

The invention relates to a method for the generation of a voltage having a triangular type of waveform by addition of a saw-tooth shaped first voltage to a saw-tooth type of voltage wherein the saw-tooth type of voltage is transformed by suppression of a portion, symmetrical relative to the centre line, of a second saw-tooth shaped voltage, which is of opposite phase to the first saw-tooth shaped voltage, in such a way that it has horizontal sections of zero amplitude in the time interval $0.25T$ to $0.75T$. A method of this sort, for generating a triangular shaped voltage which serves for the establishment of a correction current that is coupled into the vertical deflection current of a television receiver in order to eliminate a geometrical distortion known under the name of "gull wing" ("Mövenflügel") which becomes unpleasantly noticeable especially in picture tubes having a flat screen, is described in the earlier patent application EP 0 276 449, which is a document in accordance with Art 54 (3) EPC. Correction circuits, which have to generate a phase matched fundamental wave at the frequency of the deflection current, are necessary for these particular picture tubes. The use of filter circuits or also of synchronised oscillator circuits are known for example, wherein, however, a tuning to the fundamental wave must occur for which purpose, additional circuit outlay, with the associated costs, is required. In particular, if the circuit is intended to be suitable, selectively, for a plurality of vertical deflection frequencies, these correction circuits must be tuned to the corresponding deflection frequencies. The use of various deflection frequencies for the purpose of greater picture resolution and for the purpose of avoiding annoying flickering images on the screen is of great topical interest. Future generation television receivers will be able to handle deflection frequencies of 50, 60, 100, or even 120 Hz.

In the said patent application, a method for the generation of the required waveform is described in which two voltages having particular waveforms and equal amplitudes are added. Tests have shown that the gull wing distortion has a sinusoidal waveform from the upper edge of the picture to the lower edge of the picture. Therein, this gull wing distortion passes through zero in the vicinity of the upper edge of the picture, in the middle and in the vicinity of the lower edge of the picture. The distortion is positive e.g. during the first lines of the forward scan of the picture, then, in a sinusoidal manner, passes through the value zero, reaches a highest negative value in the upper picture half of the forward scan, then reverses through the value zero in the middle of the picture, reaches a positive maximum in the lower half of the picture and then, some lines before the end of the forward scan of the picture, again

passes through the value zero going in the negative direction. It has transpired, that the triangular shaped voltage generated in accordance with patent application EP 0 276 449 A1 must be modified still further, at the upper and lower edges of the picture, in order that the "inverted" distortion errors are also compensated.

The object of the invention is to provide a solution in order to make this modification possible. This object is achieved by the measure specified in the claim. A further embodiment of the invention arises in the appendant claim.

The invention will be described hereinafter with the help of the drawing.

Fig. 1 shows a circuit arrangement of the invention

Fig. 2 shows diagrams for explaining the manner of operation of the invention.

To commence, the manner of operation of the circuit shown in the patent application EP 0 276 449 A1 which eliminates the previously described gull wing distortion in accordance with Figure 1A will be explained once more with reference to Figure 1. The step of the invention is expressed in Figure 2.

In Figure 1, the vertical frequency, saw-toothed shaped signal V is supplied to the input of 3 of an amplifier stage 4. The signal A in accordance with Figure 2A, which is in phase with the signal V, is extracted at the emitter resistor 5 of the amplifier stage 4 and supplied to the summing circuit 1. The signal B in accordance with Figure 2B, which is in phase-opposition to the signal V, is extracted at the collector resistor 6 of the amplifier stage 4 and supplied to a diode bridge 2 via the capacitor 7. Due to the signal peaks of the voltage B, a bias voltage for the diode bridge 2 is produced on the RC element 8, 9. The signal voltage C in accordance with Figure 2C, having the horizontal sections caused by the bias voltage, is produced at the output of the diode bridge 2. The signal C is supplied to the other input of the summing circuit 1. If now, in accordance with the measure of the claim, the amplitude of the voltages supplied to the summing circuit is not made equally great, but different, in the manner that the signal voltage C is greater than the signal voltage A, then there results at the output of the summing circuit, a waveform in accordance with Figure 2D. At the beginning and at the end of the vertical period, one can see a respective inverted region so that the desired effect occurs with the aid of such a type of

correction. The different amplitudes of the voltages to be added may be obtained either in that voltages of different magnitudes are already applied to the inputs of the summing circuit 1 or, in that the summing resistors 13, 14 are dimensioned differently. The thus generated signal D is applied via a coupling capacitor 10 to an amplifier stage 11 and coupled-out through the capacitor 12.



Claims

1. Method for the generation of a voltage having a triangular type of waveform by addition of a saw-tooth shaped first voltage (A) to a saw-tooth type of voltage (C), wherein the saw-tooth type of voltage (C) is transformed, by suppression of a portion (UV), symmetrical relative to the centre line, of a second saw-tooth shaped voltage (B) which is of opposite phase to the first saw-tooth shaped voltage (A), in such a way that it has horizontal sections of zero amplitude in the time interval $0.25T$ to $0.75T$, wherein the amplitude of the saw-tooth type of voltage (C) is greater than the amplitude of the saw-tooth shaped first voltage (A) and the addition of the saw-tooth shaped first voltage (A) to the phase-opposed voltage (C) provided with the horizontal sections is effected in such a way that the triangular type of waveform (D) has zero crossings at $0+dT$, $0.5T$ and $T-dT$ of the period T .

2. Method in accordance with Claim 1, characterised in that, the voltages (A, C) to be added, which are supplied to the summing circuit (1), have equally great amplitudes and that the saw-tooth type of voltage (C) is weighted in the summing circuit (1) by a factor greater than 1 relative to the the first saw-tooth shaped voltage (A).