455-A AU 233 EX

FT99102 XR 2,054,799

Cross Reference
250-9

Examiner

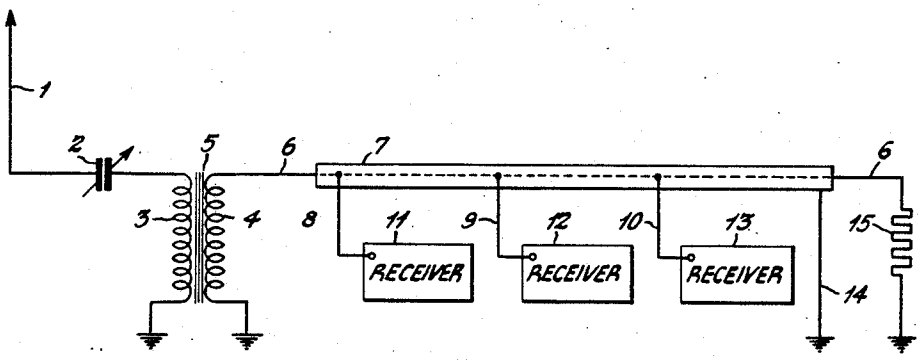
455/6

Sept. 22, 1936. W. KAUTTER 2,054,799

HIGH FREQUENCY DISTRIBUTION SYSTEM

Filed April 1, 1933

4-20-32



INVENTOR
WOLFGANG KAUTTER
BY H. G. Grover
ATTORNEY

Patented Sept. 22, 1936 2,054,799

UNITED STATES PATENT OFFICE

2,054,799

HIGH FREQUENCY DISTRIBUTION SYSTEM

Wolfgang Kautter, Berlin, Germany, assignor to Telefunken Gesellschaft für Drahtlose Telegraphie m. b. H., Berlin, Germany, a corporation of Germany

Application April 1, 1933, Serial No. 663,907
In Germany April 20, 1932

3 Claims. (Cl. 250—9)

The present invention relates to a radio distribution system comprising a multiplicity of receiving stations connected to a high frequency cable which in turn is connected to a common receiving antenna. A customary high frequency cable is provided in general with an input resistance of the order of approximately 150 ohms. This is the case if the cable is free from reflections i. e. when it terminates in a resistance equal to the wave resistance and when the input resistances of the various receiving stations connected to the distributing cable are substantially greater than the wave resistance of the cable proper. In connecting the receiving antenna directly to the cable it is not possible to obtain a uniform transmission of the entire frequency band without the means of an additional tuning arrangement, since for the various frequencies of the receiving range (reception must be secured over the band from 150 to 1500 kilocycles) the apparent impedance of the antenna varies to a great extent. However, it has already been proposed to use an amplifier tube for obtaining a coupling between the antenna and the cable, essentially independent of the frequency. In accordance with the present invention the same end is obtained when instead of the amplifier tube, a high frequency transformer comprising an iron core is used.

An object of the present invention is accordingly to provide an iron core transformer which shall be substantially aperiodic, that is it will transfer substantially equally all the radio frequencies within the broadcast range, to a radio frequency transmission line.

A further object is to provide an antenna circuit for use with such a transformer which shall be resonant to a given frequency and means in the antenna circuit for determining such frequency.

A still further object of the invention is to provide a shielded radio frequency transmission line to transmit the incoming signals to a plurality of radio receivers connected thereto. Other objects of the invention will become apparent as the description thereof proceeds.

For a better understanding of the invention reference is made to the accompanying drawing, in which the single figure shows a schematic circuit diagram of apparatus embodying the invention. In the drawing, reference numeral 1 designates the antenna, which is connected to the high frequency transmission line 6 by a transformer having primary 3 and secondary 4 and preferably a substantially iron core 5. For the purpose of adjusting the frequency to which the antenna 1 is resonant, a variable condenser 2 may be connected between it and primary 3. Transmission line or single conductor 6 may be shielded throughout its length by being enclosed in a metallic conduit 7 grounded as shown by any suitable means such as the lead 14. The transmission line 6 may be terminated by a resistor 15 having an impedance equal to the surge impedance of the line in order to prevent standing waves therein. A plurality of radio receiving sets 11, 12 and 13 may be connected to separated points along the line by the leads 8, 9 and 10 respectively.

I preferably choose the antenna of the greatest length consistent with the band of frequencies to be picked up and transferred to line 6, and of such natural capacity that its resonant frequency is slightly higher than the highest radio frequency to be transmitted to the line 6. As the losses over a high frequency transmission line of the class described are usually greater at the higher end of the frequency range, the use of such an antenna will in a measure compensate for such losses, and thereby render the overall transmission characteristic of the entire system more nearly uniform throughout the broadcast range of frequencies. Since in assuming a definite frequency band to be received and a definite cable or line 6, and since a definitely dimensioned high frequency transformer operates only with an antenna with optimum efficiency when the latter has a definite capacity, the variable condenser 2 is provided whereby the capacity of the antenna may be adjusted to render its resonant frequency slightly higher than the highest frequency to be transmitted in any case where the antenna capacity itself does not have the desired value.

As the radio frequency transformer I prefer to use one whose iron core 5 consists of finely divided iron particles, or iron powder, held together by means of a suitable binder of insulating material. It is found that this type of transformer may be arranged to have a very small leakage inductance and a small winding to winding capacity and is therefore substantially aperiodic over the range of frequencies to be transmitted.

Having described a single embodiment of my invention it will be understood that I do not limit myself thereto but intend to include therein any arrangement of apparatus coming within the scope of the following claims.

I claim:

1. In an arrangement for transmitting a broad

band of radio frequency currents to a plurality of separated points, an antenna, an adjustable condenser for resonating said antenna to a desired frequency, a transformer connected to said resonating means and having a powdered iron core, a radio frequency transmission line conductively connected to the secondary of said transformer and extending to said separated points, said line comprising a single unloaded conductor having uniform impedance per unit of length and a grounded shield surrounding said conductor, a plurality of signal receiving devices at said points, and means connecting said receiving devices to said transmission line.

2. In combination, a high frequency transmission line arranged to transmit a broad band of high frequencies and comprising a single conductor having a uniform impedance per unit of length, the inductance of said line being solely due to that of the conductor itself, the losses in said line being greater at the high frequency end of said band and means for compensating for said unequal transmission comprising an antenna system arranged to be resonant at a frequency just above the high frequency end of said band and an iron cored transformer having its primary winding connected to said antenna and its secondary connected to said transmission line.

3. The combination of the preceding claim in which the low potential ends of said transformer windings are connected to a common ground and said windings being arranged to have a small capacity value between primary and secondary.

WOLFGANG KAUTTER.