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METHOD OF AND ARRANGEMENT FOR PRODUCING CORRECTING IMPULSES

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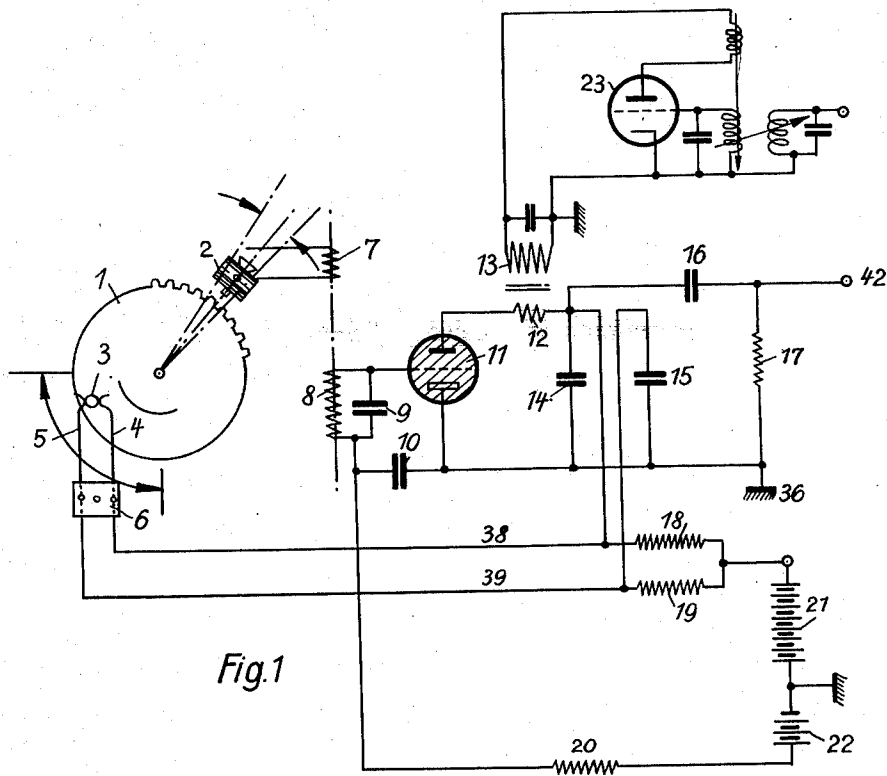


Fig. 1

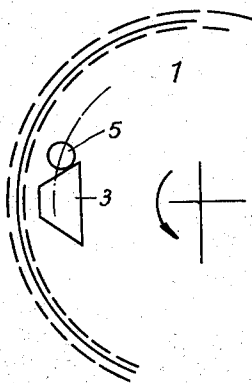


Fig. 2

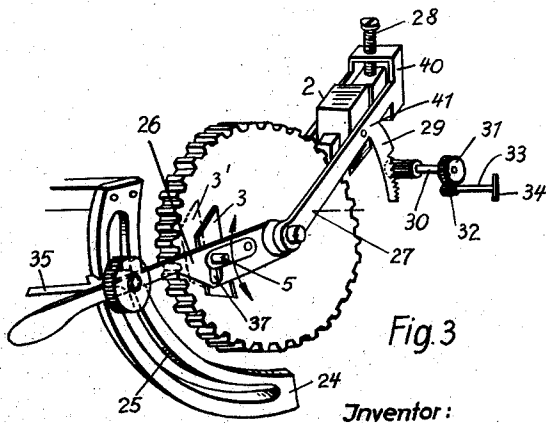


Fig. 3

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METHOD OF AND ARRANGEMENT FOR PRODUCING CORRECTING IMPULSES

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The subject matter of the invention is a method of and arrangement for producing sharp correcting impulses, more particularly for television purposes, which may be employed both at the transmission end as well as at the receiving end.

According to the invention, there are at first produced by means of a desired synchronously operated (for example by connection with A. C. mains) generator, for example a rotary generator, impulses of desired form, which do not possess exactly the requisite high chronological equidistance. By means of these impulses there is excited an oscillatory circuit, which in turn supplies impulses of the required equidistance but not of the desired form, which in turn control a suitable generator, for example a gas-filled grid controlled glow discharge tube, which now supplies control impulses possessing both the requisite equidistance as well as the requisite form. These impulses, according to the invention—if the arrangement is to be employed at the transmission end—may be employed for modulating a suitable intermediate wave (for example an 1800 metre wave), which in turn is modulated on to the actual transmission wave, for example a 7 metre wave.

A form of embodiment of an arrangement for carrying out the method according to the invention is illustrated by way of example in the drawing, in which

Fig. 1 is a diagram of the complete arrangement, while in

Figs. 2 and 3 there are illustrated details of the generator employed according to the invention.

In the drawing 1 is the rotary part of the toothed phonic wheel employed according to the invention, 2 the magnet coil, and 3 a contact preferably connected firmly with the disc 1. 4 and 5 are brushes, which are shiftable by means of the diagrammatically indicated arrangement 6. By suitable adjustment of the spacing of the two brushes there may be produced sparkless connection of the charging circuit generating the long impulses, by adjustment of the coil 2, whilst by shifting the total short-circuit contact there may be adjusted the image phase. 7 and 8 are inductances, 9 and 10 capacities. The circuit comprising the coil 8 and the capacity 9 is tuned sharply to the frequency to be produced, and is loosely coupled in such fashion with the coil circuit of the toothed phonic wheel that the same is impulsed by the impulses generated by the toothed phonic wheel. The oscillatory cir-

cuit controls in turn the discharge tube 11, which is supplied with anode potential over the resistance 18 in conjunction with the condenser 14, and the grid of which is linked up with a suitable negative bias, which is selected in such fashion in relation to the anode potential that an independent discharge is unable to occur. The glow discharge tube—in place of which there may also be employed another suitable element—now supplies in turn the desired signalling potentials. These if the arrangement is employed at the receiving end may be picked up in direct fashion at the terminal 42. If on the other hand the arrangement is intended for use at the transmission end, the anode circuit of the discharge tube is coupled by means of the coils 12 and 13 with the anode circuit of an oscillator 23 tuned to a suitable wave, for example of 1800 metres, and the modulated 1800 metre wave thus produced employed for modulating the actual transmission wave. In place of the inductive coupling it is also possible to employ any other suitable coupling. With the anode of the glow discharge tube there is also connected through the medium of the leads 38 and 39, which are short-circuited once for a brief space of time upon each revolution of the disc 1, the condenser 15, which is charged by the battery 21 over the resistance 19.

21 is the charging battery, 22 a bias battery. The resistance 20 may be selected at approximately $.5 \cdot 10^6$ ohms, the resistance 17 at 10^5 ohms, the condenser 10 at $1 \mu\text{f.}$, and the condenser 16 at $0.001 \mu\text{f.}$ The condenser 9 may have a value of approximately $.1 \mu\text{f.}$

A form of embodiment, according to the invention, of the construction and arrangement of the short-circuit contact 3 and of the magnet 2 is disclosed in Figs. 2 and 3.

The disc 1 carries two contact members 3 and 3', which are arranged exactly opposite to each other on either side of the disc, are insulated against the disc and are conductively connected with each other, and which may be mounted to be immovable on the disc. The leads 38 and 39 terminate in two current pick-up brushes 4 and 5, which are arranged in such fashion that the same upon each revolution of the disc each move once into engagement with the corresponding contact plates 3 and 3'. At least one of the two brushes is made to be tangentially shiftable (not designed) in relation to the disc 1, so that the duration of contact upon a constant speed of rotation of the disc 1 may be varied within wide limits. The two brushes, for example, may

be secured in a fork encompassing the disc 3 and mounted, for example, on the axis of rotation, whereby at least the one contact 5 is arranged to be shiftable in a longitudinal slot 37. By displacement of this contact there is adjusted the duration of contact, and accordingly sparkless connection of the condenser 15 is ensured. By displacement of the entire fork 26 carrying the contacts along the guide 25 it is possible in simple fashion to adjust the time of initiation of the long impulses, and accordingly the image phase. 35 is a locking means for the fork 26. In order to permit of the desired adjustment of the image in the transverse direction the coil 2 is also made to be radially shiftable, for example by means of the fork 40, in which the coil is secured by means of the shaft 41 and the screw 28. For exact adjustment of the position of the coil there may be employed the drive 32 having the hand-grip 34, which drive acts for example on a gear wheel 31 engaging through the medium of the part 27 with an arm 29 rigidly connected with the fork 40.

Naturally it is possible to employ corresponding mechanical embodiments of any other desired kind, for example to mount the contacts 5 in rigid fashion, and to make the contact discs 3 and 3' shiftable, for example, along a groove provided in the disc 1. It is essential as regards the invention that the arrangement be such that both the adjustment of the phase as well as the adjustment of the transverse position of the image takes place purely by displacement of the contact elements or the coil respectively, preferably during operations.

Generally speaking, the charging circuit 14—18 will be selected in such fashion that the charging period of the condenser 14 corresponds with the scanning period of 2—3 image points, whilst the charging circuit 19—15 should be so selected that the charging of the condenser 15 takes place in an interval corresponding with the duration of the desired long impulses, for example, therefore, in the time corresponding with the scanning of a line.

The operation of the arrangement is as follows:

The toothed phonic wheel moved by a motor running synchronously with the image-scanning element generates impulses, which are not exactly equidistant, and also do not possess the sharp form of curve necessary for the synchronization signal. These impulses, by sufficiently loose coupling, excite the oscillatory circuit which comprises the condenser 9 and the coil 8, and is tuned to the requisite line-control frequency, and in turn produces an oscillation, which certainly possesses the requisite chronological equidistance but not the necessary form of curve. These oscillations in turn control a relaxation-oscillation generator, for example the glow discharge tube 11, which is charged over the resistance 18 and the condenser 14. The condenser 14 is preferably selected at 0.01 μ f. and the resistance 19 at 50,000 ohms, so that the charging period of the condenser 14 corresponds approximately with the time required for scanning 2—3 image points.

At the grid of the glow discharge there is a constant negative bias, which is selected in such fashion that an independent discharge is unable to take place. The discharge does accordingly not occur until the potential of the grid has been moved to an adequate extent into positive by the potential supplied by the oscillatory circuit. At this moment the condenser 14 is discharged over the glow discharge tube and—

since the grid of the tube has again already become negative and the tube itself is blocked—is again charged in the stated time over the resistance 18. The form of the signalling impulse delivered by the glow-discharge tube is accordingly determined by the discharge beat and the ensuing charging of the condenser 14. During the remaining duration of the line the glow-discharge tube remains blocked and the condenser fully charged.

The glow-discharge tube accordingly supplies for each line a sharp, brief potential impulse, i. e., a line change potential, which possesses both the requisite high chronological equidistance as well as the required form of curve.

Apart from the short (line) impulses there are also required, as well known, long (image-changing) impulses for controlling television image generators. For producing these impulses there is provided the second charging circuit, which comprises the condenser 15 and the resistance 19. This circuit is disconnected from the anode of the glow-discharge tube during the scanning of the image, and is connected with the anode of the tube, through the lead 30, the contacts 3 and 3' and the line 38, merely for the duration of the image change, so that during the image change both charging circuits are connected with the anode of the glow-discharge tube.

By suitable adjustment of the pick-up contacts it may be accomplished that the condenser 15 is connected at a moment when the condenser 14 has already been fully charged. In this manner sparking is safely avoided upon the connection of the condenser. The circuit 19—15 is selected in such fashion that the charging of the condenser 15 requires a period of time which corresponds approximately with the time required for the scanning of a line. The form of curve of the long (image-changing) impulse now produced upon the discharge controlled by the oscillatory circuit is determined by the discharge beat and the time of discharge of the two condensers 14 and 15 connected for a brief period of time in parallel, so that the image-change signal possesses a form differing considerably from the line-changing impulse, which enables the two signals to be separated at the receiving end by analysis of the frequency.

By suitable relative adjustment of the current pick-ups 4 and 5 determining the duration of contact it is possible in simple fashion to accomplish that the condenser 15 is again disconnected immediately the same has been fully charged, so that it in no way affects the image-change signals until the next image change.

The method according to the invention also enables in the most simple fashion the synchronization potentials, which are necessary for the production of television images, to be produced at the receiving end.

I claim:

1. A mechanical generator of primary electrical impulses having slight irregularities in frequency, the output of said generator loosely coupled to an oscillatory circuit, said oscillatory circuit being sharply tuned to the fundamental frequency of said impulses required for synchronizing purposes, a relaxation oscillation circuit comprising a direct current source, a charging resistance, a storage condenser and a gas-filled grid-controlled thermionic tube, said oscillatory circuit being connected to the grid of said tube, a bias source connected to said grid

for negatively biasing it to such an extent that the tube is only released upon the passage of the positive relaxation maximum of the frequency of the oscillatory circuit, said synchronizing impulses to be produced being taken from said condenser.

2. An arrangement for producing synchronizing impulses of exact sharp impulse form and of exactly equal spacing, more particularly for television purposes, comprising a toothed wheel coupled with a synchronous motor, the magnet coil of said wheel being connected to a second coil, and an oscillatory circuit loosely coupled to said second coil, said oscillatory circuit being sharply tuned to the fundamental frequency of said impulses required for synchronizing purposes, a relaxation oscillation circuit comprising a direct current source, a charging resistance, a storage condenser and a gas-filled grid-controlled thermionic tube, said oscillatory circuit being connected to the grid of said tube, a bias source connected to said grid for negatively biasing it to such an extent that the tube is only released upon the passage of the positive relaxation maximum of the frequency of the oscillatory circuit, said synchronizing impulses to be produced being taken from said condenser.

3. An arrangement for producing synchronizing impulses of exact sharp impulse form and being of exactly equal spacing, more particularly for television purposes, comprising a toothed wheel coupled with a synchronous motor, the magnet coil of said wheel being connected to a second coil, and an oscillatory circuit loosely coupled to said second coil, said oscillatory circuit being sharply tuned to a harmonic of the fundamental frequency of said impulses required for synchronizing purposes, a relaxation oscillation circuit comprising a direct current source, a charging resistance, a storage condenser and a gas-filled grid-controlled thermionic tube, said oscillatory circuit being connected to the grid of said tube, a bias source connected to said grid for negatively biasing it to such an extent that the tube is only released upon the passage of the positive relaxation maximum of the frequency of the oscillatory circuit, said synchronizing im-

pulses to be produced being taken from said condenser.

4. An arrangement for producing synchronizing impulses of exact sharp impulse form and being of exactly equal spacing for line changing and image changing synchronization for television purposes comprising a generator in the form of a toothed wheel coupled with a synchronous motor, a magnet coil arranged in operative relationship to the teeth of said wheel, said generator being adapted to produce a frequency train the amplitudes of which having approximately said exact sharp impulse form and said exactly equal spacing, a second coil connected to said magnet coil of said wheel, an oscillatory circuit loosely coupled to said second coil, said oscillatory circuit being sharply tuned to the fundamental frequency of said line changing impulses, a relaxation oscillation circuit comprising a direct current source, a first charging resistance and a second charging resistance, a first condenser and a second condenser, a glow discharge device and a mechanical short-circuiting contact arrangement mechanically coupled to said toothed wheel, said first condenser being charged from said direct current source through said first resistance, the charging time corresponding to the scanning of several image points, and said second condenser being charged from said direct current source through said second resistance, the charging time of said second condenser corresponding approximately with a scanning time of one line, said first condenser being the line changing condenser connected in the anode circuit of said discharge device, said second condenser being the image changing condenser connected to said short circuiting contact arrangement short-circuiting said second condenser after one picture being completely scanned, said second condenser being connected in parallel to said first condenser in the short circuiting interval of said contact arrangement, the synchronizing line changing impulses being taken from said first condenser, and the synchronizing image changing impulses being taken from said second condenser.

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