June 7, 1932. S. M. BAGNO 1,862,327

SOUND RECORDING

Filed Jan. 18, 1930

Fig. 1

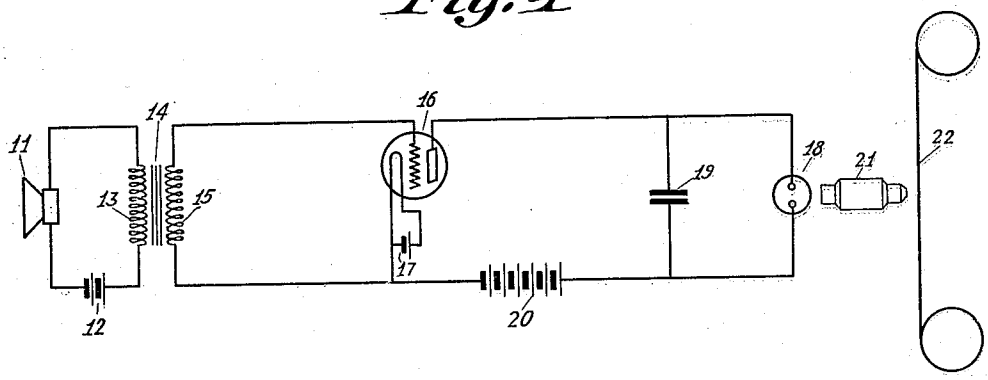
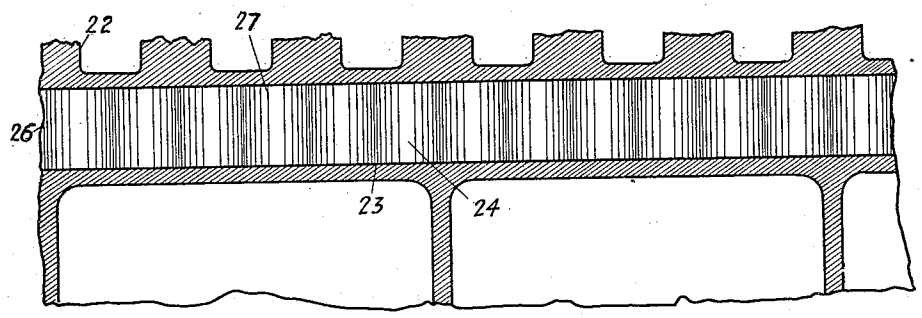


Fig. 2



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SOUND RECORDING

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The object of this invention is to provide an improved method of sound recording.

A further object of this invention is to provide an improved method of recording sound upon moving strips as in the production of talking motion pictures.

Another object of my invention is to produce a sound record, in which the average density is directly proportional to the sound intensity.

A further object of this invention is to record sound upon a moving film as striations.

It is a more particular object of this invention to record sound upon a moving film as striations of uniform density.

These and other objects of this invention will become apparent from the following specification taken in connection with the appended drawing.

In accomplishing my invention, the sound being recorded is caused to produce a fluctuating electric current in the usual manner, and after amplification, the current is used to charge a condenser, which condenser, when it is fully charged, discharges through a neon tube. The intensity and duration of the light from the tube is always the same. The number of lines per unit length of film varies indirectly with the impedance of the tube, as caused by the varying input. In other words, the number of lines in the negative will be directly proportional to the intensity of the sound, and each line will be recorded to be equally black and will have the same width. Therefore, the average intensity of the light falling through the positive upon the photocell in reproduction, will be directly proportional to the number of lines upon the negative produced by recording, in accordance with my method. This is in contradistinction to the usual method in which the light source in recording does not vary in direct proportion to the sound intensity and the record produced consequently does not vary in density in direct proportion to the sound intensity.

Having thus briefly described my invention, attention is invited to the accompanying drawing in which;

Fig. 1 shows a diagram of a circuit adapted to produce a film record in accordance with my invention; and,

Fig. 2 represents a section of the negative record as produced by my invention.

Referring now more particularly to Fig. 1, the microphone for picking up the sounds to be recorded is represented at 11 and is connected through the source 12 to the primary 13 of the transformer 14. The secondary 15 of the transformer 14 is connected to the input of the thermionic device 16. The filament of the thermionic device 16 is supplied by the low potential source 17 in the usual manner. The plate circuit of the thermionic device 16 includes the neon tube 18 and the condenser 19 in parallel, and the high potential source 20. The light produced by the neon tube 18 is adapted to be concentrated and focused upon the film as a narrow band of light running transverse the film record 22. The record 22 is adapted to be moved past the optical system 21 at a uniform speed, the details of the mechanism for moving which constitute no part of the present invention.

Referring now more particularly to Fig. 2, there is shown a section of the negative of the film 22 as produced by my invention. The sound strip is represented as 26 and is composed of a series of striations 27, the spacing of which will vary from the minimum spacing, as shown at 23 to the maximum spacing as shown at 24, the total record as shown in this figure being intended to represent a pure sine wave. In the positive, the sound would be composed of dense portions of varying length separated by clear portions of the same width.

The operation of my recording arrangement is as follows: The sound to be recorded

is picked up by the microphone 11 and amplified by the amplifier device 16. The output of 16 serves to charge the condenser 19, which latter may be of the order of .1 microfarad. As soon as this condenser has been charged to the break down voltage of the neon tube 18, it will be discharged, causing a light which will produce a striation upon the film 22. The duration of the light impulses are determined merely by the charge of the condenser 19, and will be practically independent of the length of time necessary to charge the condenser. Therefore, the duration of the light impulses will be practically the same and the clear portions of the finished film will be of even width. The length of time necessary to charge the condenser will vary, of course, in accordance with the intensity of the current being recorded, and will be represented on the finished film as dark portions of varying length.

Having thus described my invention, attention is invited to the fact that various modifications may be made differing from the form shown and described for the purpose of illustration only, but falling within the scope of my invention. I am, therefore, not to be limited to the specific form shown but by the scope of my invention as set forth in the appended claims.

I claim:

1. The method of sound recording which comprises producing an electric current varying in accordance with the sound to be recorded, producing light impulses of constant duration at an interval varied in accordance with the intensity of the current representing the sound to be recorded and recording of said light impulses.

2. The method of sound recording which comprises producing an electric current varying in accordance with the sound to be recorded, producing light impulses of constant duration, and at an interval varied in accordance with the intensity of the current representing the sound to be recorded, and photographically recording said light impulses.

3. Apparatus for recording sound which comprises means for producing a current representative of the sound being recorded, means for amplifying said current, a condenser adapted to be charged by the amplified current, a gas filled lamp adapted to be actuated by said condenser when charged to a predetermined voltage, a moving photographic record, and means for focusing the light from said gas filled lamp upon said moving record whereby a record representative of the sound being recorded is produced, composed of striations of equal width and density separated by an amount varying inversely with the intensity of the sound pulses being recorded.

4. Apparatus for recording sound which comprises a condenser adapted to be charged by the current representative of the sound being recorded, a neon lamp adapted to be actuated by said condenser, and a moving photographic record exposed to the light of said lamp, whereby a record representative of the sound being recorded is produced.

5. Apparatus for recording a current representative of the sound being recorded, which includes, a condenser adapted to be charged by said current, a light source adapted to be actuated by said condenser and in circuit therewith, and a moving photographic record in cooperative relation with the said light source upon which fluctuations of said source are recorded.

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