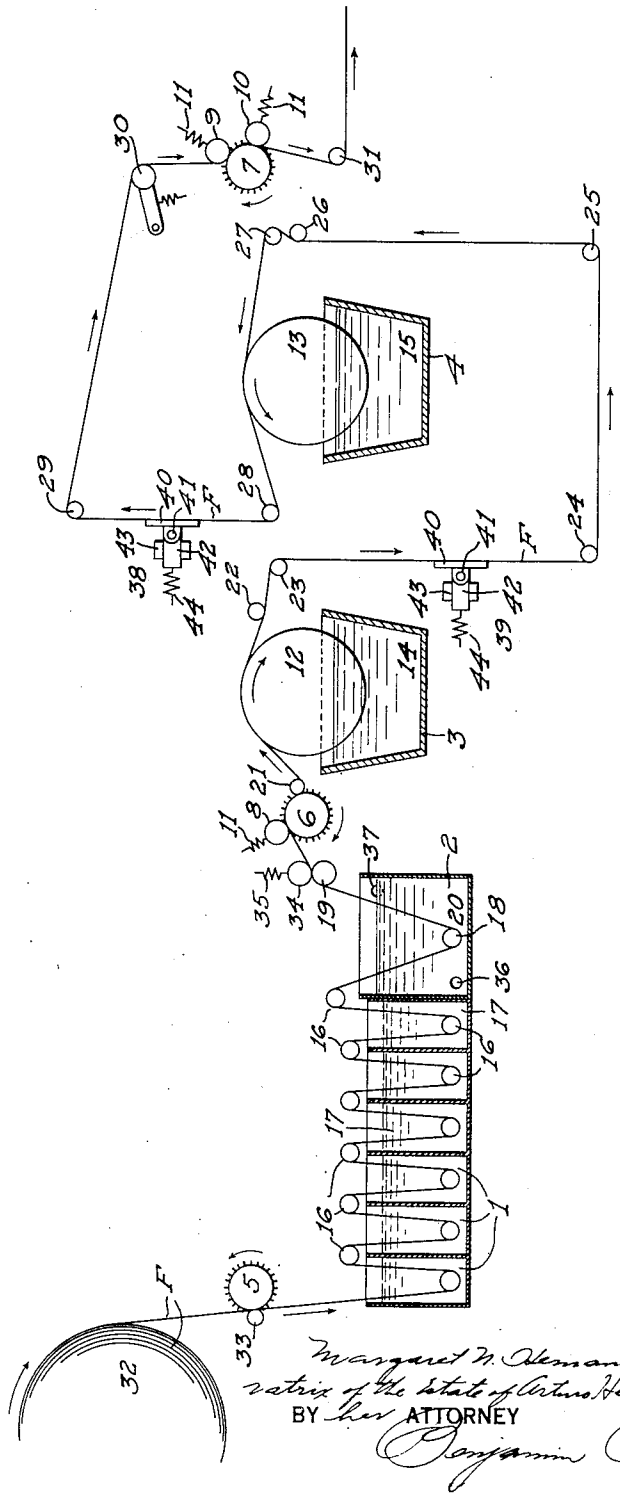
Feb. 3. 1925. 1,525,423

A. HERNANDEZ-MEJIA

PROCESS AND APPARATUS FOR COLORING COLOR MOTION PICTURE FILMS

Filed Dec. 18, 1922



INVENTOR

Margaret N. Hernandez, Administratrix of the estate of Arturo Hernandez-Mejia.

BY her ATTORNEY

Benjamin Roman.

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UNITED STATES PATENT OFFICE.

ARTURO HERNANDEZ-MEJIA, DECEASED; BY MARGARET N. HERNANDEZ, ADMINISTRATRIX, OF NEW ROCHELLE, NEW YORK, ASSIGNOR TO COLORGRAPH LABORATORY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PROCESS AND APPARATUS FOR COLORING COLOR-MOTION-PICTURE FILMS.

Application filed December 18, 1922. Serial No. 607,714.

To all whom it may concern:

Be it known that ARTURO HERNANDEZ-MEJIA, deceased, late a citizen of the Republic of Venezuela, has invented certain new and useful Improvements in Process and Apparatus for Coloring Color-Motion-Picture Films, of which the following is a specification.

This invention relates to color motion picture photography and projection, and particularly to the process and product described in the patent to Arturo Hernandez-Mejia, No. 1,174,144, granted March 7, 1916, wherein the film which produces the natural color motion pictures, is sensitized on its opposite sides, complementary color record images, such as red and green value records, of the same subject are printed in registry upon its opposite sides, and each of the image records is changed to a color complementary to the color of the filter with which it was taken.

The principal object of the invention is to provide a simplified, convenient, economical, automatic, and improved process and machine for performing the coloring process upon said film, and particularly for carrying out this work efficiently on the large commercial scale required for the proper exploitation of the invention covered by the said patent.

Other objects and advantages will hereinafter appear.

The accompanying drawing shows a general diagram of the process and machine constituting this invention.

In making the films described in said patent, the red value records or images are usually all printed on one side of the film, and hence this side has to be colored green, while all the green value records are printed upon the opposite side of the film and therefore the latter side of the film has to be colored red. This coloring operation is usually performed by means of changing or converting the dark silver salts constituting the images into a colored compound or substance. Such conversion of the images may be carried out by means of treating the side of the film, which is to be red, with a suitable solution of copper sulphate or chloride and potassium ferricyanide, and by treating the opposite side of the film, which is to be green or blue-green, with a solution of ferrous sulphate and hydrochloric acid. Various other solutions may be utilized for carrying out the above result. Another method of coloring the film is by bleaching or mordanting the film and then treating each side with a basic dye. Either of the aforesaid methods will tone, color, or convert the dark silver salt comprising the images into the colored compound required in the production of the aforesaid type of films. The drawing herein illustrates the latter method of performing the coloring operation but it will be hereinafter evident that the former coloring method may be likewise performed by utilization of the same machine.

In carrying out the invention there is provided a series of vessels 1 adapted to contain mordanting fluid, a vessel 2 adapted to contain water for washing the film after mordanting, a vessel 3 adapted to contain basic green dye solution, and a vessel 4 adapted to contain basic red dye solution. The apparatus or machine is provided with a series of driving sprockets 5, 6, 7, adapted to engage the usual perforations at the sides of the film, to thereby propel the film, and cooperating pressure rollers 8, 9, 10, pressed upon by springs 11, normally press against the said sprockets to maintain them in gear with the film perforations. Above the vessels 3, 4 are mounted driven rotating rollers 12, 13, which are partially immersed in the basic dye solutions 14, 15, and as these rollers rotate they carry upwardly, upon their peripheries, coatings of the respective basic dye solutions. A series of rolls 16 serve to guide and direct the film through the mordanting solution 17, a series of rolls 18, 19 guide and direct the film through the water or washing fluid 20, rolls 21, 22, 23 direct the film in contact with the periphery of roller 12, rolls 24, 25, 26, 27, 28 reverse the film and direct it to and in contact with the periphery of roller 13, and rolls 29, 30, 31 direct the film toward the driving sprocket 7 and discharge it. As the film F is propelled or fed through the apparatus it is unwound from the reel 32 and passed between the sprocket 5 and roll 33, over and around

the rolls 16 and through the mordanting solution 17, under the roll 18 and through the washing fluid 20, between the roll 19 and a downwardly pressing pressure-roll 34, pressed upon by a spring 35, between the sprocket 6 and pressure roll 8, under the roll 21, over the periphery of the rotating driven roller 12, under, over, and around the directing and reversing rolls 22, 23, 24, 25, 26, 27, over the periphery of the rotating driven roller 13, over and around the rolls 28, 29, 30, between the sprocket 7 and pressure rolls 9, 10, and under the roll 31, whereat the film is discharged. By following the diagram in the drawing it will be seen that in the travel of the film through this apparatus it is first mordanted upon its opposite sides by the solution 17 in vessel 1, then washed by the water or other washing fluid 20 in vessel 2 to arrest the mordanting action, then treated by the green basic dye, by its rolling contact with the periphery of roller 12, which carries this dye up from the solution 14 upon its periphery as it is being driven, then reversed by the rolls 23, 25, 27, etc., and its opposite side subjected to rolling contact with the roller 13, whereby it is similarly treated by the red basic dye from the solution 15, and then it is conveyed to its discharge. The several arrows shown in the drawing aid in following thereupon the progress of the film through the apparatus and the performance of the coloring process thereupon. In the vessel 2, the water or other washing fluid 20 is shown as continually entering through the inlet opening 36 and running out through the outlet opening 37, by which means a constant current is imparted to the washing fluid and the same is continually refreshened.

In case there should occur unevenness in the deposit by the rollers 12, 13 of the coloring solution upon the film sides there are provided devices 38, 39 for spreading the moist solution coating adhering to the sides of the film, so as to effect a uniform layer of the deposit thereupon. Each of these devices comprises a suitable pad 40 pivoted at 41 to a plate 42 slidable longitudinally in guiding ways 43, and this plate is normally pressed upon by a spring 44, whereby the pad 40 is caused to bear under tension against the film, constantly, resiliently; and uniformly. As the film advances, therefore, any unevenness or wave of solution deposit that may exist upon its surface is spread out to uniformity by the pad 40 and such possible defects are remedied. The device 39 serves to operate upon the green treated side of the film, while the device 38 similarly serves to operate upon the red treated side of the film.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:—

1. A machine for coloring film having color records upon its opposite sides comprising means to feed the film, means to pass the film through mordanting fluid, means to pass the film through washing fluid, a pair of vessels containing fluids of different colors, a rotating roller in each of said vessels, means to pass the film in contact with one of said rollers for applying the coloring fluid thereupon, means bearing against said contacted side of the film to uniformly spread the coloring fluid thereover, means to reverse the film, means to pass the reverse side of the film in contact with the other of said rollers, and means bearing against said reverse side of the film to uniformly spread the coloring fluid thereover.

2. A machine for coloring film having color records upon its opposite sides comprising means to feed the film, means to pass the film through mordanting fluid, a pair of vessels containing fluids of different colors, a rotating roller in each of said vessels, means to pass the film in contact with one of said rollers for applying the coloring fluid thereupon, means to uniformly spread the coloring fluid over said contacted side of the film, means to reverse the film, means to pass the reverse side of the film in contact with the other of said rollers, and means to uniformly spread the coloring fluid on said reverse side of the film.

3. A machine for the purpose described having the combination of means to feed the film, a vessel for mordanting fluid, a vessel for washing fluid, a vessel for coloring fluid, a roller rotating in said last vessel, a vessel for complementary coloring fluid, a roller rotating in the said complementary fluid vessel, means to pass the film through said first vessel, means to pass the film through said second vessel, means to pass the film in contact with said first named roller, means to spread the coloring fluid uniformly over said contacted side, means to reverse the film, means to pass the film in contact with the last named roller, and means to spread the coloring fluid uniformly over said reverse side.

4. A machine for the purpose described having the combination of means to feed the film, a vessel for mordanting fluid, a vessel for coloring fluid, a roller rotating in said coloring fluid, complementary coloring fluid, a roller rotating in said last vessel, means to pass the film through said first vessel, means to pass the film in contact with said first named roller, means to reverse the film, and means to pass the film in contact with the last named roller.

5. A machine for the purpose described having the combination of means to feed

the film, a vessel for coloring fluid, a roller rotating in said vessel, a vessel for complementary color fluid, a roller rotating in said last vessel, means to pass the film in contact with said first named roller, means to reverse the film, and means to pass the film in contact with said last named roller.

6. The process for applying color to films of the class described which consists in utilizing a pair of fluids of complementary coloring properties, conveying a layer of each of said fluids to the exterior of the fluid, feeding the film continuously, passing the film in contact with one of said layers, reversing the film, and then passing the film in contact with the other of said layers.

7. The process for applying color to films of the class described which consists in utilizing a pair of fluids of different coloring properties, conveying a layer of each of said fluids to the exterior of the fluid, feeding the film continuously, directing the film whereby one of its sides is in contact with one of said layers, and then directing the film whereby its opposite side is in contact with the other of said layers.

8. The process for applying color to films of the class described which consists in utilizing a mordanting fluid, a pair of fluids of different coloring properties, conveying a layer of each of said fluids to the exterior of the fluid, feeding the film continuously, directing the film so as to pass through said mordanting fluid, directing the film whereby one of its sides is in contact with one of said layers, and then directing the film whereby its opposite side is in contact with the other of said layers.

9. The process for applying color to films of the class described which consists in utilizing a mordanting fluid, a washing fluid, a pair of fluids of different coloring properties, conveying a layer of each of said last named fluids to the exterior of the fluid, feeding the film continuously, directing the film so as to pass through said mordanting fluid, directing the film so as to pass through said washing fluid, directing the film whereby one of its sides is in contact with one of said layers, and then directing the film whereby its opposite side is in contact with the other of said layers.

10. The process for applying color to films of the class described which consists in utilizing a pair of fluids of different coloring properties, conveying a layer of each of said fluids to the exterior of the fluid, feeding the film continuously, passing the film in contact with one of said layers, spreading the coloring fluid uniformly over said contacted side, reversing the film, then passing the film in contact with the other of said layers, and then spreading the coloring fluid uniformly over the opposite side of the film.

11. The process for applying color to films of the class described which consists in utilizing a pair of fluids of complementary coloring properties, conveying a layer of each of said fluids to the exterior of the fluid: feeding the film continuously, directthe film whereby one of its sides is in contact with one of said layers, spreading the coloring fluid uniformly over said side of the film, then directing the film whereby its opposite side is in contact with the other of said layers, and then spreading the coloring fluid uniformly over said opposite side of the film.

12. A machine for the purpose described having the combination of means to feed the film, a pair of vessels for fluids of different coloring properties, means adapted to travel through and above each of said fluids and to convey a layer of said fluid above the surface of the fluid, means to direct the film whereby one of its sides will pass in contact with one of said coloring layers, means to reverse the film, and means to direct the film whereby its opposite side will pass in contact with the other of said coloring layers.

13. A machine for the purpose described having the combination of means to feed the film, a pair of vessels for fluids of different coloring properties, means to convey a layer of each of said fluids above the surface of the fluid, means to direct the film whereby one of its sides will pass in contact with one of said coloring layers, and means to direct the film whereby its opposite side will pass in contact with the other of said coloring layers.

14. A machine for the purpose described having the combination of means to feed the film, a pair of vessels for fluids of different coloring properties, means to convey a layer of each of said fluids from the body of the fluid, means to direct the film whereby one of its sides will pass in contact with one of said coloring layers, and means to direct the film whereby its opposite side will pass in contact with the other of said coloring layers.

15. A machine for the purpose described having the combination of means to feed the film, a pair of vessels for fluids of different coloring properties, means adapted to travel through and above each of said fluids and to convey a layer of said fluid above the surface of the fluid, means to direct the film whereby one of its sides will pass in contact with one of said coloring layers, means to spread the coloring fluid uniformly over the side of the film, means to reverse the film, means to direct the film whereby its opposite side will pass in contact with the other of said coloring layers, and means to spread the fluid uniformly over the opposite side of the film.

16. A machine for the purpose described having the combination of means to feed the film, a pair of vessels for fluids of different coloring properties, means to convey a layer of each of said fluids above the surface of the fluid, means to direct the film whereby one of its sides will pass in contact with one of said coloring layers, means to spread the coloring fluid uniformly over the side of the film, means to direct the film whereby its opposite side will pass in contact with the other of said coloring layers, and means to spread the fluid uniformly over the opposite side of the film.

Signed at the city of New York, in the county of New York, and State of New York, this 15th day of December, A. D. 1922.

MARGARET N. HERNANDEZ.
Administratrix of the estate of Arturo Hernandez-Mejia, deceased.