

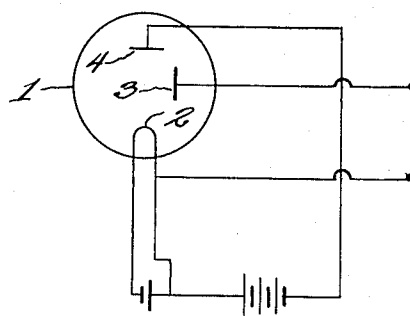
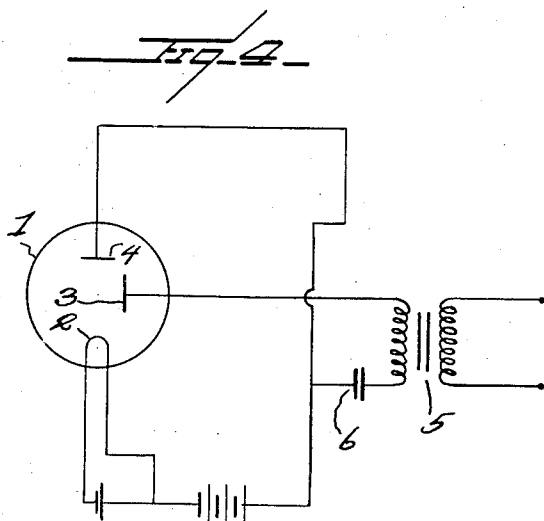
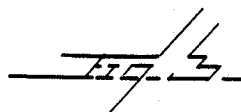
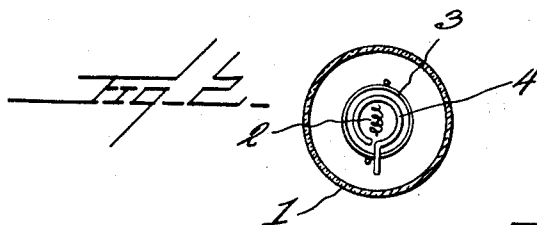
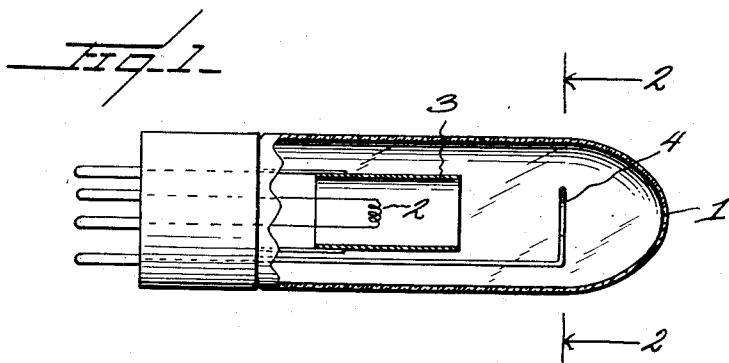
June 23, 1942.

A. H. BLUE

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ELECTRICAL RECORDING DEVICE

Filed Jan. 17, 1940



Inventor

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UNITED STATES PATENT OFFICE

2,287,463

ELECTRICAL RECORDING DEVICE

Archie Henry Blue, Christchurch, New Zealand,
assignor of one-fourth to Ross Derisley Wood,
and two-twentieths to Henry Poynton Bridge,
both of Christchurch, New Zealand

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2 Claims. (Cl. 176—122)

My invention relates to light recording tubes and more particularly to the use of such tubes in the recording or transmitting of mechanical or electrical oscillations with the aid of light.

Mercury vapour discharge tubes have hitherto been used in sound recording, and the light from such tubes has been controlled or influenced by an electrostatic field set up in the discharge space. The electrostatic field has in some cases been varied in accordance with sound and the intensity of the light emitted by the tube has been controlled in this way.

According to the present invention light modulated in intensity in accordance with electrical or mechanical oscillations is generated by means of a glow discharge tube, the light from which is electrically controlled or influenced.

The invention further provides a glow discharge device comprising an envelope containing mercury vapour and having disposed therein a filamentary cathode, and an anode surrounding said cathode, and a target grid arranged near the anode; said target grid is placed at the end, so as to lie substantially along the axis of said filamentary cathode.

The invention is illustrated by way of example in the accompanying drawing in which Figures 1 and 2 show views in part sectional side elevation and in end elevation respectively of a discharge tube in accordance with the invention, and Figures 3 and 4 illustrate diagrammatically two circuit arrangements according to the invention.

Referring to Figures 1 and 2, an envelope 1 which may be of quartz or glass is filled with mercury vapour at a suitable pressure. Within the envelope 1 are mounted a filamentary cathode 2 of helical shape and a cylindrical anode 3 (for example of nickel) surrounding the cathode 2.

Near one end of cylindrical anode 3 is placed a target grid 4. The filament 2 faces target grid 4 through cylindrical anode 3. In this way when current is applied to filament 2 and target grid 4, an electrical field is established in the discharge space around the filament 2 and parallel to the cylindrical anode 3. The effect of this electrical field is greatly to intensify the light emitted and to concentrate it in an axial direction.

Referring to Figure 3, in which like parts are given the same references as in Figure 1, the target grid 4 is connected to a point of positive potential relating to the cathode 2. The potential difference between the target grid 4 and the cathode 2 may for example be about 250 volts.

When applying the arrangement described to the recording of sound, electrical oscillations from a microphone are impressed, after suitable amplification on the anode 3 and filament 2. This brings the tube into such a state that a small change of current strength produces a large change in the light emitted in a direction axially of the anode in accordance with a linear relation. When adjusted in this way, the oscillatory currents on filament 2 and anode 3 cause the intensity of the light emitted to vary correspondingly. These variations in light intensity may be used in known manner to produce a photographic sound record. The light is of course emitted in a direction axially of the anode 3 and is in the form of a cylindrical column of light extending as far as the wall of the glass container or envelope.

In the circuit of Figure 4 instead of applying varying currents to filament 2 and anode 3, the light variations are obtained by impressing electrical oscillations upon target grid 4 and anode 3. The target grid 4 is connected to a positive potential in relation to anode 3. Electrical oscillation which may be derived as before from a microphone are impressed upon the primary winding of the transformer 5 and in this way an alternating potential difference is applied between electrodes 3 and 4. Target grid 4 is capacity coupled to secondary of transformer 5 by capacitor 6, and in this way modulates the light emitted.

Although the invention has been described with particular reference to sound recording, it may be applied to other purposes. When for example the apparatus is used for transmitting oscillations with the aid of light from one station to another the light from the sending station may be allowed to fall upon a photosensitive device at the receiving station.

The apparatus may be also used in connection with the receiving station of a phototelegraphic system, the incoming electrical oscillations being impressed upon the discharge device and producing corresponding changes in the intensity of the light emitted. In combination with a suitable scanning device, therefore, the apparatus may be used to build up at the receiving station the picture transmitted.

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 glow discharge device, comprising an elongated envelope containing mercury vapor,

a filamentary cathode within and on the longitudinal center of the envelope, an anode in the form of a cylinder coaxial with the envelope and enclosing said cathode and electrically separated therefrom and having a terminal exposed exteriorly of the envelope for the connection of a source of electric potential therewith, and a target grid disposed in spaced relation with the cathode and spaced from an end of the anode and upon the axial center of the anode in line longitudinally of the anode with the cathode.

2. A glow lamp, comprising an elongated cylindrical tube, a filamentary cathode within the tube and disposed upon the longitudinal center thereof, an anode in the form of a cylinder ex-

tending lengthwise within and coaxial of the tube and enclosing said cathode and electrically separated therefrom, the anode having a terminal exposed exteriorly of the tube for connection with a source of electric potential and the cathode having terminals exposed exteriorly of the tube for connection with said source, an annular target grid disposed in an end of the tube in spaced relation with the adjacent end of the cylindrical anode and coaxial therewith, said grid having a terminal exposed exteriorly of the tube, and a quantity of mercury within the tube for vaporization by said cathode when the latter is energized.

ARCHIE HENRY BLUE.