PATENT SPECIFICATION

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Application Date (in United Kingdom): May 8, 1930. No. 14,134/30.

Complete Accepted: May 14, 1931.

COMPLETE SPECIFICATION.

Improvements in or relating to the Tinting of Combination Kinematograph and Sound Record Films.

We, KODAK LIMITED, a Company registered under the Laws of Great Britain, of Kodak House, Kingsway, London, W.C. 2, (Assignees of KENNETH CLAUDE DEVEREUX HICKMAN, British Subject, of Kodak Park, Rochester, New York, United States of America) 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 tinting of kinematograph films of the kind having an untinted sound record area and a tinted picture area and has for its object to prevent the accidental tinting of the sound record area and thus obviating the consequent unintentional sound variations which are apt to occur.

It has hitherto been proposed to apply liquids to kinematograph films by drawing the film over a liquid-applying roller having a circumferential groove corresponding in width to that of the area to be tinted so that the longitudinal margins of the film contact with and thus rotate the roller. With this known method, however, the parts of the film and roller which are in contact move in the same direction so that when the film diverges from the surface of the roller, this is liable, on account of surface tension, to draw some of the wet liquid layer from the film thereby causing the formation of irregular edges on the layer.

According to this invention the film and the tint-applying roller are moved relatively to one another in such a manner that the parts of the film and roller which are in contact move in opposite directions whereby the marginal limit or longitudinal boundary between the sound record area and the area to be tinted is moistened before the tint is applied in a direction opposite to that in which the film is moving, so that the edge of the tinted area adjacent to the sound record is sharply defined.

The tint-applying roller may be provided with an annular groove or gap in its peripheral surface corresponding to that of the sound record area, this groove or gap being bounded by flanges so that the tint is applied to the film on both sides of the sound record area.

In the accompanying drawings,

Figure 1 illustrates purely diagrammatically one general arrangement of apparatus for applying tint to a motion picture film in accordance with the present invention,

Figure 2 shows in end elevation on an enlarged scale the tint-applying roller shown in Figure 1,

Figure 3 is a similar view of a modified form of roller,

Figures 4 and 5 are side elevations of modified tint-applying devices,

Figure 6 shows in section the effect of employing a plain surfaced roller,

Figure 7 is a similar view showing the action of a flanged roller employed in accordance with this invention, and

Figure 8 shows in plan a strip of film to which the tint is applied according to the invention.

In the general arrangement illustrated in Figure 1 the film strip 10 carried on a reel 9 passes over upper rollers 11, guide roller 12 and tensioning rollers 14 which carry a weight 13. The film then passes round a heated roller 15, guide roller 16, two further heated rollers 17 and 18, guide roller 19 and a fourth heated roller 20, whence it is taken round guide rollers 21 and 22 to a reel 24. A weight 23 carrying the rollers 22 serves to tension this part of the film.

A tint-applying roller 25 (Figure 2) which is rotated, as shown in Figure 1, in the opposite direction to that in which the film 10 is moved, dips into a reservoir 26 containing a suitable dye or tint and has raised flanges 27 and an intermediate surface 28. This roller is so disposed below the film that the distance between each of the flanges 27 and the film is, say, one or one and a half thousandths of an inch, and the distance between the surface 28 and the film is, say, seven or eight thousandths of an inch, these dimensions varying with the viscosity of the dye or tint employed. Arranged on each side of the roller 25 is a wiper 29 which removes any dye or tint adhering to the

outer surfaces of the flanges.

As the film 10 passes between the slowly rotating roller 17 and the more rapidly revolving roller 25 the tint carried by the flanges 27 is applied to the film in advance of that carried on the intermediate surface 28. Hence no tint is applied by the main surface of the roller until the marginal limits have been moistened and as these are still wet when the main body of the tint is applied in a direction opposite to that in which the film is moving the longitudinal edges of the tinted area will be sharply defined. The thickness of the layer of tint applied may be varied by adjusting either the relative speed of the rollers 17 and 25 or the distance between the roller 25 and the film above it. The succession of heated rollers 15, 17, 18 and 20 are provided for the purpose of rapidly drying the solvent of the dye or tint employed.

Figure 3 shows a modified form of roller for so applying the tint that the sound record area lies between two tinted areas, so as to reduce the tendency for the film to shrink. In this construction the roller 25 has a circumferential groove 32 corresponding to the width of the sound record area and bounded at the circumference by flanges 27*a*, an additional wiper 29*a* cooperating with the groove.

Instead of the film 10 being passed round a roller 17 as above described, it may if desired be held in tension between two spaced rollers 17*a* (Figure 4), the flanged roller 25 applying tint to the underside of the film which moves in the opposite direction to that of the contacting surface of the roller. With this arrangement the area of the film which is at any instant receiving tint from the roller 25 is increased. A similar arrangement is illustrated in Figure 5 in which the roller 25 is arranged between the film and a plain roller 33 which supplies tint to the roller 25 from the reservoir 26.

As will be readily seen the provision of the projecting flanges on the tint-applying roller and rotation thereof so that the contacting surface moves in the opposite direction to that of the film result in the formation of regularly and accurately defined longitudinal margins of the tinted layer deposited on the film, and the formation of irregular or ragged edges is thus prevented.

The effect of using a plain surfaced roller is illustrated in Figure 6 from which it will be seen that a relatively large meniscus indicated at 40 is produced in the tint layer 39 and as the upper edges of this meniscus are relatively thin the boundaries of the layer will be ragged and irregular. When, however, a flanged roller is employed in accordance with the present invention, not only does a relatively small meniscus as indicated at 41 in Figure 7 result, but the roller does not tend to draw the layer from the film where the film and roller diverge so that even when of considerable thickness the layer 39 has regularly and accurately defined longitudinal boundaries. Figure 8 illustrates the manner in which the marginal portions 42 of the layer are applied by the flanges 27 in advance of the main body of the layer 39 applied between the marginal portions in a direction opposite to that in which the film is moved.

It will be understood that the construction and arrangements above described are given by way of example only and that these may be modified without departing from the spirit of the invention.

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

1. The method of applying tint to a kinematograph film so as to produce a tinted picture area and an untinted sound record area according to which the film and a tint-applying roller of the type set forth are moved relatively to one another in such a manner that the contacting portions of the film and roller move in opposite directions whereby the marginal limit or longitudinal boundary between the sound record portion of the film and the area to be tinted is moistened before the tint is applied in a direction opposite to that in which the film is moving, so that the edge of the tinted area adjacent to the sound record area is sharply defined.

2. In apparatus for applying tint to kinematograph films by the method as claimed in Claim 1 the combination with the tint-applying roller, of means for moving the film and rotating the roller in opposite directions and at the desired speed relatively to each other with or without means for wiping clean the outer surfaces of the flanges.

3. Apparatus for applying tint to kinematograph films as claimed in Claim 2 in which the tint-applying roller is provided with an annular groove or gap in its peripheral surface corresponding in width to that of the sound record area this groove or gap being bounded by flanges so that the tint is applied to the film on both sides of the sound record area.

4. Apparatus for applying tint to kinematograph films substantially as

described or as illustrated in Figures 1 and 2 or Figure 3 or Figure 4 or Figure 5 of the accompanying drawings.

Dated this 8th day of May, 1930.
KILBURN & STRODE,
Agents for the Applicants.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1931.

Fig. 1.

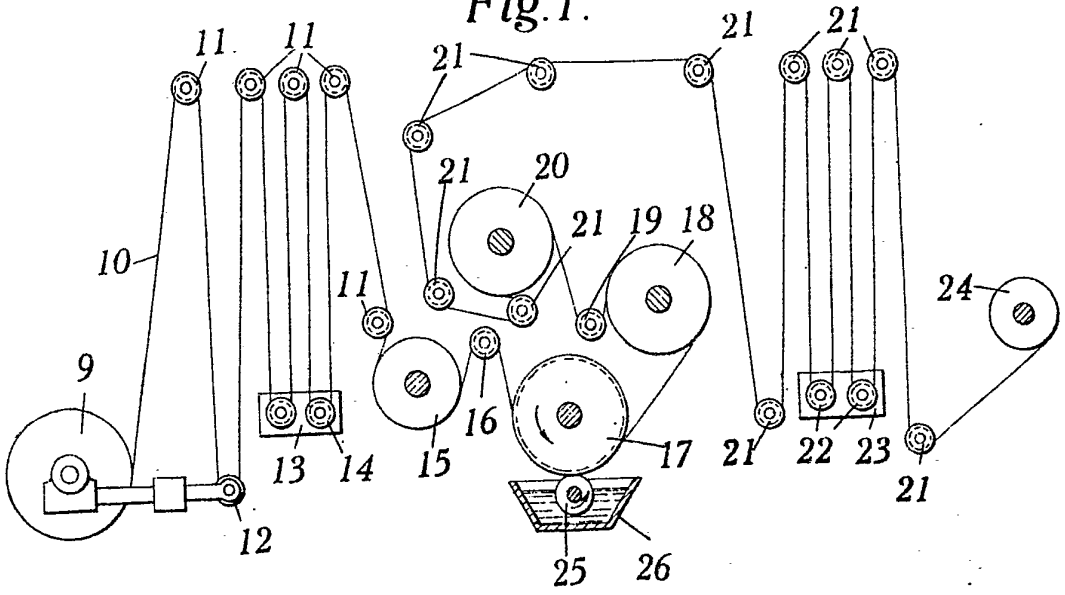


Fig. 3.

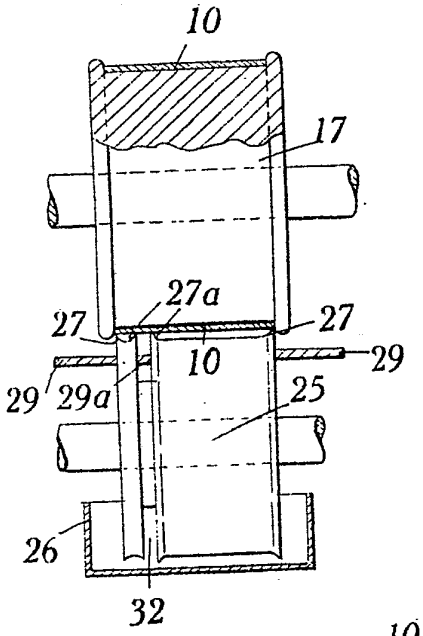
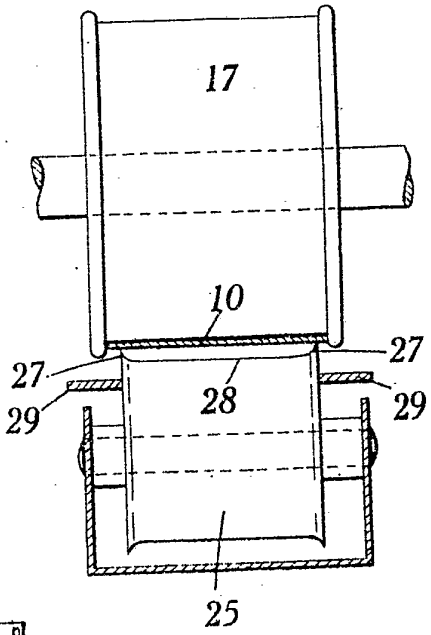


Fig. 2.



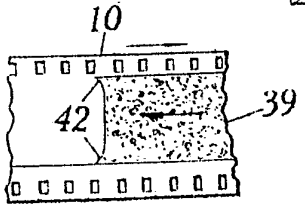
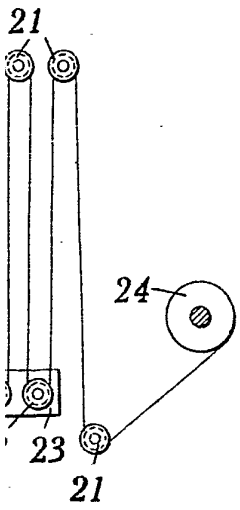


Fig. 8.



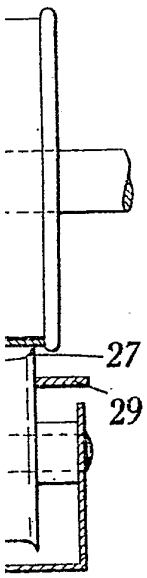


Fig. 4.

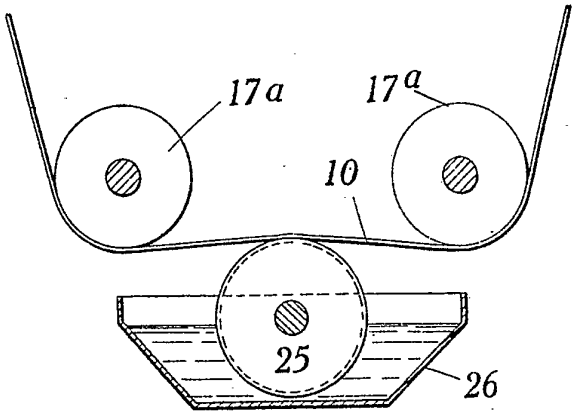


Fig. 5.

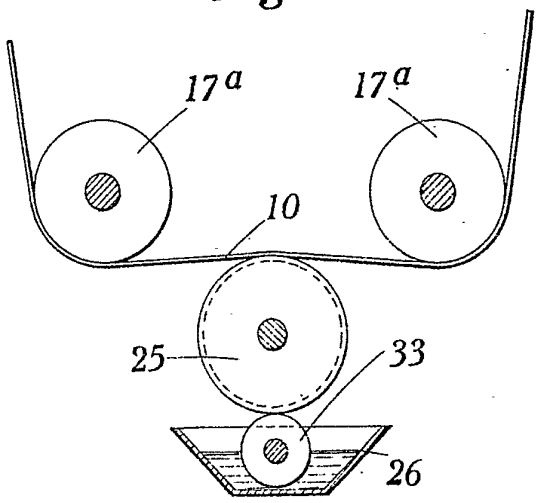


Fig. 6.

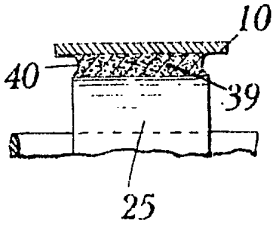


Fig. 7.

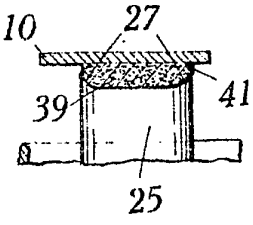


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Fig. 1.

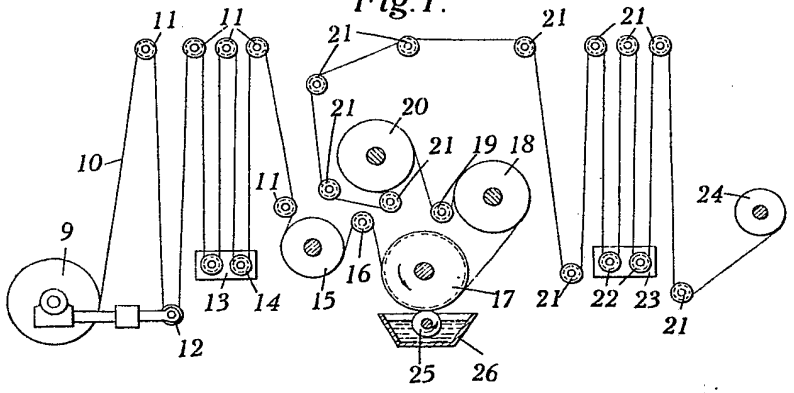


Fig. 3.

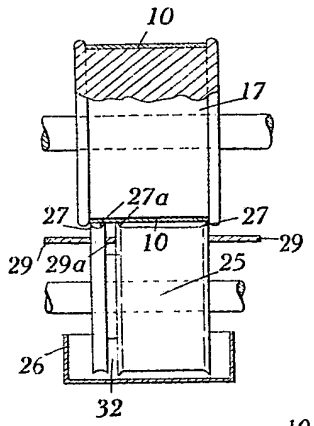
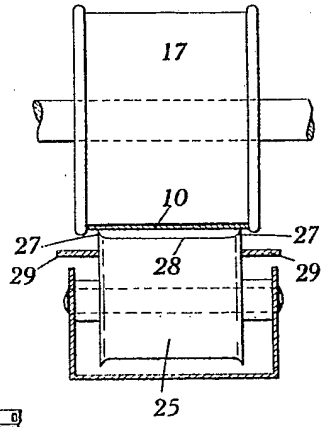


Fig. 2.



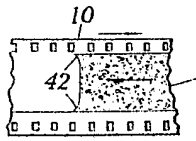


Fig. 8.

Fig. 4.

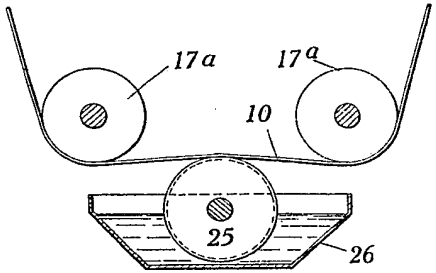


Fig. 5.

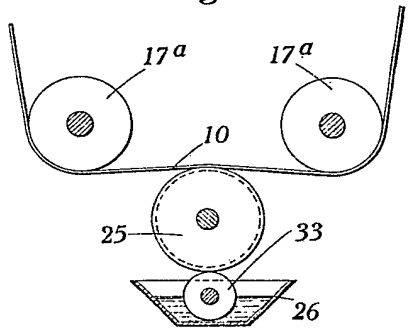


Fig. 6.

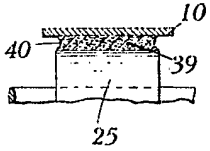
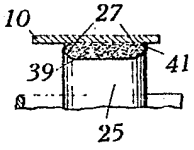


Fig. 7.



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