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SHORT WAVE OSCILLATOR
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Fig. 1

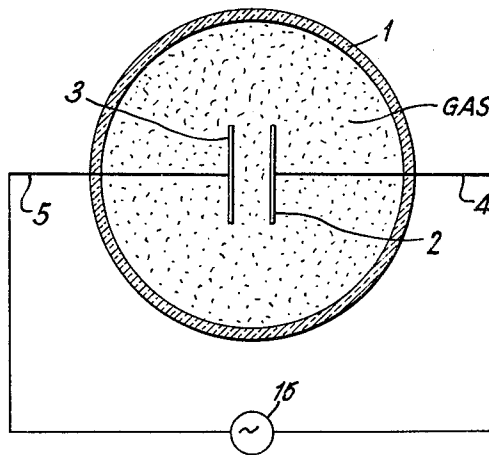
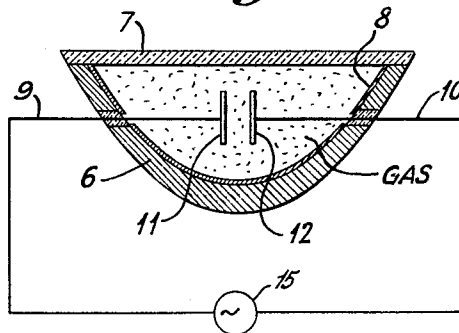


Fig. 2



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SHORT WAVE OSCILLATOR

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6 Claims. (Cl. 250—36)

The invention is concerned with the generation of electric oscillations of a wavelength on the order of magnitude of millimeters or centimeters. It is known that waves having the foregoing lengths may be produced by means of magnetrons or retarding field (electron oscillation) tubes. However, a limitation is imposed upon the production of waves by the said oscillator means because of the dimensions of the electrode system of such oscillators. For instance, in a practical magnetron tube fitted with a solid (unsplit) anode, the anode cylinder is of a diameter of 1 mm. in order that the tube may be enabled to generate an electric oscillation of the order of 1 centimeter. However, to make an electrode system of this size, not to speak of still further diminished sizes, is attended with extremely great technical difficulties.

It is known in the art that there are dipole substances which will selectively absorb waves inside the range of millimeters and centimeters. Substances of the said sort, for instance, are water, alcohol, and ammonia. Selective absorption seems to be predicated upon the fact that the dipoles (dipole molecules) of the substance, in turn, are excited by electric oscillations to experience oscillations, this resulting in a sort of anomalous dispersion; that is, the said selective absorption of the electric oscillations within the range or band of millimeter and centimeter waves.

The object of the invention is an arrangement obviating the difficulties above enumerated and which is adapted to the production of ultra-short-wave oscillations and which comprises a dipole substance exhibiting selective absorption in the range of millimeter and decimeter waves, more particularly ammonia, the dipoles of which are capable of generating ultra-short oscillations by the action of oscillations which correspond to the said absorption band.

The invention shall now be explained in more detail by reference to the appended drawing in which Figs. 1 and 2 show two embodiments of the invention, given by way of example only.

Referring to Fig. 1 of the drawing, 1 denotes a spherical vessel which is filled with ammonia vapors. Confined inside the vessel 1 are two plate-shaped electrodes 2 and 3 placed so as to face each other. Instead of plates, also grid or grate-shaped electrodes could be used. The meshes of such reticulate electrodes should surpass and exceed the length of the waves to be generated. To these electrodes may be fed by way of the leads 4 and 5 an RF electrical field

from source 15, the frequency being of an order of magnitude less than the frequency to be generated. As an illustration, if the frequency to be generated by the dipole substance is to be 1 cm., then the frequency of the source 15 might be 10 cm. By the action of the said alternating electrical field cross the electrodes 2 and 3, the dipoles of the gas are excited to oscillate with the result that electrical waves whose wavelength is of the order of millimeters or centimeters are produced. In order to prevent these waves from being absorbed by the wall or shell 1, it is expedient to use for the said wall or shell a substance exhibiting low absorptivity, a synthetic resin such as "Trolitul," for instance.

Another exemplified embodiment of an arrangement according to the present invention is represented in Fig. 2. It distinguishes itself from the one of Fig. 1 only by the shape of the vessel in which are mounted the electrodes 11 and 12 between which the electrical field is set up and which have the supply leads 9 and 10. The vessel is indicated at 6. It may consist of metal, the leads 9 and 10 being introduced therein while being insulated therefrom. The vessel has the form of a paraboloid of rotation. The inside thereof is lined with a reflecting coat or layer 8. The vessel is shut by means of a window which is permeable to electrical waves. Trolitul may here be used for the window. The electrical oscillations produced in the ammonia vapors filling the vessel 6 are reflected from the layer 8 and reach the outside through the said window 7.

For the excitation of the dipole oscillations recourse could be had also to means and auxiliaries other than electrical fields. For instance, it may be expedient to subject the dipole substance which serves for the generation of ultra short oscillations to mechanical vibrations; say ultra-acoustic (suprasonic) waves.

What is claimed is:

1. An ultra high frequency generator for radio waves of the order of a few millimeters in wavelength, comprising an enclosed vessel containing a gaseous substance having dipolar molecules which exhibit selective absorption in a desired frequency range, and means for exciting said molecules whereby electromagnetic waves in the desired frequency range are generated.

2. An ultra high frequency generator for radio waves of the order of a few millimeters in wavelength, comprising an enclosed vessel containing a gaseous substance having dipolar molecules which exhibit selective absorption in a desired frequency range, and means for applying a radio

frequency electrical field to said molecules the frequency of which is less than the frequency to be produced.

3. An ultra high frequency generator for radio waves of the order of a few millimeters in wavelength, comprising an enclosed vessel containing ammonia vapor, and means for exciting the dipolar molecules of said vapor for producing electrical waves of the order of centimeters and less.

4. An ultra high frequency generator for radio waves of the order of a few millimeters in wavelength, comprising an enclosed vessel containing a fluid substance composed of dipolar non-metallic molecules which exhibit selective absorption in a desired frequency range, and means for exciting said molecules whereby electromagnetic waves in the desired frequency range are generated.

5. An ultra high frequency generator for radio

waves of the order of a few millimeters in wavelength comprising an enclosed vessel containing a fluid substance composed of dipolar molecules which exhibit selective absorption in a desired frequency range, and means for forcefully exciting said molecules whereby electromagnetic waves in the desired frequency range are generated.

6. An ultra high frequency generator for radio waves of the order of a few millimeters in wavelength, comprising an enclosed vessel containing an alcoholic substance composed of dipolar non-metallic molecules which exhibit selective absorption in a desired frequency range, and means for exciting said molecules whereby electromagnetic waves in the desired frequency range are generated.

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