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ELECTRICAL WAVE GENERATOR

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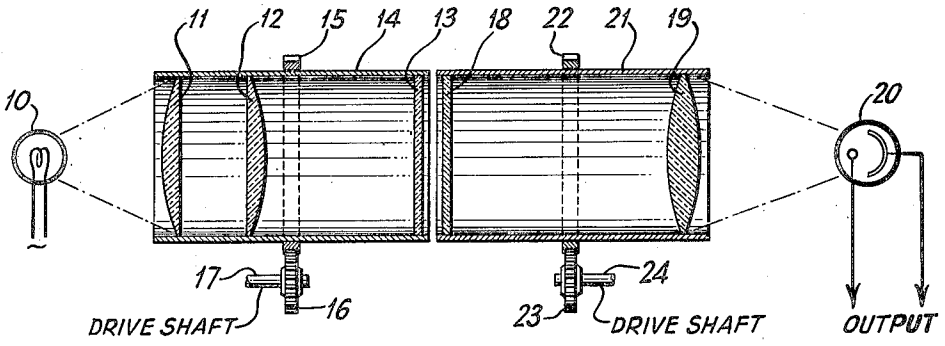

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ELECTRICAL WAVE GENERATOR

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4 Claims. (Cl. 250—41.5)

My invention relates in general to electrical wave voltage or current generators, and more particularly to the type of electrical generators wherein variations in light are transformed or changed into varying current or voltage waves.

In many forms of electrical apparatus, particularly in the radio field, there are a number of instances where a current of a predetermined complex wave form is highly utilizable. An example of such an application is, for instance, in the deflection of a cathode ray beam by electromagnetic means wherein it is desired that the beam be deflected linearly. In such a case, in order to compensate for the self-inductance of the deflecting coil per se, a special wave form must be used in order to drive a current of a saw-tooth wave formation through the deflecting coil. Usually, such generators embody the use either of highly complex apparatus, or electrical means are used which must be adjusted accurately and which do not always maintain their adjustment. Accordingly, it is one of the objects of my invention to provide an apparatus for producing electrical current or voltage waves of a predeterminable wave form.

Again, where complex wave forms are produced the circuit parameters may change with time, or heat, or other conditions so that the over-all circuit parameters are changed and the wave form itself consequently suffers. Accordingly, it is another of the objects of my invention to provide an apparatus to produce current or voltage waves of predeterminable wave form wherein the wave form will be maintained substantially constant.

Again, in apparatus as has been hereinbefore referred to, there is a tendency for the produced wave form to vary with variations in frequency of the produced wave. Accordingly, it is another of the objects of my invention to provide an apparatus to produce current or voltage waves of predetermined wave form wherein the wave form may be maintained substantially unchanged over a wide range of frequencies.

Also, in apparatus which generates or produces wave forms which may be simple or complex, there is a tendency on the part of the apparatus during changing conditions to change the frequency of the produced wave. Accordingly, it is another of the objects of my invention to provide an apparatus wherein the frequency of the produced current or voltage waves of a desired wave formation may be easily regulated.

It is known at the present time that light may be polarized by passing the light through various materials and that the polarization may vary in some cases with variations in applied electrical energy, and in other cases with the physical position of the polarizing medium with respect to the light beam passing therethrough. Accordingly, it is another of the objects of my invention to provide an apparatus wherein the polarization of a light beam is used to transform a substantially constant beam of light into electrical current or voltage waves of a desired wave formation.

Accordingly, the objects of my invention are:

1. To provide an apparatus to produce electrical current or voltage waves of predeterminable wave form.

2. To provide an apparatus to produce current or voltage of predeterminable wave form wherein the wave form will be maintained substantially constant.

3. To provide an apparatus to produce current or voltage waves of predetermined wave form wherein the wave form may be maintained over a wide range of frequencies.

4. To provide an apparatus wherein the frequency of a produced current or voltage wave of a desired wave form may be easily regulated.

5. To provide an apparatus wherein the polarization of a light beam is used to transform a substantially constant beam of light into electrical current or voltage waves of desired wave form.

In general, my apparatus operates in the following manner:

A plurality of polarizing means are interposed between a source of light, the intensity of which may be maintained substantially constant, and means responsive to the light, the latter means being adapted to change light fluctuations into varying electrical waves. In the more particular embodiment shown hereinafter, two sheets of "polaroid" are mounted adjacent each other and between a light source and the photoelectric cell, and the sheets are turned in a predeterminable fashion relatively each to the other so that the amount of light passing to the photoelectric cell varies. It will be appreciated that the sheets may turn in the same direction at different speeds or may turn in opposite directions. It should also be appreciated that the angular change, and hence the change in polarization of the light beam may be made to take place by a proper gearing and/or cams according to a predetermined angular change pattern, and accordingly by combining the polarizing influences of

each of the sheets, a wave form of predeterminable characteristics may be evolved.

My invention will best be understood by reference to the single figure of the drawing which shows one movement thereof.

Referring to the drawing, a source of light here illustrated as a lamp 10 passes a light beam through an optical system comprising lenses 11 and 12, the light beam then passes through a polarizing element 13 which may be the so-called "polaroid" material, and hence is polarized in one plane. In the illustrated embodiment, the lenses 11 and 12 and the polarizing element 13 are mounted in a housing 14, the latter having joined thereto a gear 15. This gear is adapted to mesh with a further gear member 16 which is joined to the drive shaft 17 as illustrated.

Positioned immediately adjacent the polarizing element 13 is a second polarizing element 18 which may or may not have the same polarizing characteristics as the element 13. The light beam passes through the polarizing element 18, and thence through a focussing lens 19 where it is focussed onto the cathode of a photoelectric tube 20. The polarizing element 18 and the focussing lens 19 are, in this illustration, mounted in a housing 21 similar to the housing 14. Joined to the housing 21 is a gear 22, by means of which the housing may be rotated, and meshing with the gear 22 is a gear member 23 which is driven by a drive shaft 24. It will readily be apparent that the drive shafts 17 and 24 may be driven from the same prime mover, and it will readily be apparent that this showing is for purposes of illustration only, and that the proper gears and/or cams may be interposed between the gear 23 and the prime mover for the purpose of obtaining any desired velocity pattern for the housing.

It will also be apparent that a Kerr cell might be substituted for a polarizing element, and instead of the rotation which takes place in the illustrated embodiment, the Kerr cell might be energized by potentials of a wave form such that the combination of the polarization of the light beam due to the combined action of the plurality of cells will give a predeterminable wave form output from the photocell 20.

It has been assumed in the explanation contained hereinbefore that the light from the source 10 was of substantially constant intensity. It is, of course, entirely feasible to modulate the light source itself so as to combine with the action of the polarizing mediums in order that complex wave forms may be produced.

What I claim is:

1. Apparatus for generating varying electrical waves comprising a source of light of substantially constant intensity, photoelectric means, a plurality of light polarizing means positioned adjacent each to the other adapted to change the polarization of light passing therethrough in accordance with the continuous rotation of said polarizing means, and means for rotating at least one of said polarizing means.

2. Apparatus in accordance with claim 1 and wherein said polarizing means are rotated in the same direction and at differing speeds.

3. Apparatus in accordance with claim 1 wherein at least a pair of said polarizing means are rotated in opposite directions.

4. Apparatus in accordance with claim 1 wherein means are provided to modulate the light source.

JAMES N. WHITAKER.

DISCLAIMER

2,254,022.—*James N. Whitaker*, Weehawken, N. J. ELECTRICAL WAVE GENERATOR. Patent dated August 26, 1941. Disclaimer filed December 31, 1942, by the inventor; the assignee, *Radio Corporation of America*, consenting.

Hereby enters this disclaimer to claims 1 through 4 of said patent.

[*Official Gazette February 2, 1943.*]

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