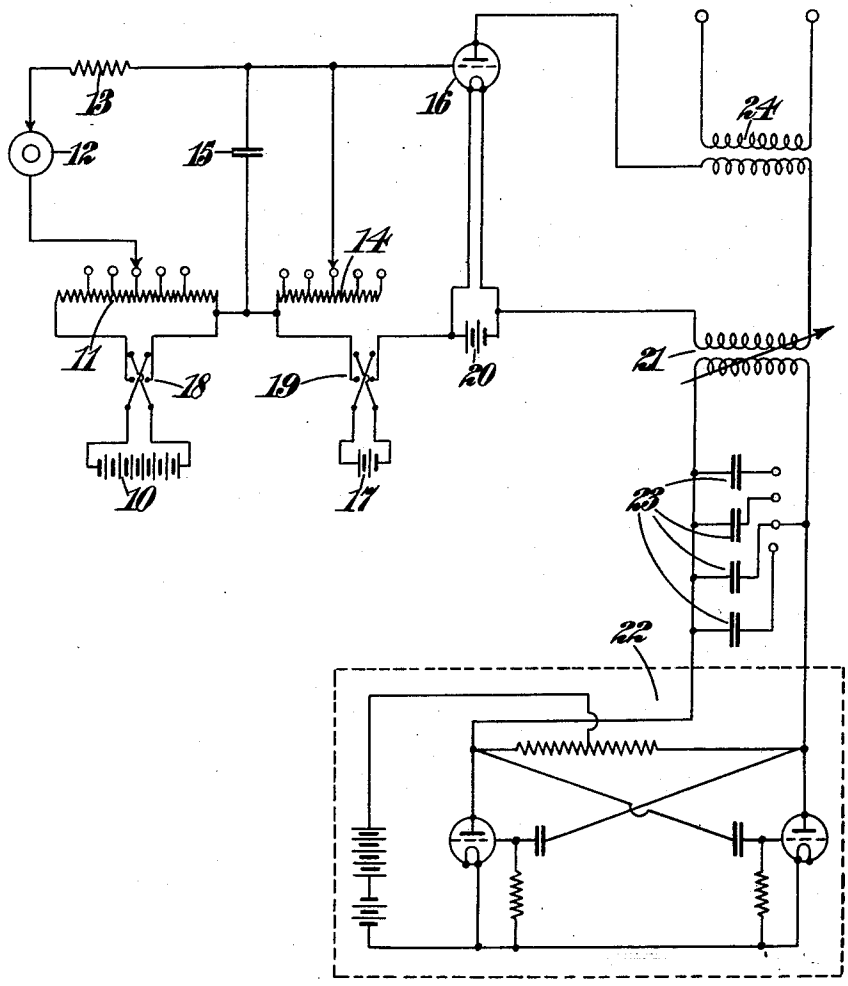
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PICTURE TRANSMITTING SYSTEM

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INVENTOR

Otho Fulton

by Byrnes, Stebbins & Parmelee

Attys.

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PICTURE TRANSMITTING SYSTEM

Otho Fulton, Bromley, England

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5 Claims. (Cl. 178—5)

This invention relates to a process for the control of electric current impulses for the purpose of remote picture transmission and its object is to enable current impulses whose rise and fall is sudden to be transmitted to a distance with a minimum of distortion.

The type of system to which this invention relates is that in which the tone values of picture elements are represented by current impulses having a sudden rise and fall and comprising means for converting such impulses into or causing such impulses to produce or control similar impulses of current or voltage whose rise and fall is comparatively gradual.

According to the present invention means is provided for varying the characteristics of such gradual rise and fall of voltage or current without appreciably affecting their limiting values. The term gradual is used comparatively throughout this specification and implies that the rise and fall is gradual compared with that of the original current impulses, which in the case of half-tone foils must be almost instantaneous as the exploring means passes from a conducting to an insulating line.

Such a system may comprise a source of current (such as a battery) connected electrically in series with a picture exploring means, a resistance, and a further resistance shunted by a condenser, the characteristics of the circuit being variable so as to vary the time of charging and discharging the condenser without varying its limits of potential difference. This may be done by simultaneously varying the resistance in parallel with the condenser and the effective voltage of the battery.

Such gradual voltage changes are preferably applied to a grid of a valve the circuit being arranged so that the grid is always varied between suitable limits of potential. In this case the end of the resistance or grid leak not connected to the grid may be connected to the filament through a grid bias battery. This will fix one limiting valve of the grid potential. The application of the term grid leak to the resistance shunted by a condenser does not imply that the value of its resistance is necessarily of the order usually associated with grid leaks.

A change over switch may also be provided for simultaneously reversing the connections to both batteries for the purpose of recording positive images from either positive or negative picture transmitting surfaces. That is to say a current can be transmitted from the transmitting aerial either when a current flows in the circuit of the exploring means or when no current flows therein, according to the position of the change over switch.

In order that the invention may be more readily understood one preferred example thereof will now be described with reference to the accompanying diagram which represents the circuit employed with this preferred form.

It will be seen that a battery 10 is connected to a potentiometer 11 by means of which it supplies a variable voltage to the circuit of the picture exploring means 12. The picture exploring means is connected in series with a resistance 13 and a grid leak 14 which is tapped so that the resistance in circuit can be varied. A condenser 15 is shunted across the grid leak 14 and the ends of the grid leak are connected one to the grid of a valve 16 and the other to one terminal of a grid bias battery 17, the other terminal of which is connected to the filament of the valve 16. 18 and 19 represent two reversing switches operated by a single control for simultaneously reversing the connections to both batteries for the purpose described. 20 is the ordinary battery for heating the filament of the valve. In the anode circuit of the valve will be seen a transformer 21 through which the valve receives oscillations from a local oscillator 22, of known type. Such oscillations are tuned by a tapped bank of condensers 23. The modulated oscillations are drawn from the circuit through the transformer 24 which may for instance be connected to the microphone terminals of a wireless transmitter.

In the case of half-tone foils on which the picture is represented by insulating lines on a conducting background, the action of the system may be considered on the assumption that the exploring means 12 is alternately a conductor and an insulator. Thus when the exploring means becomes a conductor a current flows through it and through the resistance 13. Part of this current goes to charge the condenser and part goes through the resistance 14. Thus the potential difference across the resistance 14 gradually rises as the condenser becomes charged and more current flows through the resistance. When the exploring means becomes an insulator the condenser gradually discharges itself through the resistance 14. It is clear that if the resistance 14 is reduced in value the time of discharge is shortened, but it is also clear that the ratio of the resistance of 14 to the whole resistance of the circuit 10, 11, 12, 13, 14 is reduced, and hence the maximum potential difference across the resistance 14 is reduced. It is to keep the limits of grid

potential constant when altering the resistance 14 that the potentiometer 11 is inserted, and is mechanically coupled to the adjusting means of the resistance 14 so that as the resistance is decreased the effective potential difference of the battery 10 is increased. The tapping points are chosen with this end in view and the tapping switches are mounted on a single spindle.

In a modified form of the apparatus the condenser 15 is made variable while the resistance of 14 and the effective potential difference of the battery 10 remain constant.

In the circuit shown the transformer 21 is loose coupled. Either of the transformers 21 and 24 may be made loose or variably coupled to reduce the damping imposed by one circuit on another. As shown the damping of the anode circuit of the mixing valve 16 imposed on the tuned circuit of 21 and 23 is reduced by the loose coupling.

I claim:

1. A picture transmitting system, comprising an oscillator, means for modifying the output of said oscillator comprising a valve, a resistor, a contact point, a movable picture reproduction having conducting and insulating portions and a source of current in series circuit relation with the grid and filament circuit of said valve, a further resistor in said circuit and a condenser shunting said further resistor, and means for varying the characteristics of the circuit so as to vary the time of charging and discharging the condenser without varying its limits of potential difference, including means for varying the effective voltage of the source of current, and the resistance of the further resistor simultaneously.

2. A picture transmitting system, comprising an oscillator, means for modifying the output of said oscillator comprising a valve, a resistor, a contact point, a movable picture reproduction having conducting and insulating portions and a source of current in series circuit relation with the grid and filament circuit of said valve, a further resistor in said circuit and a condenser shunting said further resistor, said condenser having one terminal connected to the grid and the other terminal to the filament, a grid bias battery in the series circuit between said other terminal and said filament for determining one limiting value of the grid potential, and means for simultaneously reversing the connections to the grid bias battery and the source of current.

3. A picture transmitting system, comprising an oscillator, means for modulating the output of said oscillator, comprising a valve, a source of current, a contact point and a movable picture reproduction having conducting and insulating portions in series circuit relation with the filament and grid of said valve, means for applying gradual voltage changes to the grid, means for altering the wave-form of the voltage time curve of the grid potential without appreciably affecting its maximum and minimum values, and means including a large air cored transformer for taking audio-frequency oscillations from the valve.

4. A picture transmitting system comprising an audio-frequency oscillator, a valve having an anode circuit, a large air cored transformer for supplying audio-frequency oscillations from said oscillator to said anode circuit, means including a tapped bank of condensers for tuning said transformer, a source of current, a contact point and a movable picture reproduction having conducting and insulating portions in series circuit relation with the filament and grid of said valve, means for applying gradual voltage changes to the grid, and means for altering the wave-form of the voltage time curve of the grid potential without appreciably affecting its maximum and minimum values.

5. A picture transmitting system, comprising an oscillator, means for modulating the output of said oscillator, comprising a valve, a source of current, a contact point and a movable picture reproduction having conducting and insulating portions in series circuit relation with the filament and grid of said valve, means for applying gradual voltage changes to the grid, means for altering the wave-form of the voltage time curve of the grid potential without appreciably affecting its maximum and minimum values, and means including a large air cored transformer for taking audio-frequency oscillations from the valve, said transformer being loosely coupled to reduce the damping of the carrier wave imposed by the external circuit.

OTHO FULTON.