

123,786

PATENT



SPECIFICATION

Application Date, Dec. 3, 1917. No. 17,881/17,

Complete Left, June 3, 1918.

Complete Accepted, Mar. 3, 1919.

PROVISIONAL SPECIFICATION.

Improvements relating to Polychrome Cinematography.

I, ARON HAMBURGER, of 38, Dover Street, Mayfair, London, W. 1, Consulting Chemist, do hereby declare the nature of this invention to be as follows:—

This invention relates to the production of cinematograph films in colour.

It has been proposed to prepare cinematograph films by printing a doubly sensitised film from complementary colour negatives, one of which is reversed, and then dyeing the developed images each with its appropriate colour. This has, however, hitherto involved either the incorporation of chemicals for the dyeing operation in the emulsion on each side, or the successive treatment in separate operations of each side of the film while the other is protected.

5 The object of the present invention is to avoid the difficulties introduced by the incorporation of colour toning chemicals in the emulsion on the one hand, and on the other to avoid the hitherto necessary protective coating of one side of the film prior to the other side being treated.

10 This invention consists broadly in causing a cinematograph film sensitised on both sides and of the type above indicated to be dyed on both sides simultaneously or practically simultaneously.

15 The invention further consists in causing dye impregnated bands or bands of pigmented paper to be applied and passed between pressing rollers, the double printed film to be dyed, which may or may not have been previously bleached, being introduced between the bands as they pass between the pressing rollers, which are preferably disposed on practically vertical axes.

20 The invention further consists in employing steam heated rollers, preferably immediately behind the first pressing rollers.

25 The invention also consists in feeding a double printed bleached film between a pair of clamping frames, adapted to clamp the film between them, making fluid tight joints round the edges, and arranging for dyeing fluids to be brought into contact with the film on each side, to effect the dyeing, the fluid circulation arrangements being such that the fluids are kept separate.

30 In carrying this invention into effect in one form, by way of example, I provide a machine carrying a double printed bleached film and feeding it between pressing rollers. In this machine I also carry a pair of bands, which are preferably continuous, and carried round suitable pulleys. These bands are also carried between a pair of pressing rolls, which are mounted on vertical axes in such a way that the film to be dyed passes between the two bands. These bands are of absorbent material, and the appropriate dyes are arranged to flow on to them at a point before they reach the pressing rolls, so as to keep them at that point saturated with dye. A further pair of rolls are mounted behind the first pressing rolls, and these are arranged to be steam heated. The film and the dyeing bands are caused to pass slowly through the rolls, the rate

[Price 6d.]



being such as will permit of the dyeing being properly effected. The film is then washed off and fixed in the usual way.

In carrying the invention into effect in another form, instead of employing absorbent bands to carry the dyes, I mount a series of frames in chain form round suitable spring pressed polygonal rollers. These frames are preferably closed shallow tanks, the closure of which is effected on the outside by glass plates, and on the inside by jointing material, which seals them against the film, which one element of each pair of chains clamps between them. Inlet and outlet passages are provided for the dyeing fluids. The fluid may conveniently be fed from centrally disposed reservoirs, which can be raised and lowered. They are raised to cause the flow of the fluid into the tank chambers, and lowered to withdraw the fluid therefrom; or again, in another arrangement, the fluids may be caused to circulate through jets, which play upon the film while it is clamped between the frames. When dyeing has been effected, the chains are moved on one link, and the operations repeated on the next section of film. The film is also arranged to be fed on through washing, fixing and drying appliances, as usual.

In another method of carrying this invention into effect, I effect the bleaching and pigmenting in one operation, by providing a bath in which the strips of carbon paper or dye gelatine paper are caused to be soaked for a suitable time, say five minutes, on their passage to the two pairs of pressing rolls above described. They are allowed to remain in contact a sufficient time and are then fed forward into a position where the carbon paper is brought into contact with a hot developing solution or the dye paper with a cold washing solution. Simultaneous bleaching and pigmenting is thus effected.

The required combined bleaching and pigmenting solution is prepared from the following ingredients:—

Copper sulphate	-	-	-	4 oz.	
Potassium bromide	-	-	-	1400 grs.	
Potassium bichromate	-	-	-	180 grs.	30
H.Cl.	-	-	-	80 minims.	

The copper sulphate is dissolved with the potassium bromide in 20 oz. of water, and the potassium bichromate in another equal quantity of water, with the indicated H.Cl. added. The two solutions are then mixed slowly while stirring well and the resulting solution is ready for use. The dyes required are for greenish blue, basic methylene blue, which should be as nearly as possible minus red, and for magenta red, basic fuchsin red which should be as nearly as possible minus green.

Dated this 1st day of December, 1917.

MARKS & CLERK. 40

COMPLETE SPECIFICATION.

Improvements relating to Polychrome Cinematography.

I, ARON HAMBURGER, of 38, Dover Street, Mayfair, London, W. 1, Consulting Chemist, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to the production of cinematograph films in colour (see Application 123,787).

It has been proposed to prepare cinematograph films by printing a doubly sensitised film from complementary colour negatives, one of which is reversed,

and then colouring the developed images each with its appropriate colour. This has, however, hitherto involved either the incorporation of chemicals for the colouring operation in the emulsion on each side or the successive treatment in separate operations of each side of the film while the other is protected.

5 The object of the present invention is to avoid the difficulties introduced by the incorporation of colour toning or dyeing chemicals in the emulsion on the one hand, and on the other to avoid the hitherto necessary protective coating of one side of the film prior to the other side being treated.

10 This invention consists broadly in producing cinematograph films in colour by dyeing or otherwise colouring practically simultaneously both sides of a doubly sensitised film which has been printed and developed.

The invention further consists in causing dye impregnated bands or bands of pigmented paper to be passed between pressing rollers, the double
15 printed film to be dyed, which may or may not have been previously bleached, being introduced between the bands as they pass between the pressing rollers, which are preferably disposed on practically vertical axes.

The invention further consists in employing dye fixing rollers preferably immediately behind the first pressing rollers.

20 The invention also consists in feeding a double printed bleached film between one or more pairs of clamping frames, adapted to clamp the film between them, and making fluid tight joints round the edges, and arranging for dyeing fluids to be brought into contact with the film within the frames on each side, to effect the dyeing, the fluid circulation arrangements being such that the fluids are kept separate.

25 In the accompanying diagrammatic drawings,

Figures 1 and 2 show in plan and elevation views of the general arrangement of the operative parts of a machine for dyeing a continuous sensitised film on each side with a suitable dyeing fluid.

30 Figures 3 to 7 show a modification in which a series of frames in chain form are arranged round suitable spring-pressed polygonal rollers for carrying the dyes instead of employing absorbent bands.

Figure 3 is an end elevation of the complete machine.

Figure 4 is a plan.

35 Figure 5 is a detail plan of joint between the ends of two elements or frames.

Figure 6 is an elevation of one element or frame, and

Figure 7 is a section on the line 7-7 of Figure 6 showing two elements pressed together.

40 The machine shown by way of example in Figures 1 and 2 is provided with means for carrying a double printed bleached film *a* and passing it between a pair of suitably operated pressing rollers *b b'* by which the continuous bands *c c'* of porous absorbent material charged with the dyeing fluid and the film is fed.

45 The machine is also provided with guide or tension rollers *d d'*, and at a point beyond the pressing rollers *b b'* there are conveniently a pair of dye fixing perforated rollers *e e'* emitting dry steam on the dye bands to fix the dye on such portion of same as is required to be dyed, around which sets of rollers the continuous bands are in engagement. At points intermediate of the tension rollers and the pressing rollers suitable means are provided for keeping the absorbent bands *c c'* suitably saturated with the dyeing fluid.

50 The film and the dyeing bands are caused to pass slowly through the rolls, the rate being such as will permit of the dyeing being properly effected. The film is then washed off and fixed in the usual way.

In carrying the invention into effect in another form, instead of employing absorbent bands to carry the dyes I mount a series of frames in chain form
55 round suitable spring-pressed polygonal rollers. These frames act in a similar manner to those described in the Specification of my Application No. 17,882 of 1917, and are preferably closed shallow tanks, the closure of which is effected

on the outside by glass plates, and on the inside by jointing material which seals them against the film, which one element of each pair of chains clamps between them.

In Figures 3 to 7, cast brass frames *g* carry brass frames *h* securing rubber sealing strips *i* and glass plates *j* perforated to connect with inlet and outlet passages *k* for the dyeing fluids. The two halves of the cells are carried respectively around polygonal drums *l*, adjacent cells being connected by a plain link joint *m*, shown especially in Figure 5. The two halves forming a complete cell, one half being carried on one series of drums and the other on a second series, are registered by means of spigots or guiding pins *n* taking into holes, and the frames as a whole are positioned with respect to the drums by projections *p* on the latter entering holes *o* on the former. The two halves of the frames are normally caused to approach by means of a spring indicated by *q*, and a simple linkage *r* can be provided for moving them to and fro. The dye may conveniently be fed from tanks *r*¹ disposed centrally between the chains of frames around the rollers and means may conveniently be provided for raising or lowering these tanks; for instance, they can be mounted on standards *s* and held in the top position by a swinging link *t* which can be moved by hand so that the tanks can be lowered into the bottom position. They are raised to cause the flow of the fluid into the tank chambers, and lowered to withdraw the fluid therefrom; or again, in another arrangement the fluids may be caused to circulate through jets, which play upon the film while it is clamped between the frames. When dyeing has been effected, the chains are moved on one link and the operations repeated on the next section of film. The film is also arranged to be fed on through washing, fixing and drying appliances, as usual.

In another method of carrying this invention into effect, I effect the bleaching and pigmenting or dyeing in one operation, by providing a bleaching bath the composition of which is given below in which strips of carbon paper or dye gelatine paper are caused to be soaked for a suitable time; say five minutes on their passage to the two pairs of pressing rolls above described. The two papers and the film are allowed to remain in contact simultaneously a sufficient time and are then fed forward into a position where the carbon paper is brought into contact with hot water for development or, in the case of the dye paper, with cold water for washing. Simultaneous bleaching and pigmenting is thus effected.

I find that carbon and dye gelatine papers containing the desired colours when applied to a silver photograph image have in addition to the property of bleaching the silver image, the property of impregnating the bleached image with the colour or pigment contained in them, that is to say, as the silver image is bleached by the solution it is at the same time absorbing pigment or pigmented gelatine from the band or plaster of carbon paper or dye-gelatine paper and by some action; perhaps catalytic, the amount of pigmented or coloured gelatine which is absorbed by the silver image during the coincident bleaching and pigmenting process becomes insoluble in water. Then in the case of carbon paper this is developed in hot water as usual, the paper floating away or being gently removed and the resulting mass being treated with the warm water as in the usual carbon process removing the soluble pigmented gelatine and leaving the image in colour. In the case of dye gelatine papers cold water treatment is employed instead of treatment by warm water.

The required combined bleaching and pigmenting solution for use either with dye bands or carbon pigment paper is prepared from the following ingredients:—

Copper sulphate	-	-	-	4 oz.
Potassium bromide	-	-	-	1400 grs.
Potassium bichromate	-	-	-	180 grs.
H.Cl.	-	-	-	80 minims.

The copper sulphate is dissolved with the potassium bromide in 20 oz. of water, and the potassium bichromate in another equal quantity of water, with the indicated H.Cl. added. The two solutions are then mixed slowly while stirring well and the resulting solution is ready for use. The dyes required are
5 for greenish blue, basic methylene blue, which should be as nearly as possible minus red, and for magenta red, basic fuchsin red which should be as nearly as possible minus green.

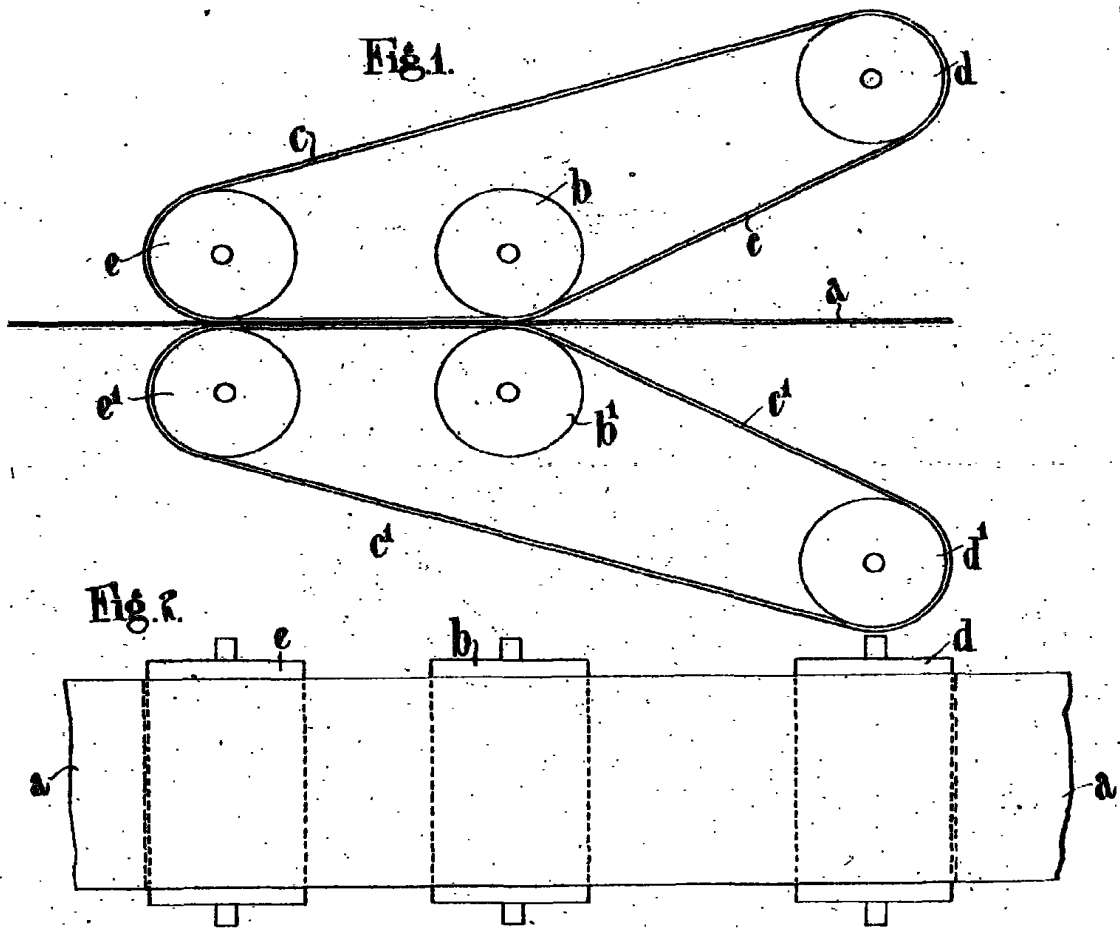
Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that
10 what I claim is:—

1. Producing cinematograph films in colour by dyeing or otherwise colouring practically simultaneously both sides of a doubly sensitised film which has been printed and developed.
2. Method of and means for dyeing the two sides of a continuous film bearing
15 images on both sides, consisting in passing such film between endless bands of absorbent material charged with dyeing fluid forced into contact with the film by pressing rollers on each side thereof.
3. In a process for colouring both sides of a continuous film with a dyeing fluid using continuous bands of absorbent material charged with dyeing fluid,
20 mounting the bands on each side of the film on sets of rollers having vertical axes at least one pair of which act as pressing rolls and one pair dye fixing rollers, substantially as described.
4. In the processes claimed above feeding a double printed bleached film between a pair of clamping frames, adapted to clamp the film between them,
25 and making fluid tight joints round the edges, and arranging for dyeing fluids to be brought into contact with the film within the frames on each side, to effect the dyeing, the fluid circulation arrangements being such that the fluids are kept separate.
5. A process for colouring films with dyeing fluids substantially as shown
30 and described.
6. Multi-coloured cinematograph films produced substantially in the manner hereinbefore described.
7. A process as claimed in Claim 1 in which the bleaching and colouring on each side are effected simultaneously for example by means of carbon paper.

35 Dated this 3rd day of June, 1918.

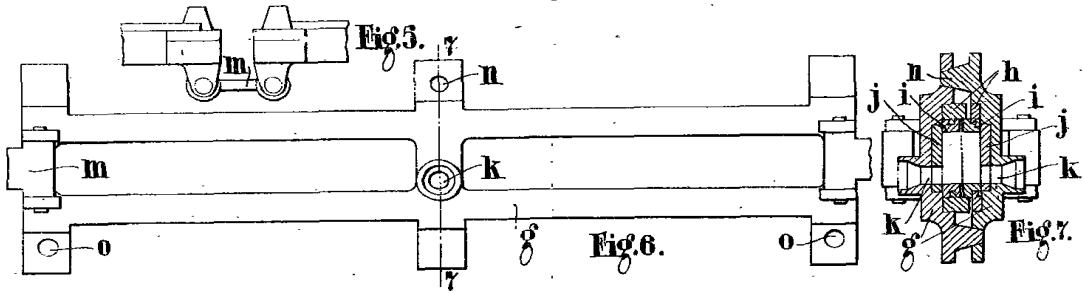
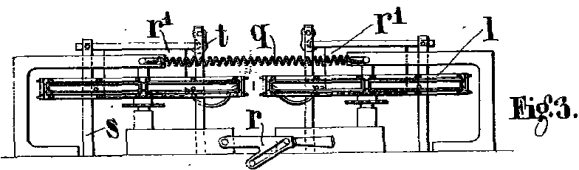
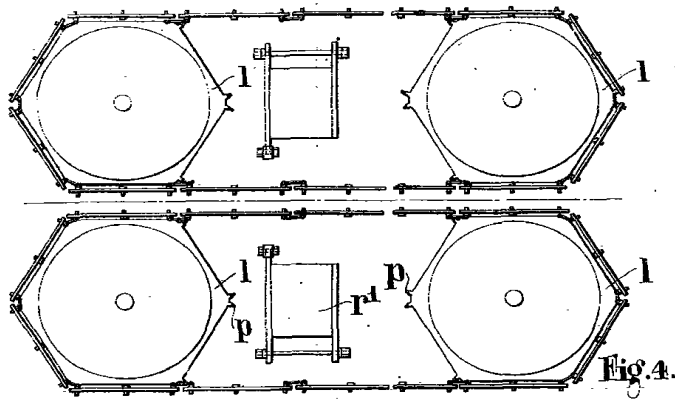
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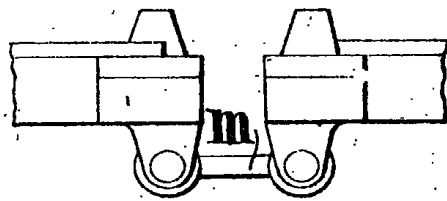
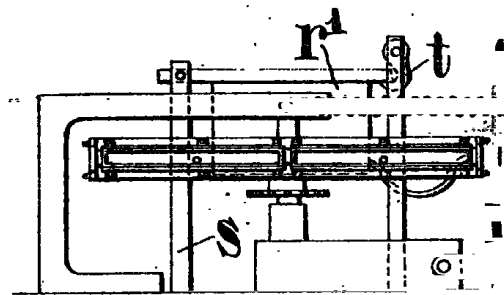
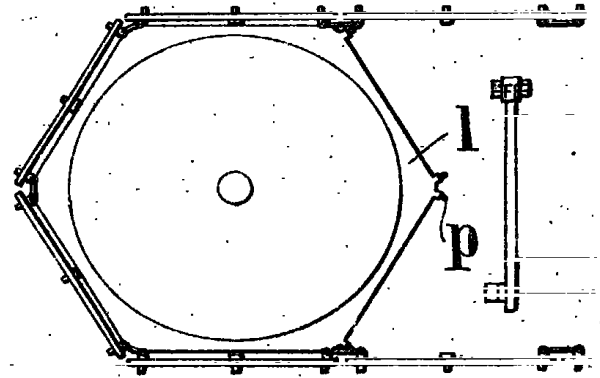
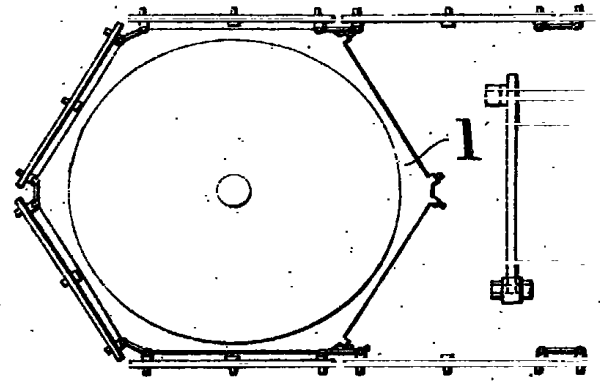


Fig. 5.

