Nov. 26, 1935. H. E. HOLLMANN 2,021,891

DOUBLE RECEIVER TUBE FOR ULTRA SHORT WAVES

Filed June 30, 1933

Fig. 1

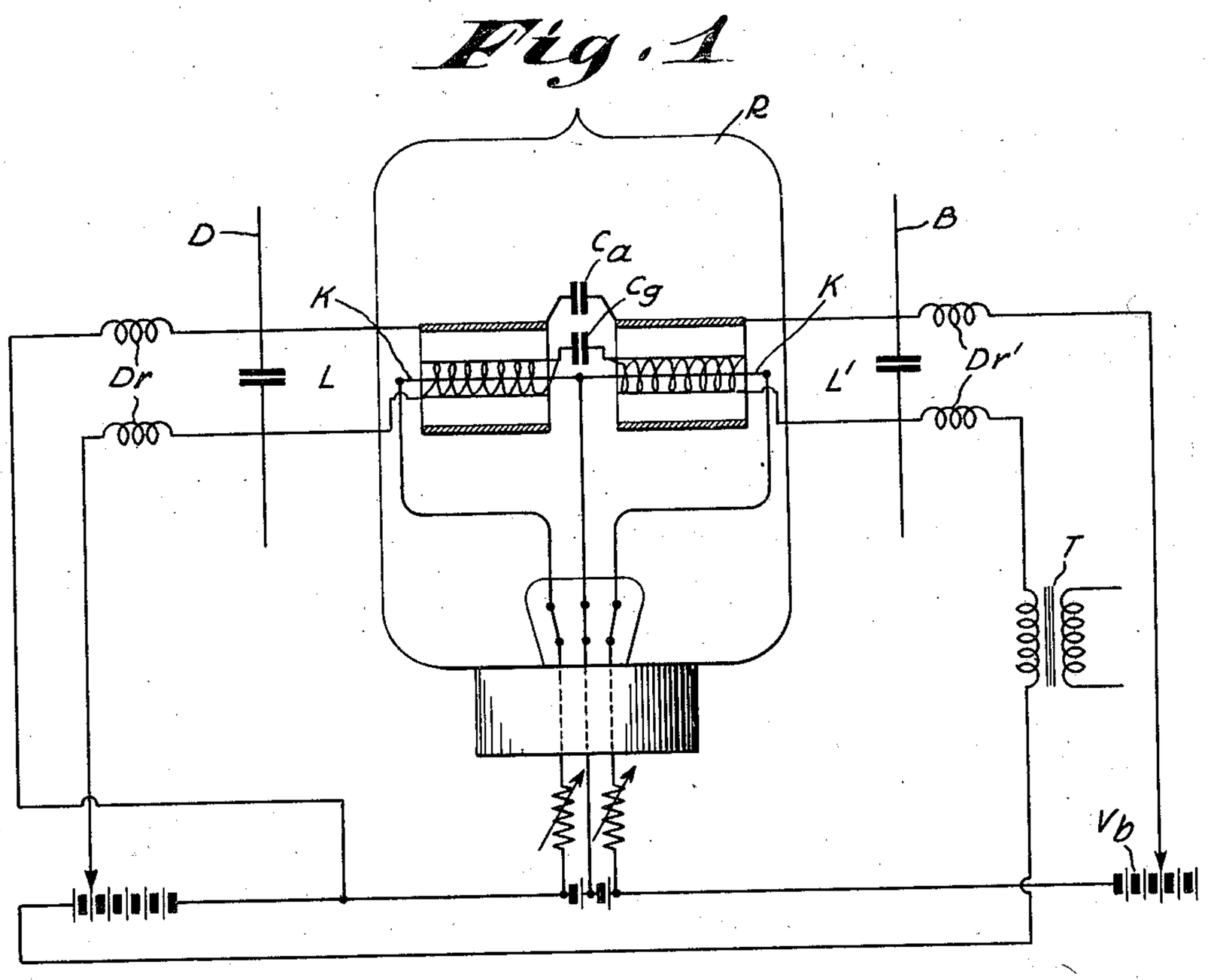
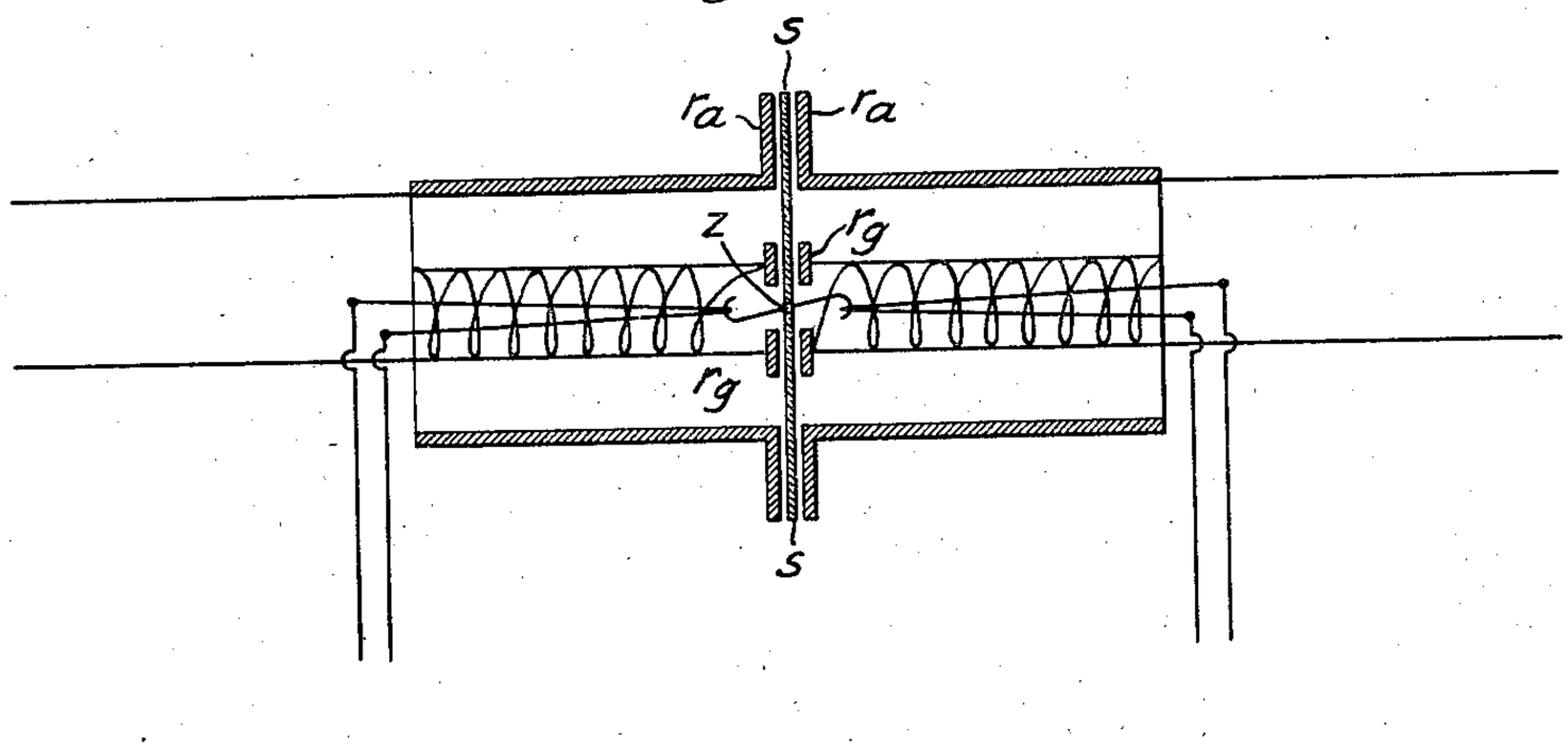


Fig. 2



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Patented Nov. 26, 1935 2,021,891

UNITED STATES PATENT OFFICE

2,021,891

DOUBLE RECEIVER TUBE FOR ULTRA SHORT WAVES

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Application June 30, 1933, Serial No. 678,487
In Germany July 8, 1932

5 Claims. (Cl. 250—27.5)

It is known that in a receiver tube designed for ultra short waves (in what is called a retarding or brake field circuit scheme) the directional (rectifier) action diminishes as the point where oscillating starts, is approached so that with decreasing damping no growth in sensitivity is obtainable any more, indeed, that gain and demodulation in a single tube disturb mutually. In order to eliminate such action, a two-tube receiver has been suggested wherein the two functions are taken over by two separate tubes, i. e., an oscillator and a rectifier tube so that all chances of disturbance are precluded. One practical advantage of such a two-stage (two-tube) receiver set resides in that each tube is furnished with its distinct tuning means, both of which must be tuned to the incoming or transmitter wave, and this tends to complicate the setting of the apparatus undesirably.

This disadvantage is obviated by the present invention which also allows of a reduction of damping and demodulation, but in a single radio frequency system so that only this one system needs to be tuned. Separation of both functions according to the invention is insured by dividing an electrode system uniformly acting for ultra short waves into two parts fulfilling both functions of demodulation and regeneration.

In Figures 1 and 2 are shown two practical embodiments of the basic idea of the invention by way of example.

Referring to Figure 1, R is the double receiver tube which, as well known from the earlier art, is inserted in a continuous parallel wire (Lecher wire) system which, at one end, has the receiving aerial D and which is capable of being tuned by the shifting of the bridge B. The tube R differs from a normal receiving tube, according to the invention in that its electrodes are not continuous, but interrupted, a path for the flow of radio frequency oscillations being created between parts of grid and plate by the blocking condensers C_a and C_g. The cathode K consists most suitably also of two parts which must be heated separately from each other in accordance with prevailing conditions. The various electrode parts receive their supply voltages from both sides by way of the Lecher wires LL' and the choke coils D*r* and D*r'*. In the diagrammatic representation the part located close to the antenna takes care of the damping reduction, whereas the other part is connected to act as a brake audion which in the grid circuit has as a load the transformer T for the modulation frequency. The brake voltage V_b so-called serves for the adjustment of the working point upon the (rectifying) characteristic, whereas for the oscillator part heating and grid voltage is variable. By the grid voltage the tube is tuned most accurately to the sending wave, while for the heating regeneration is pushed to a point very close to oscillation initiation. It is suitable to operate the rectifier part with such a high or such a low grid potential that it will work away outside the electron resonance, since in that way reaction of demodulation upon the damping reduction through the varying grid potential of the audion part is avoided. Of course, the brake audion could be replaced also by standard tube rectifier circuit schemes.

Figure 2 represents another embodiment of the double tube in that the block condensers C_a and C_g are constructionally united directly with the electrodes. For this purpose, the grid and plate parts, on the anterior sides turned toward each other have metallic rings r_a and r_g which are insulated from each other by mica annuli or a mica disk *s*, and which represent directly the capacities for a path of flow of the radio frequency energy. The two cathodes in V-shape are introduced from both sides into the grid and stayed in reference to each other by an intermediate piece. As to the rest the operation is the same as that of the double tube Figure 1.

In order that the two electrode parts may be adapted to their different functions they may also be dimensioned dissimilarly. The basic idea of the invention holds also true of any desired electrode shape such as wire or planar (sheet) electrodes.

I claim:

1. A vacuum tube comprising a first anode, grid and cathode and a second anode, grid and cathode both sets of electrodes being located within a single evacuated envelope, said anodes and grids being respectively coupled together capacitively and said cathodes directly.

2. A vacuum tube comprising a first anode, grid and cathode and a second anode, grid and cathode both sets of electrodes being located within a single evacuated envelope, said anodes and grids being respectively coupled together capacitively.

3. A vacuum tube comprising a first cylindrical anode, cylindrical grid, and cathode, and a second cylindrical anode, cylindrical grid, and a cathode, both sets of electrodes being located within a single envelope, said anodes and grids being respectively coupled together capacitively

and also respectively mounted coaxially with regard to one another.

4. A vacuum tube comprising a first cylindrical anode, cylindrical grid, and cathode, and a second cylindrical anode, cylindrical grid, and a cathode, both sets of electrodes being located within a single envelope, said anodes and grids being respectively physically separated from one another within the tube and mounted coaxially on the same straight line, the ends of the respective anode and grid electrodes having flat plates for capacitively coupling said electrodes to one another.

5. An electron discharge device comprising a first cylindrical anode and a grid, a second cylindrical anode and a grid, and cathode means for said anodes and grids, all within a single envelope, said anodes and grids being respectively coupled together capacitively, said anodes being mounted coaxially with respect to each other.

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