

Feb. 8, 1938.

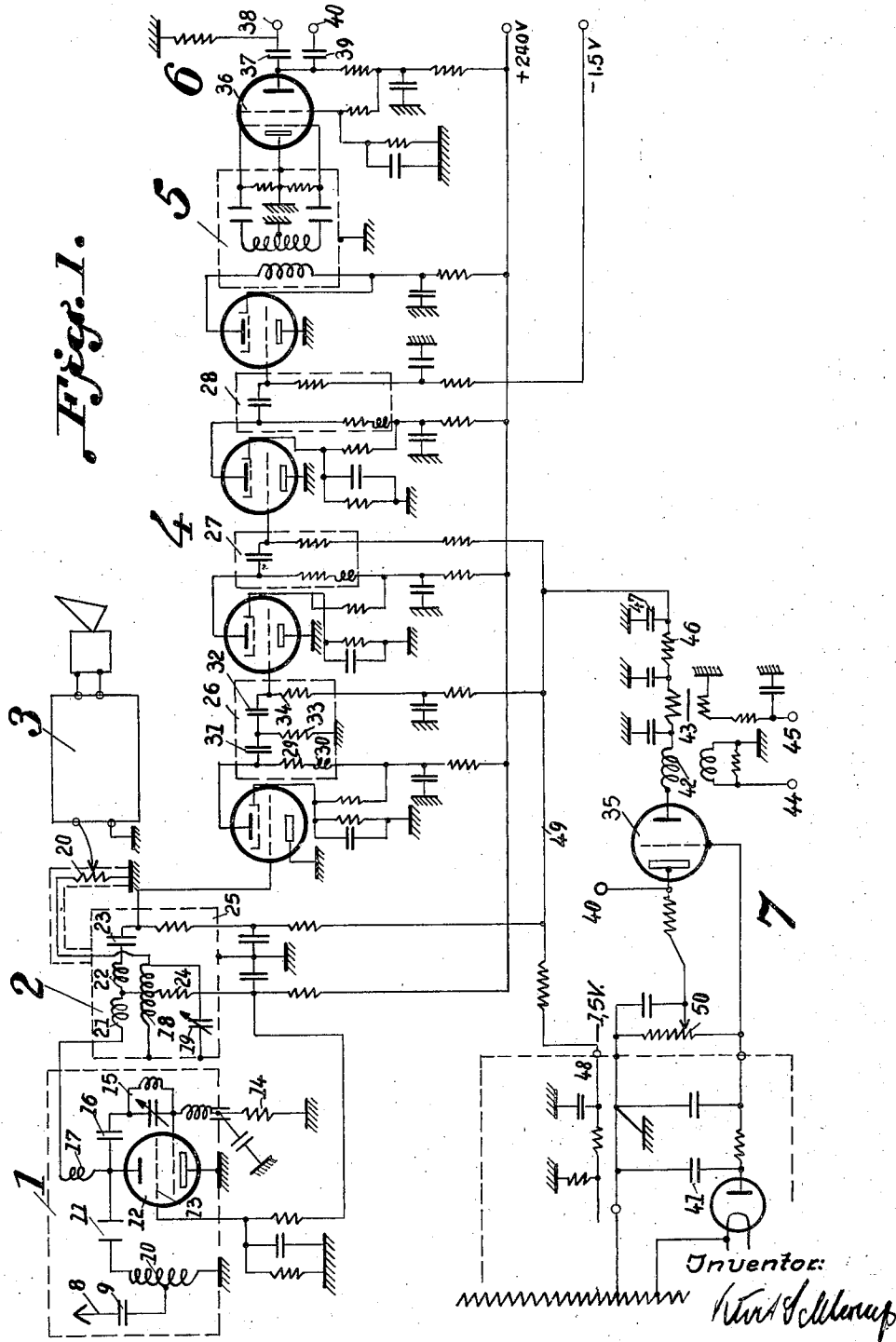
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2,107,393

RADIO RECEIVING SYSTEM

Filed June 29, 1934

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 2.

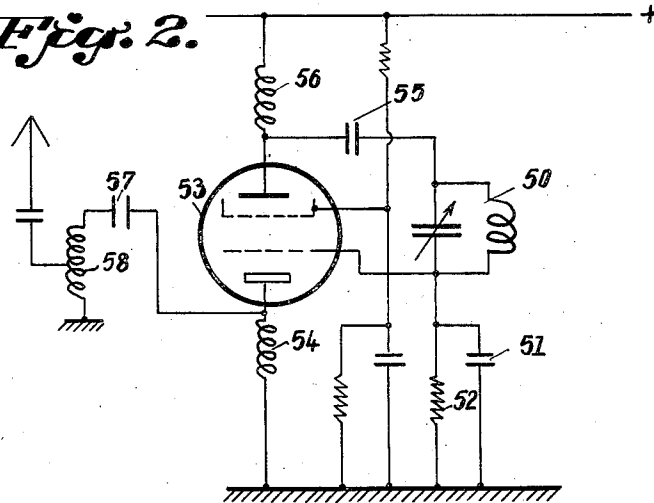
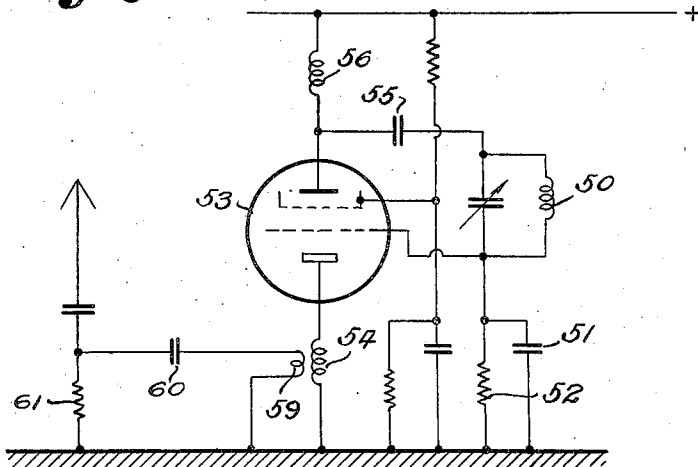


Fig. 3.



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UNITED STATES PATENT OFFICE

2,107,393

RADIO RECEIVING SYSTEM

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Application June 29, 1934, Serial No. 733,070

In Germany July 1, 1933

4 Claims. (Cl. 250—20)

The subject matter of the present invention relates to a circuit for receiving vision signals, conveyed by an ultra-short wave carrier, accompanied by sound signals, conveyed by another independent ultra-short wave carrier.

The invention is directed to the oscillator-modulator circuits and their specific connection to the aerial circuit and will be best understood with reference to the accompanying drawings, in which there are shown three special forms of embodiments of the invention.

Fig. 1 shows the aerial input circuit and the oscillatory stage, wherein the aerial circuit is coupled to the anode-circuit of the oscillator-modulator stage.

Figs. 2 and 3 show the aerial input circuit coupled to the cathode of the oscillator-modulator valve.

The operation of the circuit arrangement according to the invention is described in detail in conjunction with the drawings.

In the circuits shown in the Figs. 1-3, inclusive, a generation of oscillations takes place by purely capacitive reaction coupling, for which purpose in the case of ultra-short waves conveniently the inner capacities are adequate, and are also fully utilized. Referring to Fig. 1 the potential induced in the aerial 8 is conducted to the oscillator-modulator stage 12 through the medium of a very small condenser 9 and the choke 10. A middle tapping at 10 may be so adjusted that by reason of auto-transformation an increase in potential is obtained at the following oscillator tube. By means of a very small condenser 11 (approximately 3 cm.) it is accomplished that upon the exchange of tubes a de-tuning of the combination connection system is avoided.

A reliable generation of oscillations in the stage 12 may be accomplished according to the invention by the use of a screening grid tube. In this connection, owing to the special leading-out of the anode, the leading-out losses are diminished as compared with single-grid tubes having a normal socket. Further, an anode reaction, which is particularly detrimental in this case, is overcome to a very large extent, and the capacity reduced between anode and cathode. In this manner a considerably greater amplitude of oscillation may be obtained, so that the sensitivity of the total apparatus is particularly increased.

The bias for the tubes is so selected that operations take place in the lower bend of the e_g-i_p characteristic. According to the invention, the arrangement in this connection of the resistance

14 is of great importance, as at the same the requisite negative grid bias must adjust itself by reason of grid D. C. effect. The oscillatory circuit 15 is connected with the grid in direct fashion, and with the anode through the medium of a condenser 16, which is so small that the same acts as short-circuit only in respect of the ultra-short waves of the oscillator, and not the resulting long-wave intermediate frequency.

This condenser when using screening grid tubes may possess a size of approximately 5 cm., in which manner a particularly good long-wave elimination may be obtained as compared with single-grid tubes, in which the capacity of the condenser 16 would require to amount to perhaps 20 cm. Through the medium of an ultra-short wave choke 17 the beat frequency mixture is conducted to the separating filter for separation into sound and picture intermediate frequency.

Another form of embodiment of the combination connection is shown in Fig. 2. In this connection also the reaction coupling is produced in purely capacitive fashion over inner tube capacities. As compared with the previous connection according to Fig. 1 the oscillatory circuit 50 is in this case earthed dynamically in single-pole fashion over the condenser 51 of approximately 1000 cm., whilst for direct current the same is passed to earth over the resistance 52 of approximately 20,000 ohms. The production of oscillations is, in accordance with the invention, only possible if the cathode of the oscillator-modulator stage 53, which preferably is also a screening grid tube with the anode passed out in particular fashion, is connected with earth through the medium of an ultra-short wave choke 54.

The requisite negative grid bias occurs automatically in the resistance 52 during the oscillation. The condenser 55 for coupling the oscillatory circuit with the anode of the tube is selected at approximately 3 cm. The choke 56 does not allow the passage of ultra-short waves, and possesses, for example, 30 windings with 10 mm. diameter. The coupling of the aerial is conveniently performed in accordance with the invention with the cathode of the tube, as in this manner the oscillator amplitude may be governed to a particularly large extent by the aerial potential. The rectification in this case accordingly takes place through the medium of the e_g-i_p characteristic in the lower bend thereof. The aerial potential is fed either in capacitive fashion through the medium of a small condenser

57 and auto-transformer 58 as above, or inductively by a primary coil 59 coupling with the cathode choke 54. By means of the special input circuit arrangement consisting of a small
 5 condenser 60 and a damping resistance 61 disturbing properties and conjoint oscillation of the aerial circuit may be avoided.

In the connection system according to Fig. 2, for the purpose of additional long-wave elimination, which in the connection according to the
 10 invention is absolutely essential and is also performed to utmost extent, there may be provided in accordance with the invention a double choke arrangement. In this connection there is situated
 15 between the oscillatory circuit 50 and the resistance 52 a choke, which together with the inner and outer capacities of the tube circuit forms a short-circuit for the unavoidable long waves conjointly picked up by the aerial.

20 To avoid self-radiation of the receiving connection it is also possible in place of the simple capacitative coupling to perform in accordance with the invention coupling of the aerial by means of a differential condenser.

25 I claim:

1. In a television reception arrangement operated according to the superheterodyne principle, the combination of an aerial input coupling and an oscillatory device for receiving, signal
 30 modulated carrier frequencies, means for generating a heterodyning frequency and means for mixing said carrier frequencies with said oscillator frequency comprising an aerial, a first coupling condenser, a coupling choke possessing a
 35 middle-tapping point, said condenser being connected between said aerial and said tapping point, an oscillator-modulator valve having a cathode, a control grid, a screening grid and an anode, a second condenser connected between the one
 40 end of said choke and an electrode of said oscillator valve, the other end of said choke being earthed, an oscillating circuit tuned to the heterodyning frequency comprising a coil and an adjustable condenser, a third condenser, a resistance, said third condenser and said oscillating
 45 circuit being connected in series across the anode and control grid of said oscillator valve, said resistance being connected between said grid and earth.

50 2. In a television reception arrangement operated according to the superheterodyne principle, the combination of an aerial circuit and an oscillatory device for receiving, signal modulated carrier frequencies, means for generating a heter-

odyning frequency and means for mixing said carrier frequencies with said oscillator frequency comprising an aerial, a first coupling condenser, a coupling choke possessing a middle tapping point, said condenser being connected between
 5 said aerial and said tapping point, an oscillator-modulator valve having a cathode, a control grid, a screening grid and an anode, a second condenser connected between the one end of said choke and the cathode of said oscillator valve,
 10 the other end of said choke being earthed, an ultra-short wave choke connected between said cathode and earth, an oscillating circuit tuned to the heterodyning frequency comprising a coil and an adjustable condenser, a third condenser,
 15 a resistance, said third condenser and said oscillating circuit being connected in series across the anode and one grid of said oscillator valve, said resistance being connected between said grid and earth, said oscillating circuit being dy-
 20 namically earthed by a condenser.

3. An arrangement according to claim 1, in which a choke is connected between said oscillatory circuit and said resistance, which is connected between said grid and earth.

4. In a television reception arrangement operated according to the superheterodyne principle, the combination of an aerial input coupling and an oscillatory device for receiving signal
 30 modulated carrier frequencies, means for generating a heterodyning frequency and means for mixing said carrier frequencies with said oscillator frequency comprising an aerial, being connected to earth via a series connection of a first
 35 condenser and a resistance, a second coupling-condenser one electrode of which being connected to the connection point between said first condenser and said resistance of said series connection, the other electrode of said second
 40 condenser being connected to earth via a coupling coil to earth, a mixing viz. oscillator valve having a cathode, a control grid, a screening grid and an anode, an ultra-short wave choke connected between said cathode and earth, to which
 45 said coupling coil is inductively coupled, an oscillating circuit tuned to the heterodyning frequency comprising a coil and an adjustable condenser, a third condenser, a resistance, said third condenser and said oscillating circuit being connected in series across the anode and one grid
 50 of said oscillator valve, said resistance being connected between said grid and earth.

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