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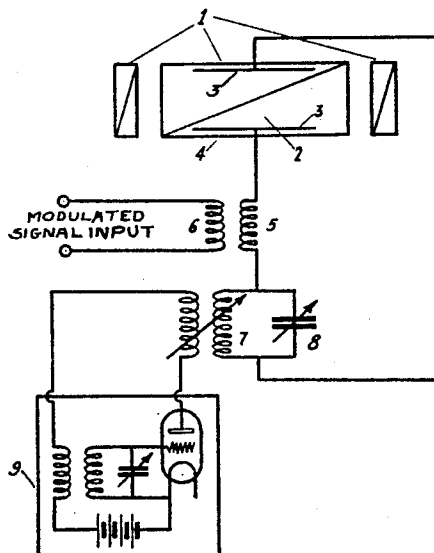
G. M. WRIGHT

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KERR CELL AND CONTROL MEANS THEREFOR

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INVENTOR
G. M. WRIGHT
BY *W. J. Adams*
ATTORNEY

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GEORGE MAURICE WRIGHT, OF GREAT BADDOW, CHELMSFORD, ENGLAND, ASSIGNOR TO
RADIO CORPORATION OF AMERICA, A CORPORATION OF DELAWARE

KERR CELL AND CONTROL MEANS THEREFOR

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This invention relates to Kerr cells and control means therefor.

It is well known that the response of the Kerr cell type of "light shutter", commonly employed in high speed picture telegraphy, substantially follows a square law, i. e. within certain limits the intensity of the light passed through the gap of the Kerr cell is proportional to the square of the voltage applied to the electrodes between which the gap is situated. The result in false volumes being given to "half tone" pictures when the voltage applied to the electrodes is a truly linear representation of the light and shade in the transmitted picture. In order to reduce this undesirable effect, it has been proposed to polarize the Kerr cell by applying a steady potential difference across the electrodes thereof, and to superimpose the potential differences due to the received picture on this steady polarizing voltage. The effect of such a polarizing voltage on non-linear relay devices is well known and results in a more proportional response to the stimulating voltage.

A very suitable dielectric to use in a Kerr cell is nitrobenzene. It has, however, the disadvantage that it possesses a slight conductivity, so that a current will flow when a steady polarizing voltage is applied. This current gives rise to some action in the cell, with the result that in the course of time a brownish deposit collects on the surface of the electrodes. After a time this deposit or sludge interferes with the passage of the light beam through the gap. Moreover, the deposit tends to adhere to the glass sides of the cell in the immediate neighborhood of the gap, thus forming a fine film which, when viewed by transmitted light, appears red. Since the light beam has to pass through two thicknesses of this film, one on each side of the gap, a serious reduction in the actinic value of the light takes place, thus causing a weakening of the exposure of the receiving sheet of photographically sensitive paper.

The present invention has for its object to provide a Kerr cell arrangement in which the disadvantages set out above are minimized or eliminated.

According to this invention control means for a Kerr cell comprise in addition to the usual means for applying signal derived voltages to the electrodes of the cell, means for applying a separate high frequency voltage to the said electrodes.

The invention is illustrated in the single figure of the accompanying diagrammatic drawing which shows one way of carrying out the said invention as applied to a picture telegraph installation.

Referring to the drawing, 1 is a Kerr cell installation comprising a Kerr cell having a gap 2 situated between a pair of electrodes 3, 3, immersed in a glass vessel 4 containing nitrobenzene, or any other liquid or combination of liquids possessing the property of exhibiting double refraction under electric stress. The secondary 5 of a transformer, 5, 6 is connected in series with a tuned oscillatory circuit 7, 8 across the gap of the said cell.

Signal derivatives (e. g. a modulated carrier wave) are fed into the primary 6 of the transformer, while the tuned circuit, which consists of a parallel arrangement of inductance coil 7 and condenser 8 either or both of which may be variable, is supplied with high frequency voltage from a high frequency oscillator 9, e. g. a valve generator. The oscillator may be coupled to the inductance 7 in the tuned circuit, as shown, or any other convenient arrangement may be utilized, and the said oscillator is so controlled and adjusted as to maintain in the said tuned circuit a substantially constant current, at a frequency preferably high relative to the carrier frequency of the signal wave, so that no material interference with the normal "grain" of the picture as determined by the said carrier may occur.

It will be seen that with this arrangement the voltage applied across the gap of the Kerr cell is at any moment the algebraic sum of the voltages across the secondary of the transformer and across the tuned circuit.

It has been found that with a nitrobenzene cell having a gap .005 inch long, a much improved proportionality of response and substantial freedom from ill effects, due to

“sludging”, may be obtained by setting up a voltage of 400 volts, at a frequency of 100,000 cycles per second across the tuned circuit, the maximum signal voltage, across the transformer secondary, being 800 volts, and the frequency of the signal carrier 6000 cycles per second.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A light control system for picture telegraphy and the like comprising a Kerr cell having the electrodes thereof separated by a liquid dielectric, means for applying signal voltages to the electrodes of said cell, and means for superimposing upon said signal voltage a separate relatively high frequency voltage for preventing the collection of deposits upon the cell electrodes.

2. In a picture telegraphy system, a Kerr cell having the electrodes thereof separated by an optically responsive liquid dielectric, means for applying modulated carrier frequency potentials to the cell for producing optical changes therein in accordance with the signals produced, and means for superimposing a relatively high frequency voltage upon the electrodes of said cell for preventing deposits produced by current flow through the cell liquid from collecting upon the cell electrodes whereby the response characteristic of the cell is improved.

3. In a picture telegraphy system or the like, a Kerr cell having a pair of electrode elements separated by a liquid optically responsive dielectric, means for applying in series signal frequency potentials to the electrodes of the said cell, and means for applying relatively high frequency potentials to the electrodes of the said cell and superimposing said high frequency potentials upon said signal frequency potentials for preventing the depositing of disintegrated particles on the electrodes of the cell.

GEORGE MAURICE WRIGHT.