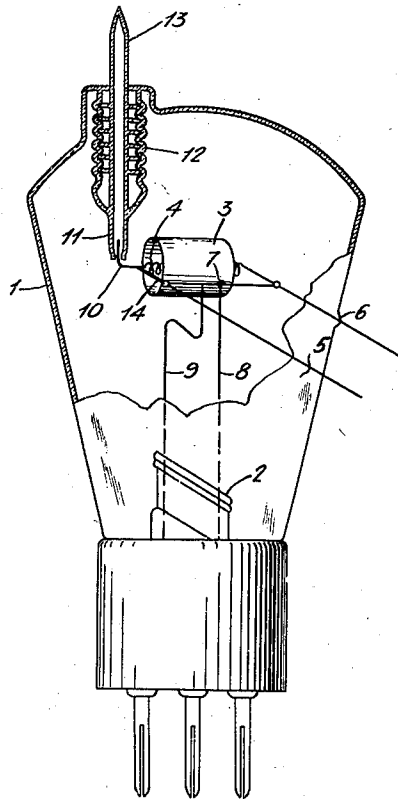


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ELECTRON DISCHARGE TUBE  
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INVENTORS  
W. E. KUHLE, D. PRINZ AND  
F. HERRIGER  
BY *H. S. Kuhn*  
ATTORNEY

## UNITED STATES PATENT OFFICE

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## ELECTRON DISCHARGE TUBE

Wilhelm Eberhard Kuhle, Dietrich Prinz, and Felix Herriger, Berlin, Germany, assignors to Telefunken Gesellschaft für Drahtlose Telegraphie m. b. H., Berlin, Germany, a corporation of Germany

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2 Claims. (Cl. 250—27.5)

This invention is concerned with an electron tube adapted to the generation, amplification and reception of short-wave oscillations of the order of magnitude of 1 decimeter. Tubes of this kind have been known in the prior art, and they are predicated for their operation upon the fact that an oscillation circuit consisting of the very electrodes is excited at its natural period, though certain phenomena occurring in the cloud of electrons, such as retardations in travelling time, electron oscillations, etc., play a more or less clearly explained part in this process.

What is common to all of the known arrangements is that the resultant frequency or wavelength is fixed once for all by the dimensions of the tube, and that this condition may not be varied by external means or only to a slight degree, thus resulting incidentally in an impairment of performance. It is therefore extremely difficult to tune a transmitter tube and a receiver to each other, a fact that makes itself felt very disagreeable upon substituting one tube for another.

According to this invention, ways and means are provided to the end that in such a tube, by external action, the geometric dimensions of the electrode arrangement may be alterable. To bring this result about the said means may take different forms. For instance, recourse may be had to elastic construction parts designed to insure vacuum tightness such as corrugated tubes made of glass, copper, tombac, etc., in order to produce a direct mechanical action upon the tube elements. Another way would be to connect with the electrodes parts which consist of magnetic material, and to alter the position thereof by the action of magnetic fields set up, by means of permanent magnets located outside the tube or coils mounted either inside or outside the tube. Finally, recourse could also be had to deformations or distortions occasioned by temperature changes to the same end, for instance, the bending of bimetal strips provided with electrical heaters so that the temperature thereof may be regulated by the outside supply of current.

One practical embodiment is shown by way of example in the attached drawing in which is embodied the scheme first mentioned above. 1 denotes the glass bulb which is furnished with a press 2. The latter supports a standard electrode system of cylindrical form in which the cathode has been omitted in the illustration for the sake of greater clarity. 3 is the cylindrical anode. The

grid 4 consists of a wire wound spirally, the ends of which are brought through the glass wall at points 5 and 6, and which may extend, if desired, in an outside parallel-wire system. The end grid wires are connected by means of the short-circuiting clip 7, to the middle of which the supporting wire 8 is attached. 9 denotes the supporting wire of the anode. One end of the grid is furnished with a small hook which engages with one end of a glass tube 11 which in turn is welded within an elastic corrugated tube 12. The tube 12 may be glass, copper, tombac, etc., and is sealed by fusion with the glass wall and the tube 11 is extended outwardly in the form of a glass rod as at 13. It thus becomes possible to transmit any desired motion from outside the envelope at 13 to the glass tube 11, and thus to the little hook 10. The connection between the hook 10 and the short-circuiting clip or bow 7 consists of an elastic leaf spring 14 so that the movements of the hook 10 do not meet any considerable opposition or resistance, and that expansion or contraction of the grid spiral is feasible in a longitudinal direction. In this manner the desired change in the natural wave-length of the electrode system is accomplishable.

It is, of course, also possible in a similar way to alter other parts of the tube system or the position thereof. For instance, the short-circuiting clip could be shifted along the parallel wires, and also by having the anode split along its length the diameter of the anode cylinder could be altered.

What we claim is:

1. An electron discharge tube comprising an envelope, a plurality of electrodes including a spiral grid electrode contained therein, a support member rigidly connected to one end of the grid, a flexible member connected to the other end of the grid, and grid adjusting means connected to said last mentioned grid end and extending through the envelope whereby the grid electrode may be adjusted in an axial direction from the outside of the envelope.

2. An electron discharge tube according to claim 1, wherein the grid adjusting means consists of a rod disposed substantially perpendicularly to the grid axis, and a corrugated cylindrical member disposed about and coacting with the rod for effecting said adjustment.

WILHELM EBERHARD KUHLE.  
DIETRICH PRINZ.  
FELIX HERRIGER.