

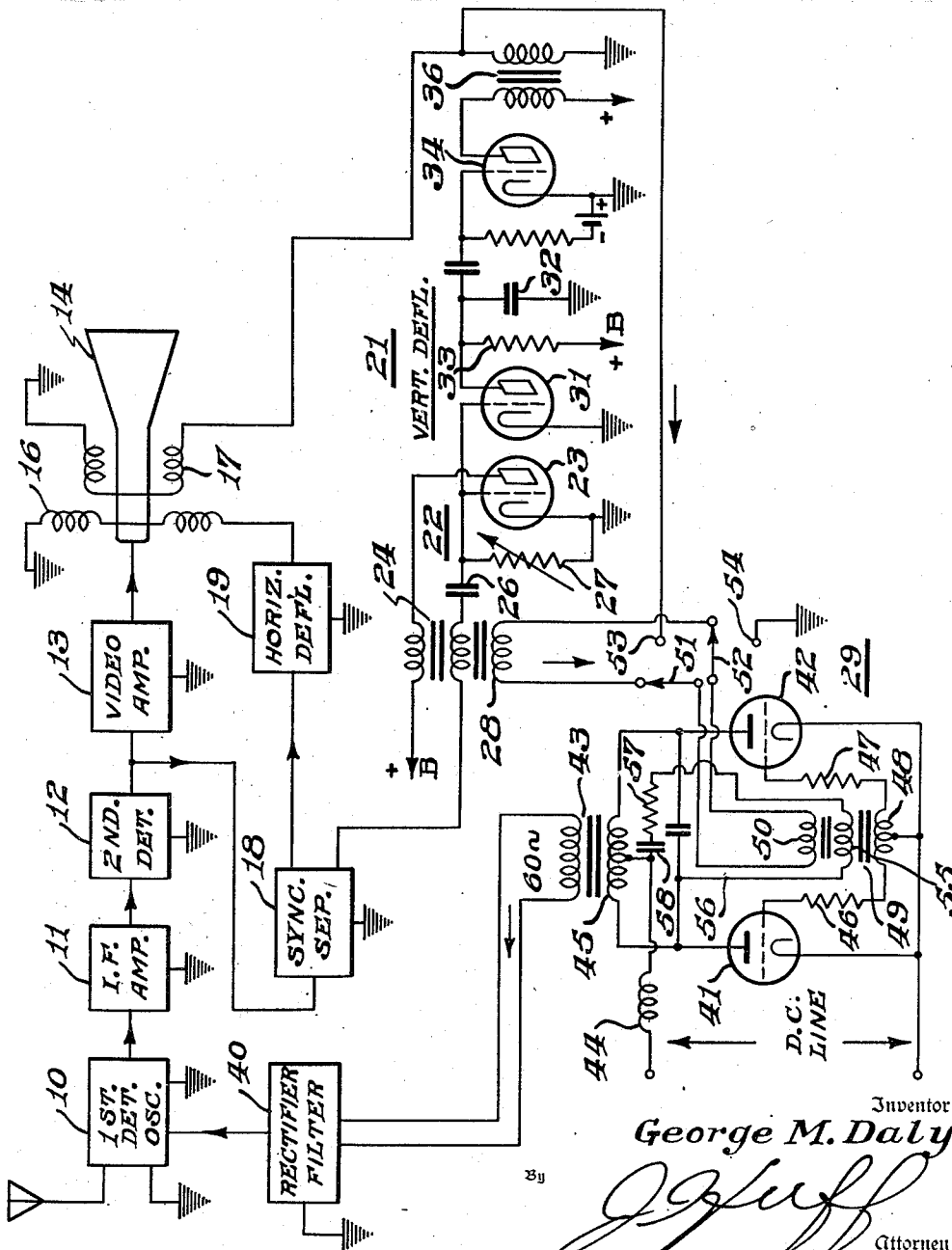
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TELEVISION POWER SUPPLY

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TELEVISION POWER SUPPLY

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My invention relates to power supply means for television apparatus and particularly to a system for supplying power to television receivers employing cathode ray tubes and located in a region supplied with direct current rather than alternating current.

One of the difficulties encountered in operating a television receiver in a district supplied with direct current is that after the D. C. has been converted to A. C. by means of a motor-generator, for example, the frequency of the A. C. is not close enough to the rate of vertical deflection of the cathode ray as controlled by the transmitter and tends to vary. The result is that the hum effects or interference patterns unavoidably introduced in the received picture are not synchronous with the vertical deflection or frame frequency and, therefore, are continuously in movement instead of being stationary. The continuous movement of such patterns causes a loss in picture detail and is generally objectionable as explained in Tolson Patent 2,124,478.

An object of the present invention is to provide an improved method of and means for supplying to a television receiver, or the like, power obtained from a direct current supply line.

In a preferred embodiment of the invention, I obtain a 60 cycle supply from the D. C. line by employing an inverter comprising rectifier tubes of the grid controlled type connected as well known in the art to change the D. C. to A. C. The novel feature resides in the manner in which the output frequency of the inverter is controlled. It is controlled by applying to the grids or other suitable electrodes a periodic voltage which is synchronous with the incoming vertical synchronizing signal whereby any interference pattern on the cathode ray screen produced by the receiver power supply will remain stationary. This may be accomplished, for example, by applying blocking oscillator pulses from the vertical deflecting circuit to the grids of the rectifier tubes.

The invention will be better understood from the following description taken in connection with the accompanying drawing in which the single figure is a block and circuit diagram showing one embodiment of the invention applied to a television receiver.

The drawing illustrates a television receiver comprising a first detector and tunable oscillator indicated at 10, an I. F. amplifier 11, a second detector 12, a video amplifier 13 and a cathode ray tube 14 having horizontal and vertical deflecting coils 16 and 17, respectively.

The incoming signal is the usual mixture of

picture signal and synchronizing signal such as defined by the present R. M. A. standards. It includes a horizontal synchronizing pulse occurring at the end of each scanning line and a vertical synchronizing slotted pulse occurring at the end of each vertical deflection. Preferably there is the well known half-line relation between the horizontal and vertical synchronizing pulses to provide odd-line interlace scanning. The invention, however, is not limited to the use of any particular type of synchronizing signal.

In the receiver illustrated, some of the video signal from the second detector 12 is supplied to a suitable separating circuit 18 which supplies horizontal synchronizing pulses to a horizontal deflecting circuit 19 and which supplies vertical synchronizing pulses to a vertical deflecting circuit 21.

The vertical deflecting circuit may include a blocking oscillator 22 comprising a vacuum tube 23, a feedback transformer 24, a grid condenser 26 and a grid leak resistor 27. The oscillator 22 is locked in step with the vertical synchronizing pulses in the usual way to produce large voltage pulses in synchronism therewith. These pulses may be supplied by means of a tertiary winding 28 to the inverter, indicated at 29, as will be explained hereinafter.

The oscillator voltage pulses are also supplied in the usual manner to the discharge tube 31 of a sawtooth wave generating circuit which includes a condenser 32 that is charged slowly through a plate resistor 33 and discharged rapidly through the discharge tube 31.

The resulting sawtooth voltage appearing across condenser 32 is impressed upon an output tube 34 which supplies a sawtooth deflecting current through an output transformer 35 to the vertical deflecting coils 17.

Referring more particularly to the inverter circuit, it may be of a well known design comprising a pair of grid controlled rectifier tubes of the gas filled type shown at 41 and 42. Their anodes are connected through the primary winding 45 of an output transformer 43 which supplies the desired A. C. to the television receiver power supply unit indicated at 46. In the example being described this A. C. power supply is caused to have a frequency of 60 cycles per second, as will be described below, since the vertical deflections of the receiver occur at the rate of 60 per second. It will be understood that all voltages and currents required by the television receiver, these including the high voltage D. C. applied to the anodes (not shown) of the cathode ray tube 14,

are obtained from power supplied by the inverter 29.

The mid-point of the primary winding 45 is connected through a choke coil 44 to one side of the D. C. power line. The cathodes of rectifier tubes 41 and 42 are connected together and to the other side of the D. C. line.

The control grids of tubes 41 and 42 are connected through resistors 46 and 47 to opposite ends of the secondary winding 48 of a transformer 49 which has its mid-point connected to the rectifier cathodes.

The primary winding 50 of transformer 49 is connected through switch arms 51 and 52 to the tertiary coil 28 of the blocking oscillator whereby one of the rectifier tubes 41 and 42 is rendered conducting every $\frac{1}{60}$ of a second by the blocking oscillator pulses. In the example illustrated, the inverter 29 is self-oscillatory as the result of coupling from the plate circuit to the grid circuit provided by a tertiary coil 55 of transformer 49. One end of coil 55 is connected through a conductor 56 to the plate of tube 41 while the other end is connected through a resistor 57 and a condenser 58 to the mid-point of coil 45. The inverter is adjusted to oscillate at a frequency slightly below 60 cycles when uncontrolled. The blocking oscillator pulses pull it in to oscillate at their frequency of 60 per second. Thus there is produced the desired 60 cycle power supply for the receiver which is synchronous with the incoming vertical synchronizing pulses and with the vertical deflection of the receiver whereby any interference or hum patterns on the fluorescent screen of the tube 14 are stationary.

The keying pulses for the inverter 29 may be obtained from the television receiver in various

other ways. For example, by throwing the switch arms 51 and 52 to the contact points 53 and 54, respectively, the primary of transformer 48 may be connected across the output transformer 36 of the vertical deflection circuit to utilize the voltage kick appearing thereacross during the return-line period.

I claim as my invention:

1. A power supply system for a television receiver of the type wherein a cathode ray is deflected both horizontally and vertically to scan a screen area, said system comprising inverter means for changing direct current from a power line to alternating current, said inverter means including at least one grid controlled rectifier tube, and means for applying a synchronizing signal to said control grid to make the frequency of said alternating current occur in a fixed frequency relation with respect to said vertical deflection.

2. A power supply system for a television image producing system of the type comprising an image producing device and a receiver of television signals operative to receive signal groups, at least one of said groups being of a character to control said image producing device, said power supply system comprising means for converting direct current to alternating current, said means being supplied with direct current from a direct current source, and means operating under control of said signal group of controlling character to cause said converting means to operate positively to produce alternating current of a major frequency bearing a predetermined relationship with respect to the frequency of said group of signals of a controlling character.

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