April 15, 1941. W. KAUTTER 2,238,268

REFLECTING ANTENNA FOR RADIO BEACONS

Filed Dec. 27, 1939

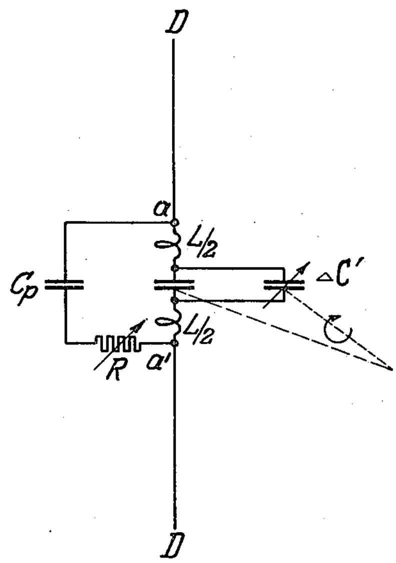

Fig. 1

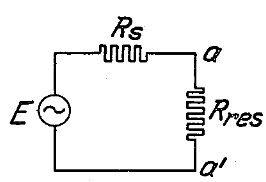

Fig. 2

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Patented Apr. 15, 1941

2,238,268

UNITED STATES PATENT OFFICE

2,238,268

REFLECTING ANTENNA FOR RADIO BEACONS

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Application December 27, 1939, Serial No. 311,081
In Germany January 7, 1939

1 Claim. (Cl. 250—33)

Radio beacons are known in which the guide beams are produced by detuning reflecting antennae with the aid of motor-driven rotary plate condensers, the detuning thus being effected in the rhythm of revolution of the condensers. Due to the fact that these condensers always have an initial capacity C_o their capacity does not vary from the zero value to C but only from

$$C_o \text{ to } C_o+\Delta C=C_o(1+x)$$

where x is more or less small with respect to number one. With such small capacity variations it will sometimes be difficult to produce strong effects on the reflecting antennae or dipoles.

The present invention is an improvement upon arrangements of this kind and consists in certain features of novelty which will appear from the following description, reference being had to the accompanying drawing in which

Fig. 1 is a diagrammatic representation showing an embodiment of the invention, while Fig. 2 is a so-called substitute or equivalent diagram that serves to explain the principle on which the invention is based.

As will be seen from Fig. 1 parallel as well as series resonance of an oscillatory circuit arranged between conductors constituting a dipole D are used. The operative means of this circuit are so calculated that the rotary condenser $\Delta C'$ when in the position where its capacity is C_o just produces series resonance with coil L of the oscillatory circuit, dipole D thus being perfectly free to oscillate. When the rotary condenser is in the position where its capacity is $C_o+\Delta C$ it acts to render the inductive branch L/2, L/2 so intensely inductive that this branch will cooperate in parallel resonance with condenser C_p of the oscillatory circuit, so as to constitute a high ohmic resistance interposed between the terminals a, a' of the dipole conductors. The magnitude R_{res}, Fig. 2, of this resistance depends in part upon the attenuation d of the circuit L, C_p and may therefore be varied by means of ohmic resistances, such as the variable resistance R, so that the attenuation acting on dipole D may be adjusted without condenser $\Delta C'$ requiring to be varied in any respect. In the case of high frequency the electromotive force E for the dipole is applied to R_{res} over the radiation resistance R_s, the dipole current hence being

$$\frac{E}{R_s}$$

for the series resonant condition and

$$\frac{E}{R_s+R_{res}}$$

for the parallel resonant condition. The modulation degree thus is

$$a=\frac{R_s}{R_s+R_{res}}$$

Consequently R_{res} must be made great with respect to R_s in case the dipole is to be affected intensely. The resonance resistance R_{res} is determined as follows:

In the event of parallel resonance the resistance of the inductive branch L/2, L/2 is

$$ix=i\omega L+\frac{1}{i\omega C_o(1+x)}=i\omega L\left(1-\frac{1}{1+x}\right)$$

$$=\frac{i}{\omega C_o}\cdot\frac{x}{1+x}\approx\frac{i}{\omega C_o}\cdot x$$

In order to obtain parallel resonance we thus have

$$\frac{x}{\omega C_o}=\frac{1}{\omega C_p} \text{ or } C_p=\frac{C_o}{x}$$

For instance, if $C_o=20\cdot10^{-12}$ farads while $C_p=200\cdot10^{-12}$ farads then $x=10\%$. The resonance resistance then is

$$\frac{1}{\omega C_p.d}=\frac{1}{\omega C_o}\cdot\frac{x}{d}$$

Hence it will be convenient to minimize C_o as far as possible. For short waves the circuit attenuation d is ½% and still less. Thus, with a frequency of 100 megacycles per second it follows that $R_{res}=1600$ ohms. This resistance is great over the radiation resistance, which is about 80 ohms. Therefore, even in the case of high frequencies the novel arrangement is suitable for modulation.

What is claimed is:

A modulating device for varying the reradiation effect of a radiation energized reflector dipole comprising an oscillatory circuit connected between the dipole parts, and a variable condenser coupled to said circuit to tune said circuit alternately to parallel resonance and to series resonance at the operating frequency dependent upon the adjustment of said condenser.

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