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ELECTRICAL LIGHT IMPULSE GENERATOR
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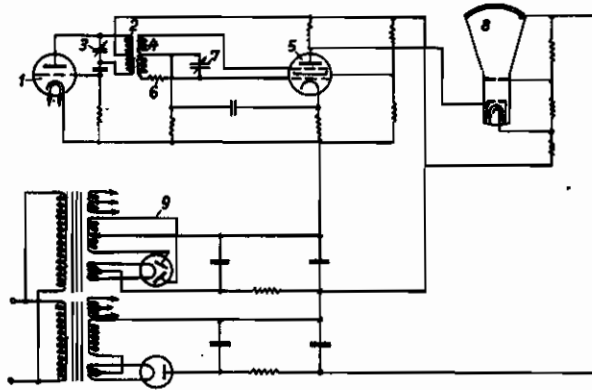


Fig. 1

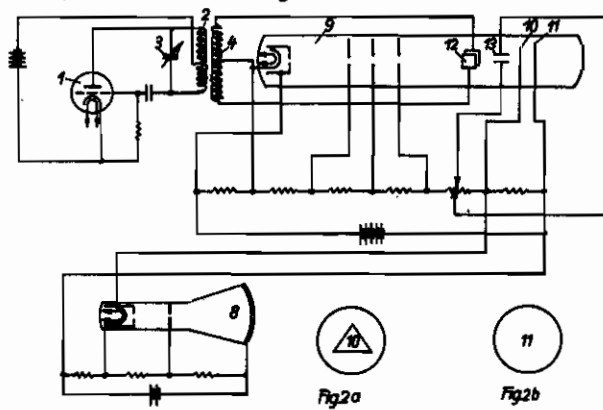


Fig. 2

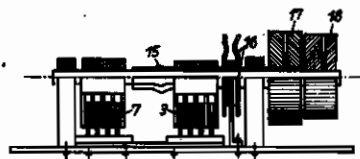


Fig. 3

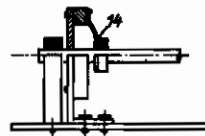


Fig. 4

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ALIEN PROPERTY CUSTODIAN

ELECTRICAL LIGHT IMPULSE GENERATOR

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The present invention relates to means for photographic reproduction of very rapid occurrences. For these purposes the object which shall be observed is lighted by a large number of light pulses in such a manner that said occurrence is reproduced by a fixed or moved film at different times. It has been already proposed for producing said light pulses to use an electrical generator producing pulses of a variable frequency and a cathode ray tube operating as a light source.

The present invention relates to generators of the described type.

The known embodiments of the generator of the type described hereinbefore have disadvantages consisting in that for using a large number of pulses per second the light of the pulses is insufficient. Even if the best optics and the most sensible films are used the light of the generator cannot expose perfectly the film. A further disadvantage consists in distorting the reproduction in the case of using a low frequency of light pulses and reproducing a rapid occurrence.

According to the present invention means for adjusting the frequency and the duration of the light pulses are provided. For these purposes arrangements are used by which short electrical impulses of adjustable times may be produced from a given control voltage.

Methods for producing short impulses from a sinusoidal control voltage have been already proposed which impulses have times being independent of the amplitudes of the control voltage.

E. g. it is possible to use an arrangement containing an electron valve with two homogeneous control grids being arranged one after another. This valve is connected by its anode and cathode in a circuit of a d. c. source. The control voltage is applied to both control grids in nearly reverse phase. The difference of the shifted phases from 180 degrees on both control grids corresponds to the required impulse duration.

According to a further object of the invention a cathode ray tube may be employed as a generator for producing short adjustable impulses. Such a cathode ray tube contains a separate electrode. The cathode ray strikes this electrode if it passes a diaphragm being arranged between the anode and said electrode. By the control voltage the cathode ray is moved over the diaphragm in the rhythm of the frequency of the control voltage. Thereby an impulse arises in the circuit of said electrode. The diaphragm may have a triangular aperture. The interruption of the cathode ray is the smaller the larger

is the distance of the ray from the top of the triangle.

In Fig. 1 an embodiment of the invention is shown. An oscillator consisting of a tube 1, a coil 2 and a variable condenser 3 produces a control frequency which may be adjusted by tuning the condenser. Via the coil 4 the coil 2 is coupled to the tube 5 operating as an impulse generator. The ends of the coil 4 are connected to the control grids of the tube 5 each. The middle point of the coil 4 is connected to the cathode. A phase shifting arrangement consisting of the resistance 6 and the condenser 7 is used for adjusting the phase displacement of more or less than 180 degrees.

A variation of the phase displacement e. g. by a variation of the capacity of the condenser 7 causes a variation of the duration of light impulse.

The cathode ray tube 8 is the light source the intensity control electrode of which is connected to the output of the tube 5. The main supply apparatus 9 consists of two parts one of which supplies the low voltages for the impulse generator, the other supplies the high voltages for the cathode ray tube. The cathode ray tube 8 may have a fluorescence screen operating as an accelerating electrode.

Figure 2 shows a further embodiment of the invention containing an impulse generator being a cathode ray tube and an oscillator 1, 2, 3 being tuned to the frequency of the light impulses. The cathode ray tube 8 contains a triangular diaphragm 10 as shown in Fig. 2a after which an electrode 11 as shown in Fig. 2b is arranged. The oscillator 1, 2, 3 is connected to a pair of deflecting plates 12 of the cathode ray tube 8. Another pair of deflecting plates 13 is connected to a direct voltage which deflects the cathode ray in the direction of the top of the triangle diaphragm. By variation of the tap on the potentiometer 14 the cathode ray is deflected to pass the triangle diaphragm 10 distant by more or less from the top. The impulses produced at the electrode 11 are used to control the light impulses.

If the optics, the sensibility of the film, and the intensity of light are given the most suitable duration of the light impulses is different for each frequency of the light impulses. Therefore according to a further object of the invention the variation of duration of light impulse should be dependent on the variation of the frequency of the light impulses. For these purposes the circuit elements determining the frequency and the duration of impulses are coupled in mechanical

manner each to other. These elements may be arranged on a common axis in such a manner that the most suitable duration is given simultaneously for each frequency.

According to a further object of the invention the coupling between these elements is made to be adjustable. For this purpose the axis of the rotatable condensers 3 and 7 according to the Fig. 1 or the axis of the rotatable condenser 3 and of the potentiometer according to the Fig. 2 are arranged concentrically each to other in such a manner that the handles of the two elements are coupled each to other by friction. By a separable coupling it is possible to adjust the both handles independently each from other. The one of the handles may have a marked line the other a scale giving the product of the intensity of the optics and the film, and of the clearness of the light source. By this way it is possible to adjust the handles to the best position each to other for each light impulse frequency. Naturally the rotatable condensers 3 and 7 respectively the condenser 3 and the potentiometer 14 shall be so tuned that the each equal angle of rotation of the element determining the impulse frequency and of the element determining the duration of impulses corresponds to the best light impulse duration.

The Figs. 3 and 4 show embodiments of a sep-

arable coupling of the rotatable condensers 3 and 7 respectively of the condenser 3 and the potentiometer 14. In Fig. 3 the condensers 3 and 7 are fixed on differently but concentrically each to other arranged axes. Both axes are coupled by friction by springs 15 being fixed on the external or internal axis. A further friction arrangement 16 is provided between the external axis and the stator of regulation arrangement. The friction of the arrangement 16 must be more strong than the friction of the springs 15.

If the handle 17 being arranged on the external axis is rotated the friction of the arrangement 16 is overcome. The internal axis is rotated by the arrangement 15. But if the handle 17 is moved, only the internal axis is connected to the handle 16 and rotated upon the reason of the more strong friction by the arrangement 16 than by the springs 15. The external axis is arrested by the arrangement 16.

According to a further arrangement of the invention means for a total uncoupling of both regulating elements are provided. That may be caused by a spring which looses the coupling by shifting.

In the embodiment according to Fig. 2 instead of the rotatable condenser 7 upon the internal a potentiometer 14 is used as shown in Fig. 4.

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