Feb. 18, 1930. T. W. CASE 1,747,225

APPARATUS FOR PRODUCING PHOTOGRAPHIC RECORDS OF LIGHT VARIATIONS CORRESPONDING TO SOUND VARIATIONS

Filed Feb. 10, 1926

FIG. 1.

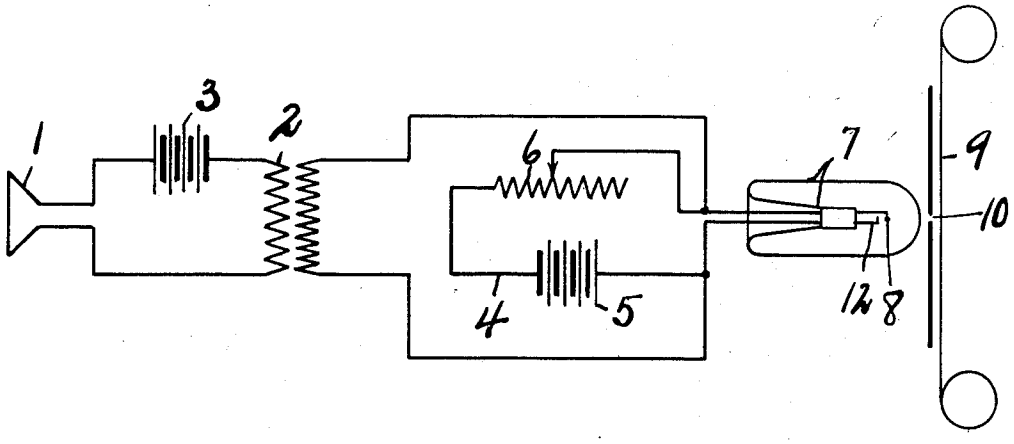



FIG. 2.

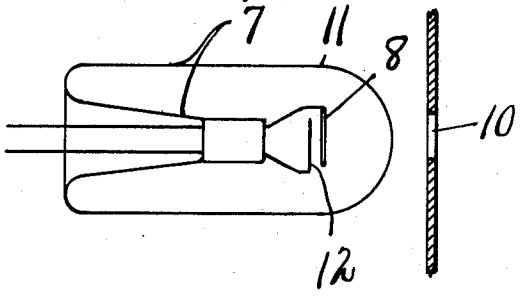
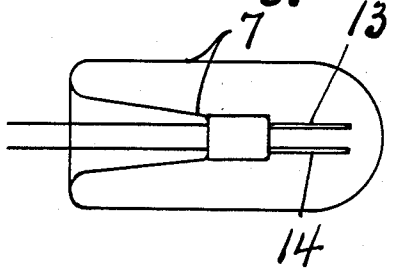



FIG. 3.




WITNESS
H. Wirsch.

INVENTOR
Theodore W. Case
BY Ellison & Thompson
ATTORNEYS

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# UNITED STATES PATENT OFFICE

THEODORE WILLARD CASE, OF AUBURN, NEW YORK, ASSIGNOR TO CASE RESEARCH LABORATORY INCORPORATED, OF AUBURN, NEW YORK, A CORPORATION OF NEW YORK

## APPARATUS FOR PRODUCING PHOTOGRAPHIC RECORDS OF LIGHT VARIATIONS CORRESPONDING TO SOUND VARIATIONS

Application filed February 10, 1926. Serial No. 87,475.

This invention relates to certain new and useful improvements in apparatus for producing a photographic record of light variations corresponding to sound variations and to the source of light used in such apparatus, and the method of producing the same.

The main object of the invention is the production of an apparatus by means of which an improved photographic record can be produced, and more especially the invention centers about a cathode glow lamp and the method of producing the same, and in which preferably a narrow elongated glow is produced substantially conforming with and elongated in the direction of length of the narrow slot through which the photographic record is produced.

A further advantage resides in the fact that the lamp produced in accordance with this invention will operate without spilling over under a considerably greater current than previously known lamps.

Other objects and advantages relate to the details of the structure and the method of producing the same, all as will more fully appear from the following description taken in connection with the accompanying drawings, in which:—

Figure 1 is a diagrammatic illustration of an embodiment of this invention.

Figure 2 is a diagrammatic view of the preferred form of lamp as shown in Figure 1.

Figure 3 is a diagrammatic view of a modified form of lamp.

The apparatus as illustrated in Figure 1 comprises a microphone —1— connected in circuit with the primary —2— of a transformer and a source of potential as the battery —3—. At this point in the apparatus any desired number of stages of amplification may be inserted.

Under any circumstances the secondary —16— of the last transformer is connected across the lighting circuit —4— in shunt with the source of potential —5— and variable resistance —6—. The lighting circuit —4— maintains the cathode glow lamp —7— in operation at desired tension. These circuits are merely illustrative of preferred embodiments of the invention and may be varied widely so long as the lamp is maintained lighted, and voice modulations are improved upon the same. The variations in the cathode glow about the negative eloctrode —8— of the lamp are photographed upon the film —9— through the narrow elongated slot —10—. In this illustration the cathode —8— is itself formed of a wire of narrow elongated form so that the glow about the lamp is of narrow elongated shape conforming with and elongated in the direction of length of the narrow elongated slot —10—, whereby a more perfect photographic record is produced in that the spread of the rays is very slight by reason of the narrow form of the source of light.

This arrangement of a source of light of narrow elongated form in such relation with a narrow elongated slot that the spread of the produced rays is very slight when passing through the slot is of considerable importance in the production of a photographic record from which the original sounds can be accurately reproduced.

The method of producing the cathode glow lamp here disclosed is in itself the perhaps most important feature of this invention in that it results in the production of an improved lamp for producing a cathode glow adapted to vary accurately in accordance with voice modulations, or sound variations.

The lamp —7— as shown comprises a bulb —11— within which there is disposed a cathode —8— and an anode —9— spaced apart a slight distance, as for instance one-eighth to one-quarter of an inch. The negative electrode is formed of a platinum wire treated as follows:

The platinum wire is coated with barium nitrate which is first changed to barium oxide so that the platinum wire has a coating of barium oxide. The wire so coated is inserted in a reducing flame whereby the oxide is vaporized and the barium metal attacks the surface of the platinum wire and forms a platinum barium compound. The platinum wire in this condition appears in a black or dark colored condition, and any surplus or excess of metal which produces a rough surface is rubbed off so that the negative elec-

trode has a surface portion consisting of a platinum barium compound of smooth and uniform exterior contour.

The electrode so formed is exceedingly efficient for the purpose of this invention. As illustrated in Figures 1 and 2, this electrode is shown as disposed laterally across the bulb —12— and nearer the front end of the bulb than the anode which may also be formed of a wire disposed substantially parallel to the cathode and spaced slightly from it, as described.

The bulb is then filled with an inert gas such as helium at such a pressure that the glow is concentrated about the cathode and is separate from the anode glow. This lamp will operate at comparatively low voltage, as for instance 300 volts in the production of an intense concentrated glow around the cathode —8— which is highly actinic for producing a film record of light variations corresponding to sound wave variations.

In Figure 3 the cathode —13— is shown as consisting of a straight wire projecting lengthwise of the bulb —7— and the anode —14— is shown as formed of a similarly shaped wire extending parallel with the wire —13— and spaced from it a short distance, as for instance the distance heretofore described.

This lamp consisting of two closely associated electrodes in an atmosphere of an inert gas, preferably helium, will operate as stated at comparatively low voltage in the production of an intense concentrated cathode glow and will carry a considerably greater current than lamps heretofore known, as for instance fifty (50) milliamperes without spilling over, whereas former lamps would spill over under a current of ten (10) milliamperes or less. This result is due doubtless to the fact that the surface portion of the cathode is produced as described, and consists of a compound of barium and platinum.

I claim:

1. A cathode glow lamp comprising a bulb, an anode within the bulb, a platinum cathode having its surface combined with barium enclosed within the bulb, and an inert gas within the bulb at a pressure adapted to maintain a concentrated glow about the cathode.

2. The method of producing a cathode glow lamp comprising coating a platinum piece adapted to become a cathode with barium oxide, subjecting the coated platinum piece to the action of a reducing flame, and removing excess particles from the treated platinum piece.

3. The method of producing a cathode comprising subjecting a platinum piece to the action of barium oxide in a reducing flame.

In witness whereof I have hereunto set my hand this 4th day of February 1926.

THEODORE WILLARD CASE.