June 17, 1930. P. A. ROBBINS 1,764,120

SOUND REPRODUCING MECHANISM

Filed May 20, 1929

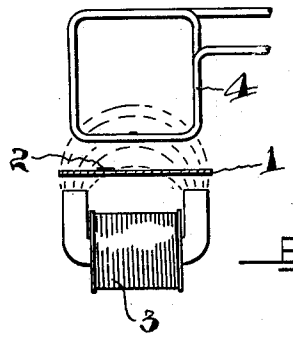


Fig. 1.

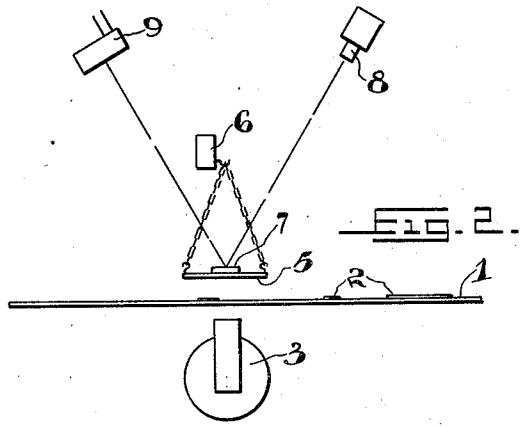


Fig. 2.

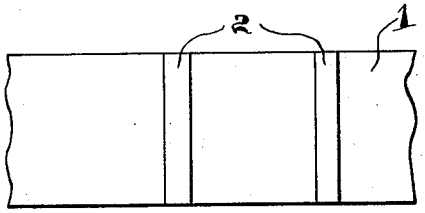


Fig. 3.

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UNITED STATES PATENT OFFICE

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SOUND-REPRODUCING MECHANISM

Application filed May 20, 1929. Serial No. 364,549.

This invention relates particularly to sound records formed as flexible strips, particularly such as are adapted for use as combined moving picture and talking films. It is at present known to form sound traces on such films of paramagnetic materials such as iron, nickel or cobalt, but such traces have inherent defects, and my object is to devise a sound record which avoids the use of such materials.

I attain my object by utilizing for the sound trace a coating of bismuth which may be applied in any convenient manner, as, for example, in the form of a self-drying paste or suspension which will produce an even coating when dry. The bismuth is hightly diamagnetic and the sound record so produced will, when drawn through a magnetic field, so influence the field as to produce electro-magnetic disturbances which may be utilized to reproduce as sound the variations of the sound trace on the record.

A record such as described may be used in connection with many different forms of electro-magnetic mechanism. I describe for that purpose two forms as shown in the accompanying drawings in which

Fig. 1 is a cross section, partly in elevation, of one form of the apparatus;

Fig. 2 a side elvation of a modified form of the apparatus; and

Fig. 3 a plan view of a flexible strip with a sound trace formed thereon in accordance with my invention.

1 is the sound record which will usually be formed of celluloid and which will, when the apparatus is used in reproducing sound in connection with moving pictures, bear the usual series of pictures thereon. 2 is the sound trace formed on the strip by the application of a coating of bismuth thereto, as hereinbefore referred to. Beneath the sound record strip is located an electro-magnet 3. Above the film I show a coil 4 having one side located close to the strip 1 so as to lie within the magnetic field produced by the magnet 3. The turns of the coil may be crossways of the strip as shown or they may be parallel of the strip or in some intermediate position. As the diamagnetic sound trace passes through the magnetic field its varying width and position cause fluctuations and disturbances in the flux flow and these variations in the field induce undulating currents of electricity in the coil.

In Fig. 2 a similar arrangement of the strip and electro-magnet is shown, but for the coil 4 there is substituted an armature 5 suspended from a stationary support 6 in a state of stable equilibrium. This armature carries a mirror 7. The variations in the positions of the lines of force in the magnetic field will necessarily vibrate the armature and thus cause a beam of light from a source 8 to be directed towards a light-sensitive cell 9 included in an electric circuit. Variations of the illumination of the light-sensitive cell due to the vibrations of the mirror will thus cause an undulatory current to flow in the circuit of the light sensitive cell, which current may be suitably amplified and converted into sound waves. The sound trace 2 may have any form known to the art.

What I claim is:

1. A sound record formed as a flexible strip having a sound trace formed thereon of a highly diamagnetic material.

2. A sound record formed as a flexible strip having a sound trace formed thereon of bismuth.

3. A sound record having a sound trace formed thereon of a material highly diamagnetic relative to the body of the record.

Signed at Highland Park, Ill. this 8th day of May, 1929.

PERCY A. ROBBINS.