferring the signal voltage picked up onto the control grid.

The shielded transmission line comprises a central conductor 16 enclosed within a shield 17 which is connected to the grounded side of condenser C as by a lead 18. The lower end of resistor A is also shown connected to ground through a condenser D. The amplified signal voltage is transferred from the plate circuit of the tube to the central conductor 16 by means of a condenser 19 which has a low impedance to the currents of all frequencies to be received.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. In a radio frequency distribution system adapted for operation over a wide frequency band and wherein a thermionic relay of relatively high transconductance is provided to act as an aperiodic amplifier, a remote resistive load, means comprising a coaxial cable for connecting said relay device to the load, the inner conductor of the coaxial cable being connected for alternating currents directly to said relay device, said load having an impedance which substantially matches the characteristic impedance of the cable, the characteristic impedance of the cable being considerably greater than the impedance thereof which would be suitable for minimum attenuation.

2. In a radio frequency distribution system adapted for operation over a wide frequency band and wherein a thermionic relay of relatively high transconductance is provided to act as an aperiodic amplifier, a remote resistive load, means comprising a coaxial cable for connecting said relay device to the load, the inner conductor of the coaxial cable being connected for alternating currents directly to said relay device, said load having an impedance which substantially matches the characteristic impedance of the cable, the

characteristic impedance of the cable being of the order of 150 ohms.

3. In a radio frequency distribution system adapted for operation over a wide frequency band and wherein a thermionic relay of relatively high transconductance is provided to act as an aperiodic amplifier, a remote resistive load, means comprising a coaxial cable for connecting said relay device to the load, the inner conductor of the coaxial cable being connected for alternating currents directly to said relay device said load having an impedance which substantially matches the characteristic impedance of the cable, the characteristic impedance of the cable being relatively high as compared to the characteristic impedance which is optimum for minimum attenuation whereby there is developed from said relay device across the load a relatively large frequency independent voltage.

4. In a radio frequency distribution system adapted for operation over a wide range of frequencies and wherein a thermionic relay device of high transconductance is connected to a remote resistive load through a coaxial cable whose inner conductor is directly connected for alternating current to the relay device and whose characteristic impedance is substantially equal to the resistance of the load, the method of developing from the source across the load a relatively large voltage substantially independent of frequency which consists in making the characteristic impedance of the cable relatively high as compared to the characteristic impedance which is optimum for minimum attenuation, and substantially matching the load to said characteristic impedance.

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