

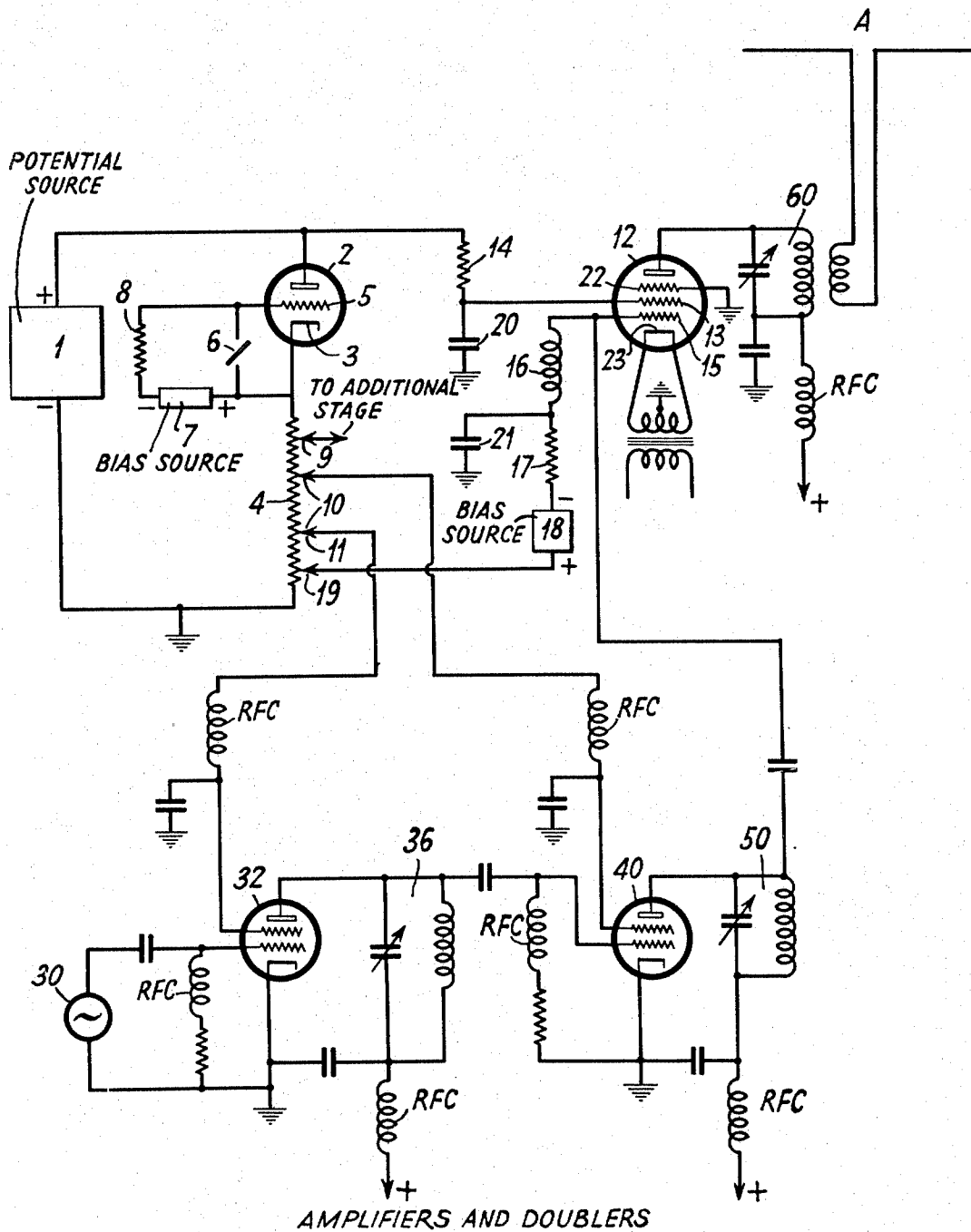
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H. J. H. WASSELL

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RADIO TRANSMITTER

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INVENTOR
HAROLD JOSEPH HUGHES WASSELL
BY *H.S. Brown*
ATTORNEY

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RADIO TRANSMITTER

Harold Joseph Hughes Wassell, Chelmsford, England, assignor to Radio Corporation of America, a corporation of Delaware

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This invention relates to radio and like transmitters and, more particularly, to multi-tube telegraph transmitters of the kind in which keying between "mark" and "space" is effected by controlling the potentials upon the screen grids of a plurality of tubes of the screen grid type, e. g., pentodes, incorporated in said transmitter.

It is a usual requirement in transmitters generally that the load upon the power source from which the tubes are operated, shall not vary excessively between "mark" and "space" and, with this requirement in mind, it is desirable, therefore, to arrange that the final keyed tube of the transmitter shall take maximum dead loss when the other keyed tubes are in the cut-off condition. The main object of the present invention is to provide an improved transmitter of the kind referred to, wherein keying is effected in a very simple and efficient manner, and wherein the above requirement is satisfied.

According to this invention a transmitter of the kind referred to comprises a main source of potential; a keying tube having its anode-cathode space in series with an impedance adapted to pass direct current, the series combination being connected across said source of potential; keying means for changing the condition of said keying tube from the conductive to the nonconductive state and vice versa; connections between taps upon said impedance, and the screen grids of certain of the screen grid type tubes to be keyed; and a connection including a source of bias potential between a further tap on said impedance and a grid of the last of the tubes to be keyed, said further tap and said bias source being so chosen that when the keying tube is in the conductive condition, the potential from said further tap substantially balances in opposition the potential from said bias source whereas when said keying tube is in the non-conductive condition said bias source alone is effective and causes the final keyed tube to take the required maximum dead loss current.

The final keyed tube is preferably not subjected to screen grid keying, the grid upon which keying is exercised being the control grid.

Preferably the main source of potential is used also for supplying anode potentials to one or more of the keyed tubes and for applying screen grid potential to the final keyed tube.

The invention is illustrated in the accompanying drawing which shows diagrammatically a preferred embodiment. Referring to the drawing, a main source 1 of potential has its positive terminal connected to the anode of a keying

tube, for example a triode 2, the cathode 3 of which is connected through a resistance 4 to the negative terminal of said source, which negative terminal may be earthed. Any convenient keying means for changing the condition of the keying tube from the conductive to the non-conductive may be provided. For example, the grid cathode space between 5 and 3 of the keying tube 2 may be shunted by a key 6 (or the contacts of a keying relay) and also shunted by a source of potential 7 in series with a resistance 8, so that in the "mark" condition, that is with the key closed, the keying tube 2 is conductive and current will flow through the resistance 4. Taps 9, 10, 11, which may be adjustable, are made upon the resistance 4 and are connected each to one or another of the screen grids of the plurality of screen grid type tubes 32, 40, etc., except the last tube 12 to be subjected to keying in the transmitter. These taps are not connected to the last screen grid tube 12. The positive terminal of the main source of potential is also connected to the anodes of the said screen grid type tubes to supply anode potential thereto. The final screen grid type tube 12 to be keyed; this tube, like the other screen grid type tubes, may be a pentode, has its screen grid 13 connected to the positive terminal of the main source of potential through a resistance 14 and its control grid 15 connected through a series circuit consisting of a choke 16, a resistance, or other high frequency decoupling means 17, and a bias source 18, to a further tap 19, which may be adjustable, near the earthed end of the cathode leg resistance 4. The screen grid 13 of the final keyed tube 12 is connected to earth through a by-pass condenser 20 and the junction point of the choke 16 with the resistance 17 is also connected to earth through a by-pass condenser 21. The suppressor grid 22 is earthed or connected to the cathode 23.

The operation of the whole system is as follows:

When the keying tube 2 is conductive current flows through the cathode leg impedance 4 and potentials are applied to the screen grids of the screen grid type tubes, except tube 12, to cause them to be conductive. At the same time the potential from the tap 19 opposes and cancels out the potential from the bias source 18 and, therefore, the final keyed tube 12 takes current as determined by the remaining operating potentials thereon. This is the state of affairs for "mark." At "space" the keying tube 2 ceases to be conductive, current ceases to flow through

the cathode leg resistance 4, the potentials on the various taps thereon disappear, all the screen grid type tubes (except the last) become non-conductive and the last tube 12 takes the predetermined maximum dead loss current as determined by its operating potentials including the bias applied by the source 18 in its control grid circuit.

The resistance 17 in the control grid circuit of the final keyed tube 12, though preferred, is not essential. If it is provided, however, it should be substantially larger than the resistive value of the portion of the cathode leg resistance 4 between the tap 19 and earth.

The particulars of the radio-frequency circuits of the tubes keyed is of general interest here and may be as shown. Wave energy from source 30 is amplified, when the key 6 is on marking, in stages 32, 40 and 12, which are coupled by circuits 36 and 50. The keyed wave energy is set up in tank circuit 60 for any use. For example, it may be supplied from 60 to antenna and radiated. Other types of radio-frequency circuits may be used.

What I claim is:

1. A transmitter of the kind referred to comprising a main source of direct current potential, an impedance, a keying tube having an anode and cathode and having its anode to cathode impedance in series with said impedance which is adapted to pass direct current, means connecting the series combination across said source of potential, keying means for changing the condition of said keying tube from the conductive condition to the non-conductive condition and vice versa, a plurality of tubes of the screen grid type to be keyed, connections between taps upon said impedance and the screen grids of a plurality of said tubes to be keyed, and a connection including a source of bias potential between an additional tap on said impedance and an electrode of the last of the tubes to be keyed, said further tap and said bias source being so

chosen that when the keying tube is in the conductive condition, the potential from said further tap substantially balances in opposition the potential from said bias source whereas when said keying tube is in the non-conductive condition said bias source alone is effective and causes the said last keyed tube to take the required maximum dead loss current.

2. A transmitter as claimed in claim 1 wherein said electrode connected to said additional tap is the control grid of said last keyed tube and the latter is keyed on its control grid.

3. A transmitter as recited in claim 1 wherein said electrode connected to said additional tap is the control grid of said last tube and the latter is keyed on its control grid and wherein the anodes of all of said tubes of the screen grid type, and the screen grid of said last keyed tube are connected to said main source of direct current.

4. In a telegraphy system a plurality of relay tubes each having an anode, a cathode and a control electrode, circuit means connecting said tubes in cascade and with a source of wave energy to be keyed, a direct current impedance, a source of direct current potential, a keying tube having its impedance connected in series with said direct current impedance and said source of direct-current potential, means for varying the impedance of said keying tube to thereby vary the potential drop through said direct-current impedance, a connection between a point on said direct-current impedance and the control electrode in at least one of said relay tubes to control the conductivity of said relay tube as said keying tube impedance is varied, a connection between said direct-current impedance and the control electrode in another of said relay tubes, and a source of direct current in said last named connection of a polarity opposed to the polarity of the potential supplied by said direct-current impedance to said last named connection.

HAROLD JOSEPH HUGHES WASSELL.