Aug. 2, 1932. H. J. ROUND 1,869,914

RADIO TRANSFORMER

Original Filed March 31, 1920

Fig. 1

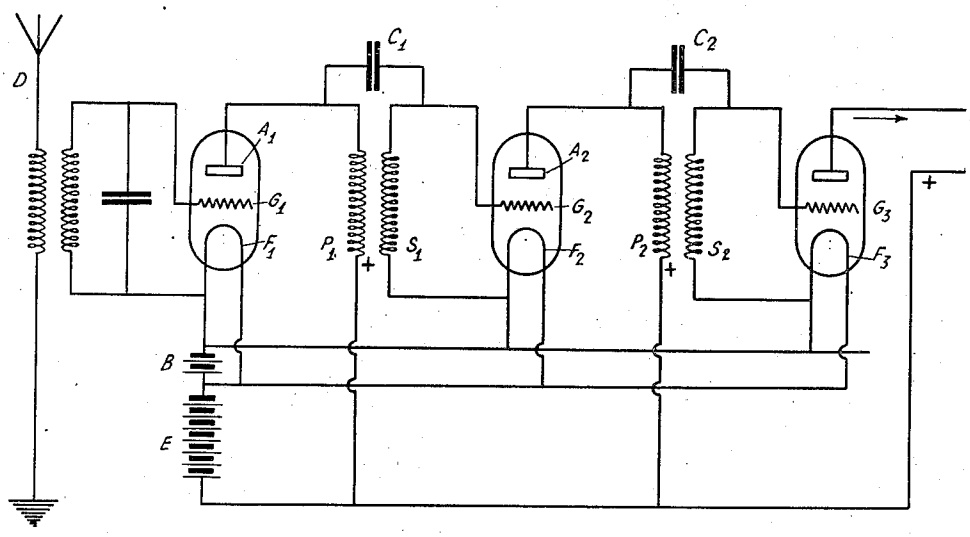
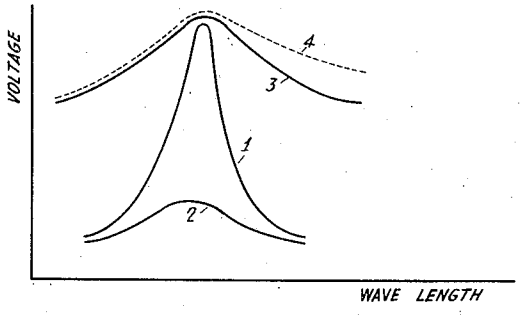


Fig. 2



INVENTOR
HENRY JOSEPH ROUND
BY Ira J. Adams
ATTORNEY

Patented Aug. 2, 1932 1,869,914

UNITED STATES PATENT OFFICE

HENRY JOSEPH ROUND, OF MUSWELL HILL, LONDON, ENGLAND, ASSIGNOR TO RADIO CORPORATION OF AMERICA, A CORPORATION OF DELAWARE

RADIO TRANSFORMER

Original application filed March 31, 1920, Serial No. 370,175, and in Great Britain May 13, 1919. Divided and this application filed August 21, 1928. Serial No. 301,038.

This application is a division of my copending application, Serial No. 370,175, filed March 31, 1920 for thermionic receiving devices for wireless telegraphy and telephony.

This invention relates to improvements in thermionic receiving devices for wireless telegraphy and telephony and has for its object an increased magnification of signals.

According to this invention two valves are coupled by means of a transformer formed of resistance wire with an air core hereinafter called a resistance transformer and so arranged that the ratio of inductance to capacity is as great as possible. More than two valves may be arranged in cascade, each valve being coupled to the next by a transformer of the kind already described. In some cases the two windings of a transformer may be connected through a condenser.

The invention is illustrated by the accompanying drawing, Figure 1 of which shows a series of valves in cascade with transformers between them. Figure 2 shows a number of curves illustrating the result obtained. In Fig. 1 F1, F2, F3 are filaments of three valves which are heated by a common battery B. The grid G1 of the first valve and the filament F1 are connected to an oscillatory circuit C coupled to an aerial D. The anode A1 of the first valve is connected to one end of a primary P1 the other end of which is connected to the positive pole of a battery E in series with the battery B. The secondary S1 is connected to the grid G2 and filament F2 of the second valve the anode A2 of which is connected to one end of a primary P2 the other end of which is connected to the positive pole of the battery E. The secondary S2 is connected to the grid G3 and filament F3 of the third valve. Each of the transformers P1, S1, P2, S2 is formed of resistance wire with an air core and the arrangements are such that the ratio of inductance to capacity is as great as possible. The two windings of the transformer may be connected through condensers C1, C2 if desired. By increasing the number of valves and of transformers the magnification of the signals may be increased as desired or until the series begins to self-heterodyne.

The result obtained is illustrated in Figure 2 which shows four curves, the abscissæ being wave lengths and the ordinates voltages. The curve 1 shows the voltages obtained at the ends of the secondary of an air core copper transformer the primary of which is connected to the anode and filament of a valve, such as A1 G1 F1, the transformer having a natural period which is near the middle of the desired range of wave lengths. The curve 2 shows the voltages obtained when the transformer has such a resistance that the amplitude is greatly reduced but at the same time its maximum occurs at about the middle of the range of wave lengths to be dealt with. It will be seen that this curve is much flatter than the curve 1, that is, the magnification is considerably reduced at the resonance point but hardly at all at the limits of the wave lengths where magnification still occurs. Curve 3 shows the voltages that may be obtained by employing a number of valves and transformers as shown in Figure 1 while curve 4 shows the effect when condensers such as C1 C2 are added.

By means of this invention it is possible to construct stable cascade amplifiers having a good range of wave length for waves even as short as 80 meters.

What I claim is:

1. A transformer adapted to transfer radio frequency currents of a broad band of frequencies from the output terminals of an amplifier, comprising a primary winding, a secondary winding inductively coupled thereto, each of said windings being formed of high resistance wire and the inductance to capacity ratio of said windings having such a value that the maximum voltage across the terminals of said secondary winding is not substantially greater than twice the minimum voltage as the various frequencies of said band are applied to said primary winding.

2. A transformer adapted to transfer radio frequency currents of a broad band of frequencies from the output terminals of an amplifier, comprising a primary winding, a secondary winding inductively coupled thereto, each of said windings being formed of wire of such high resistance that the maxi-

mum voltage across the terminals of said secondary winding at resonance is of the order of one third of the maximum voltage obtained at resonance across the secondary terminals of a similar transformer wound with copper wire.

3. A transformer adapted to transfer radio frequency currents of a broad band of frequencies from the output terminals of an amplifier, comprising a primary winding, a secondary winding inductively coupled thereto, each of said windings being formed of wire of such high resistance that the maximum voltage developed across the terminals of said secondary winding at resonance is less than one-half of the maximum voltage obtained at resonance across the secondary terminals of a similar transformer wound with copper wire.

HENRY J. ROUND.