

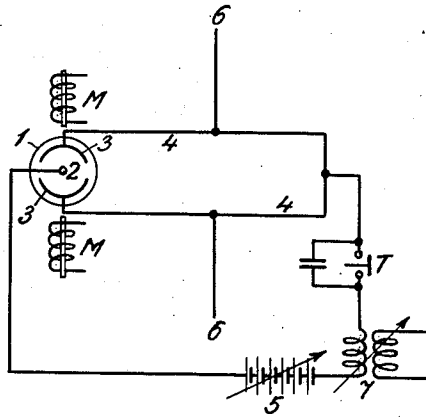
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RECEIVER FOR ULTRASHORT WAVES

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RECEIVER FOR ULTRASHORT WAVES

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2 Claims. (Cl. 250—20)

It is well-known to produce ultra-short waves by means of electronic tubes of the kind having a cylindrical anode and a filamentary cathode arranged in the axis of this anode, and in which the discharge space of the tube is under the influence of a magnetic field which acts in a direction parallel with this cathode. Also it is well-known to make such cylindrical anode in two, four or more parts and between these parts to set up oscillations by using the descending part of the characteristic curve of the tube. If this part of the tube characteristic is employed in the manner proposed by Habann the obtained frequency depends upon the natural frequency of the oscillatory circuit connected to the anode portions. The energy of the resultant frequency in this case rises in company with the anode potential whilst the intensity of the magnetic field depends upon this anode potential. Although these oscillations, whose frequency is determined by the oscillatory circuit, are obtainable with a large range of the magnetic field intensities, yet they discontinue if the rotational frequency of the electrons happens to equal the natural frequency of the oscillatory circuit.

Another method that has been proposed makes use of a cylindrical anode not subdivided and employs a magnetic field strength H which in accordance with the formula

$$f(\text{Hz}) = 0.3 \cdot 10^7 H \text{ (Gauss)}$$

is in resonance with the frequency to be produced. If now the anode potential and the degree of heating the filament are properly chosen then space charge oscillations occur in accordance with the discovery by Barkhausen-Kurz. The frequency of such oscillations is independent of the properties of the oscillatory circuit and mainly depends upon the magnetic field intensity. It has been found advantageous in connection with this method to use an electronic tube of the kind having a subdivided cylindrical anode. Since the resonant magnetic field intensity requires the anode voltage entailing the discharge oscillations to be of a definite strength, the energy of these oscillations is invariable and in most cases is very small as compared with the energy produced by the herebefore mentioned arrangement, the operation of which involves the use of the descending part of the tube characteristic.

The invention described hereafter is based on these particulars and suggests for reception purposes to utilize the second said method by virtue of its resonant magnetic field intensity, the first

said method having been adopted mainly in transmitting systems.

The invention will be understood from the following description, reference being had to the accompanying drawing which is a wiring diagram of one embodiment of the invention.

In this drawing, 1 denotes an electronic tube of the kind having a filamentary glowing cathode 2 and a cylindrical anode 3 made in two parts arranged to encircle the cathode 2. The subdivided anode 3 instead of comprising two parts may be composed of four parts, for instance, the opposing parts being interconnected by a short-circuiting bridge.

Connected to the parts of the anode 3 is a Lecher wire system 4 tuned to the wave to be received. This system may be of a length equal to a suitable multiple of a half-wavelength. Running parallel with cathode 2 is a magnetic field produced by electromagnets M. For simplicity these magnets are shown in a position offset at right angles with respect to the actual position. The intensity of this field is in accordance with the said formula adjusted to be in resonance with the frequency to be received. In this case, in the Lecher wire system 4 oscillations arise if the appertaining anode voltage and filament power of the cathode are adjusted accordingly. Hereupon the anode voltage produced by current source 5 is to be diminished or increased to such extent that the ultra-short oscillations obtained in this way shall discontinue. In this state the arrangement is extremely responsive to the wave to be received, while owing to the double tuning, viz. Lecher wire system and resonant magnetic field intensity, and in consequence also of this field intensity being of extraordinary efficiency, the arrangement will not respond to any foreign waves, even if these are closely neighboured to the desired wave. This wave is received by a dipole 6, for instance, connected to system 4. In the anode circuit a telephone T is included, the modulation of the received ultra-short wave thus being rendered audible.

The sensitivity of the arrangement may be considerably increased by superimposing a high frequency energy on the continuous anode voltage produced by a variable current source 5 and adjusted to give the results stated herebefore, the frequency of the superimposed energy being above the voice frequency range while being below the ultra-short wave to be received. Within the range thus available for calculating the superimposed frequency this may be of any suitable or desired value. Preferably a frequency of 10^6

cycles per second may be used. This additional high frequency voltage is supplied to the arrangement through a variable coupling member 7 and must be exactly adjusted as regards its amplitude having to be so adjusted especially with respect to the continuous anode voltage. To such end the anode voltage in its turn may be decreased or increased when the high frequency voltage is added. In this way it will be easy by means of slight variations to find out that amplitude of the added high frequency voltage and that continuous voltage which entail the greatest loudness of reception.

Such adjustment is aimed at by the invention and is based on the fact that under the influence of the added high frequency voltage the ultra-short oscillations are permanently starting but are not yet able to persist, thus constantly dying out again and again.

What is claimed is:

1. An arrangement for receiving ultra-short waves, which comprises an electronic tube having a subdivided cylindrical anode and a filamentary glowing cathode, means to produce a magnetic field suitable for influencing the operation of this tube, the intensity of this field being in accordance with the formula $f(\text{Hz}) = 0.3 \cdot 10^7 H$ (Gauss) resonant with the wave to be received, a Lecher wire system included in the anode circuit of said tube and tuned to the wave to be received, means for adjusting the anode voltage and cathode heating of said tube to be such that this tube by self-excitation is on the point of oscillating in accordance with the received ultra-short wave, and means to take the demodulated current from the said anode circuit.

2. An arrangement according to claim 1, having means for supplying an additional high frequency voltage to the said anode circuit.

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