

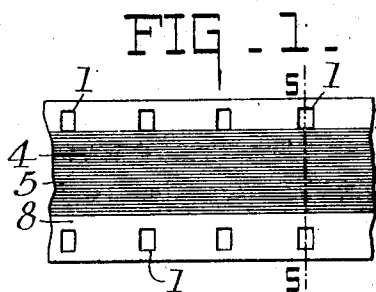
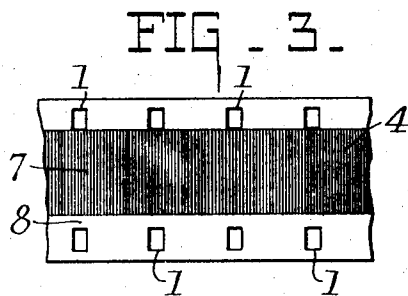
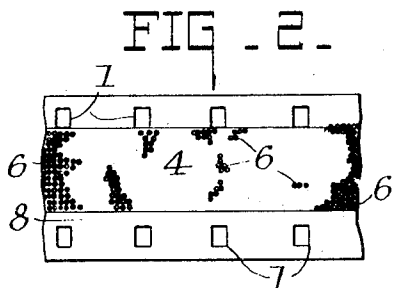
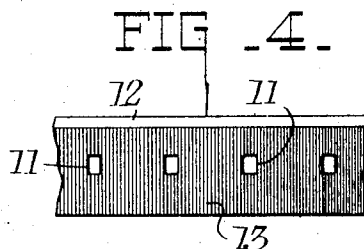
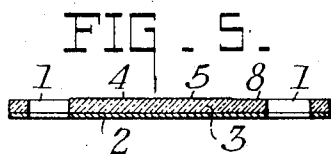
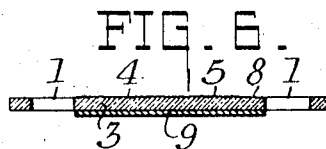
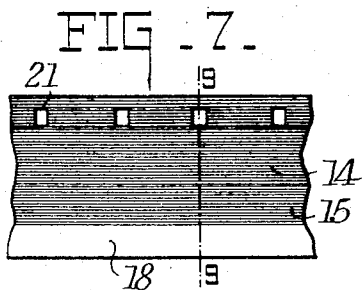
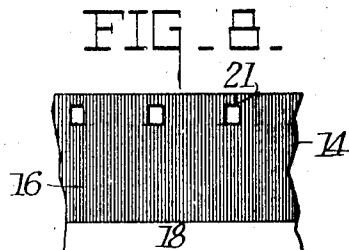
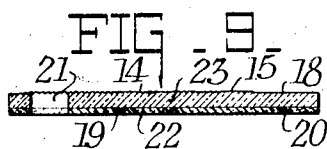
Jan. 6, 1931.

F. M. BISHOP

1,788,010

COMBINED SOUND AND COLOR MOTION PICTURE RECORD

Filed April 13, 1927



Fred M. Bishop,
INVENTOR.

BY *R. L. Stinchfield*
H. M. Perkins
ATTORNEYS.

UNITED STATES PATENT OFFICE

FRED M. BISHOP, OF ROCHESTER, NEW YORK, ASSIGNOR TO EASTMAN KODAK COMPANY,
OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK

COMBINED SOUND AND COLOR MOTION-PICTURE RECORD

Application filed April 13, 1927. Serial No. 183,337.

This invention relates to a film to be used in the synchronized reproduction of sound and motion pictures in color.

The color process for which the film is particularly intended is of the type described in patent to Berthon, No. 992,151, granted May 16, 1911. This process involves the use of a support having a sensitive material upon one surface and having a large number of minute lenses formed in the other surface. These lenses may be of spherical or cylindrical form.

A motion picture film adapted for this process may be used for the reproduction of sound by a known process wherein a photographic record corresponding to a sound record is formed in a narrow band lengthwise of the film, but it is necessary in reproduction to pass light rays through the film. Since the rear surface of the film is irregular, undesirable noise is introduced into the reproduced sound, this noise taking the form of a sustained note if the minute lenses are of uniform size and spacing.

This noise may be avoided by leaving a portion of the surface plane in a narrow band lengthwise of the film.

Reference will now be made to the accompanying drawing in the several figures of which the same reference characters denote the same parts.

Figs. 1, 2, 3 and 4 are, respectively, views of films embodying different forms of my invention.

Fig. 5 is a section on line 5—5 of Fig. 1.

Fig. 6 is a similar section showing a slight modification.

Figs. 7 and 8 show films embodying still other forms of my invention.

Fig. 9 is a section on line 9—9 of Fig. 7 showing developed images.

My invention is shown as embodied in a film in the form of a long band such as is usual in motion picture work having perforations 1 along each border and having upon one surface a sensitized emulsion 2. The support 3 is preferably of cellulose acetate but may be of any plastic composition including a cellulosic derivative such as a cellulose ester or ether, viscose or the like. Upon the

surface opposite to the sensitive emulsion there are formed in a band or area 4, longitudinally of the film, a series of minute lenticular elements. In Figs. 1 and 5 these elements are in the form of convex ridges or semi-cylinders 5 longitudinally of the film. In Fig. 2, they take the form of symmetrical convex protuberances or lenslets 6. In Fig. 3, they are convex ridges or semi-cylinders 7 transverse of the film. The portion 4 in each case does not extend the full width of the film but there is left on at least one side thereof a plane portion or band 8, shown in Figs. 1, 2 and 3 as being between one row of perforations 1 and the lenticulated band 4.

In Fig. 4 is shown a known type of film having a single central row of perforations 11, the portions between the successive perforations being utilized as picture areas.

In all of the figures the sizes of the protuberances are very much exaggerated for the sake of clearness.

Along one border of the last described film is left a smooth band 12, the rest of the rear surface of this film being covered with lenticular elements, here shown as transverse convex ridges or semi-cylinders 13.

One entire surface of the film is usually covered with emulsion as shown in Fig. 5, but if desired, the emulsion may be coated only opposite those portions which are intended for sound or picture records as indicated at 9 in Fig. 6.

In Figs. 7, 8 and 9 are shown views of another type of film having a single row of perforations 21 along one border only, the sound record area 18 being along the other border. All of the film is lenticulated except the part left smooth as this is simpler in manufacture. As shown in Fig. 7, this lenticulated area 14 may include longitudinally extending convex ridges or semi cylinders 15, or, as shown at 16 in Fig. 8 they may be transverse of the film. In Fig. 9, is shown a section of film including a support 23 having a photographic emulsion 22, here shown in a developed condition and having a photographic picture record 19 opposite the lenticulated portion 14, and a photographic

sound record 20 opposite the plane portion 18.

In any case, there will be formed in the emulsion opposite the lenticulated area a color motion picture record, usually a silver image, and in the emulsion opposite the smooth area a sound record, and the film including the support and emulsion opposite these portions respectively constitutes record areas for these purposes.

The protuberances or ridges are preferably of the order of twenty two per lineal millimeter, but the exact size is dependent in part on the curvature of the protuberances, the thickness of the film and other constants of the optical system of which the film is a part, and the size may vary widely from that mentioned, say between ten and forty per lineal millimeter; but in all events it is so minute that the focal length of an individual lens approximates, or is of the same order of size as, the thickness of the film.

I use the word "lenticulated" to define such a surface and I mean thereby a surface comprising a large number of lens-like elements.

I contemplate as included in my invention all such modifications and equivalents as fall within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A film strip for the simultaneous reproduction of color motion pictures and of sounds and comprising a transparent support having upon one surface a photographic layer and having in the other surface a smooth longitudinally extending area and a longitudinally extending lenticulated area, the lenticulations consisting of convex protuberances having a focal length of the same order of magnitude as the thickness of the film, the portion of the film opposite the smooth area constituting a sound record area and that opposite the lenticulated area constituting a natural color motion picture record area.

2. A film for the simultaneous reproduction of color motion pictures with audible accompaniment in the form of a long continuous band comprising a support of a transparent plastic cellulosic compound having upon one surface a uniform photographically sensitive emulsion and having in the other surface two longitudinally extending portions, one portion being lenticulated and covering the major part of said surface, and the other portion being smooth, the film opposite the smooth portion constituting a sound record area, and the film opposite the lenticulated portion constituting a color motion picture record area.

Signed at Rochester, New York this 9th day of April, 1927.