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J. G. CAPSTAFF

1,973,463

METHOD OF MAKING A COMBINED SOUND AND PICTURE RECORD

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Fig. 1.

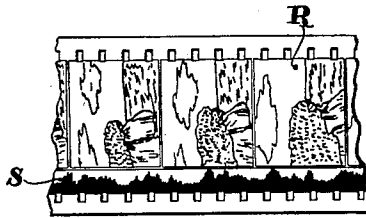


Fig. 2.

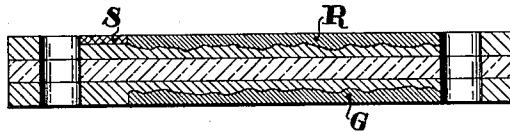


Fig. 3.



Fig. 4.

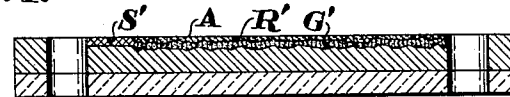
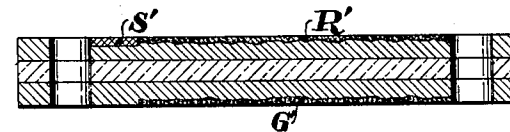


Fig. 5.



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# UNITED STATES PATENT OFFICE

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## METHOD OF MAKING A COMBINED SOUND AND PICTURE RECORD

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Application February 24, 1931, Serial No. 517,800

2 Claims. (Cl. 88—16.2)

This invention relates to film carrying a motion picture record in color and a photographic sound record, and more particularly to a film of this type in which the sound record consists of opaque metal salts and the picture record comprises complementary color component images on the same or opposite sides of the support.

Reference will be made to the accompanying drawing in several figures of which the same reference figures denote the same parts and in which,—

Figure 1 represents the face view of a film embodying my invention;

Figure 2 is a sectional view of the film embodying one form of my invention when the process is partially completed;

Figure 3 is a sectional view of the film when finished.

Figure 4 is a sectional view of another embodiment of the invention.

Figure 5 is a sectional view of film made by still another variation.

In carrying out one form of my invention I practice a color photographic process as disclosed in my prior Patents 1,196,080, patented August 29, 1916 and 1,315,464 patented September 9, 1919. The process involves the forming of registering color component silver images upon the opposite surfaces of the film and the transformation of these images into dye images. These films may be produced by printing upon opposite surfaces of motion picture film in apparatus such as is described in my prior Patents 1,478,599, December 25, 1921 or 1,591,466, July 6 1926.

In accordance with the present invention, there is also imprinted upon the double coated film prior to development a photographic sound record. This may be imprinted upon either surface. The film as a whole is then developed and fixed in the usual way producing a film, shown in Figure 2, having along one edge a silver photographic sound record S, and upon both surfaces in registration silver photographic picture records R and G respectively.

In a preferred embodiment of my invention the film is next bleached in a bath as disclosed in my Patent 1,196,080, a bath comprising potassium ferricyanide, potassium bromide and potassium bichromate. The silver of the picture records R and G and of the sound record S is now bleached and converted to silver salts, largely silver bromide.

At this stage the film is temporarily dried and a coat of protective varnish is applied over the sound record S as indicated by V in Figure 3. The remaining steps as indicated in my prior patents

are now carried out and the picture records R and G are respectively transformed into color component images, one red and one green. The sound record S having over it a protective layer V is unaffected by the remainder of the treatment and remains a record in silver salt. These salts are sufficiently opaque to the radiation to which the photo cell is responsive so that clear sound reproduction is obtained.

The layer of protective varnish over the sound track may be left on the film, in which case it serves to protect the sound record against accidental scratching in use.

Instead of converting the sound track silver image to one consisting of silver bromide, I may convert it to silver sulphide or silver iodide or to any other suitable silver, metal or double metal salt by proper treatment. To accomplish this, I may, for example, after the bleaching treatment and conversion to silver bromide, protect the picture areas with a suitable varnish, then immerse in a solution of a soluble sulphide or sulphur bearing compound which will convert the silver bromide to silver sulphide, remove the varnish from the picture areas, varnish the sound record, and then proceed with the transformation of the picture records R and G to color component dye images.

In place of the color photographic method just described, I may combine my invention with the color process in which the registering color component images are transferred to a receptive medium, such as a colloid layer, particularly gelatin, by imbibition from a relief or suitable printing surface. In carrying out this method for example, the photographic sound record is printed on a film coated with a silver halide. The sound record image is developed and fixed, leaving the remaining surface A of clear gelatin. The silver sound image is now converted by methods common in the art to an image S' of a silver, metal, or double metal salt. The color component images are then transferred by imbibition to the picture areas, one over the other, as shown by R' and G', Figure 4.

In still another embodiment of my invention I may use a double coated film coated on both sides with gelatin, at least one of the gelatin layers containing silver halide. On the silver halide layer I print the photographic sound record. I then develop, fix and transform this silver sound image by well known means to an image consisting of silver bromide, silver iodide, silver sulphide or by toning or other methods to any silver or metal salt or double salt. (S' in Fig. 5.) The two (or more) color images are then transferred

to opposite sides of the film by imbibition (R' and G' in Fig. 5).

Examples of other metal salts which are useful and into which the image can be easily converted by known methods are ferric ferrocyanide and uranyl ferrocyanide. A large number of methods of treatment has been published by which it is possible to convert a silver image into colored or uncolored metal and double metal salts.

It will be evident that a number of variations are possible, all of which I consider as included within my invention, as expressed in the appended claims.

What I claim and desire to be secured by Letters Patent of the United States is:

1. The method of making combined sound and visual records that comprises forming in a photographic sensitive gelatin silver halide emulsion layer, a silver image constituting a sound record

and a silver image constituting a visual record, bleaching both such records, and covering the sound record with a protective varnish to leave a permanent sound record consisting of silver salts and transforming the visual record into a plainly visible image.

2. The method of making a combined sound and visual record that comprises forming on each side of a sensitized support registering complementary color component silver images, on one side of said support a silver image constituting a sound record, bleaching both visual and sound silver images, covering the sound record with a protective varnish to leave a permanent sound record consisting of silver salts, and then transforming the visual images to complementary images in colors.

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20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150