

# PATENT SPECIFICATION



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## COMPLETE SPECIFICATION.

### Improvements in Apparatus for Applying Coloured Solutions or Varnishes to Motion Picture Colour Films.

We, "SIRIUS" KLEUREN-FILM MAATSCHAPPIJ N.V., a body corporate registered under the laws of Holland, of 15, Oranjestraat, Bosch en Duin, near Utrecht, Holland, and LUDWIG HORST, a German Citizen, of 20, Bergstrasse, Berlin-Steglitz, Germany, 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:—

Our invention relates to improvements in apparatus for applying solutions, more particularly of colouring solutions and varnishes to colour motion-picture films.

According to the present invention a machine is provided for applying colours or varnishes on one side and then to the other side of a subtractive two-colour motion picture film in which two rows of colour applying rollers or brushes are provided for applying colours or varnishes to the respective sides of the film, each side of the film being treated successively by one row of rollers or brushes. A subtractive two-colour film is produced on a positive film sensitized on both sides, and the mordanted or dark silver salts constituting the image are first coloured on one side of the film with one dye solution and then on the other side with the other dye solution.

Means are provided for rotating a driving roller in each row in one sense and for rotating the dyeing rollers in that row in the opposite sense.

The machine according to the present invention is illustrated diagrammatically in the accompanying drawings in which:—

Figure 1 is a longitudinal section through our improved machine, looking in one direction.

Figure 2 is a longitudinal elevation looking in the opposite direction.

Figure 3 is a detail on a larger scale.

In the construction illustrated in the drawings rollers 3 for applying dye solution are journalled upon spindles 2 supported by the frame 1 of the machine. These rollers 3 dip into troughs 4 containing the dye solution and their spindles are journalled in arms 5 of bell-crank levers

adapted to rock upon pivot pins 6 fixed on the side walls of the machine frame. The spindles 2 of the rollers 3 pass through the side walls of the frame 1 and are guided in slots 7 provided therein. By operating the other arms 8 of the bell-crank levers the rollers may be moved up and down. Guide rollers 9 are disposed above each roller 2 and at the side thereof whilst between the guide rollers 9 of successive colouring rollers a further guide roller 10 is provided.

The film 12 unwound from the reel 11 passes over the sprocket feed roller 13. 14 is a roller journalled in a pivoted arm 15 which by means of a spring 16 presses the film 12 against the sprocket roller 13 to maintain the teeth of the sprocket roller in engagement with the film perforations. At the other end of the machine the film runs over a sprocket roller 17 and is passed downwards across a roller 18 and a further sprocket roller 19 and conducted over a second row of colouring and guide rollers 3<sup>1</sup>, 9<sup>1</sup>, 10<sup>1</sup>. Underneath each colouring roller 3<sup>1</sup> which is mounted on a spindle 2<sup>1</sup> there are likewise provided troughs 4<sup>1</sup> containing dye solutions. At the end of this second row of rollers there is provided a roller 20 across which the film is passed on to the taking up reel. The accurate guidance of the film is effected by a roller 22 pivoted on a suspended arm 21 and pulled against the roller 20 by means of a spring 23.

On the spindle of each dye roller there is provided, preferably in the rear of the machine frame, see Figure 2, a worm 24 or 24<sup>1</sup> respectively in engagement with a worm wheel 25 or 25<sup>1</sup> respectively. The worm wheels 25 of the upper row of rollers are keyed to a transverse shaft 26 journalled on the machine frame and the worm wheels 25<sup>1</sup> of the lower row to a transverse shaft 26<sup>1</sup>. The shafts 26, 26<sup>1</sup> are driven from any suitable source of power by means of a strap pulley 27, worm wheels 28, 29, and 29<sup>1</sup> which engage a worm wheel 40 on the shaft 26<sup>1</sup> which is of opposite thread to the worm wheels 25<sup>1</sup>, and spur wheels 30, 31, 32, 33 and worm wheel 33<sup>1</sup> which engages in a worm wheel 41 on the shaft 26 which is of opposite

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thread to the worm wheels 25. The driving sprockets for the film are driven from the shafts carrying the sprockets 29 and 33 so that the dyeing rollers rotate in the opposite sense to the driving sprockets while the film and the periphery of the dyeing rollers travel in the same direction at their point of contact.

The arms 8 of the bell-crank levers are guided in slotted links 34, 34' secured to the machine frame, see in particular Figure 3 of the drawing showing them on an enlarged scale. Each link is provided with two notches 35 in which the arms 8 of the bell-crank levers are arrested in one of their end positions.

On the upper row of rollers the film is coloured on one side while the other side is coloured while the film passes over the lower row of rollers.

The troughs of each set of rollers contain solutions of different dyes. In accordance with the colour to be applied to the film one or the other of the respective rollers is raised by means of the bell-crank lever 5, 8 and brought in contact with the film. Simultaneously with the raising or lowering of the colouring roller its driving gear is thrown into or out of engagement, so that a colouring roller not in contact with the film does not rotate, as shown in Figure 1 at the right hand lower roller and in Figure 2 at the left hand lower roller. The rollers are preferably made narrower than the width of the film so that the film perforations are not completely covered by the rollers, for the purpose of avoiding collection of the liquid in the perforations.

It will be understood that brushes or

like solution applying means may be used instead of the dye rollers.

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. A machine for applying colouring solutions and varnishes to each side of motion picture films for the production of subtractive two-colour films in which two rows of colour applying rollers or brushes are provided for applying colours or varnishes to the respective sides of the film, each side of the film being treated successively by one row of rollers or brushes.

2. A machine for colouring films as claimed in Claim 1 in which means are provided for rotating a driving roller in each row in one sense and for rotating the dyeing rollers in that row in the opposite sense substantially as hereinbefore described.

3. A machine for colouring films as claimed in either of the preceding claims in which the rollers are narrower than the width of the film so that the film perforations are not completely covered by the rollers and collection of liquid therein is avoided, substantially as hereinbefore described.

4. A machine for colouring films constructed and arranged to operate substantially as hereinbefore described.

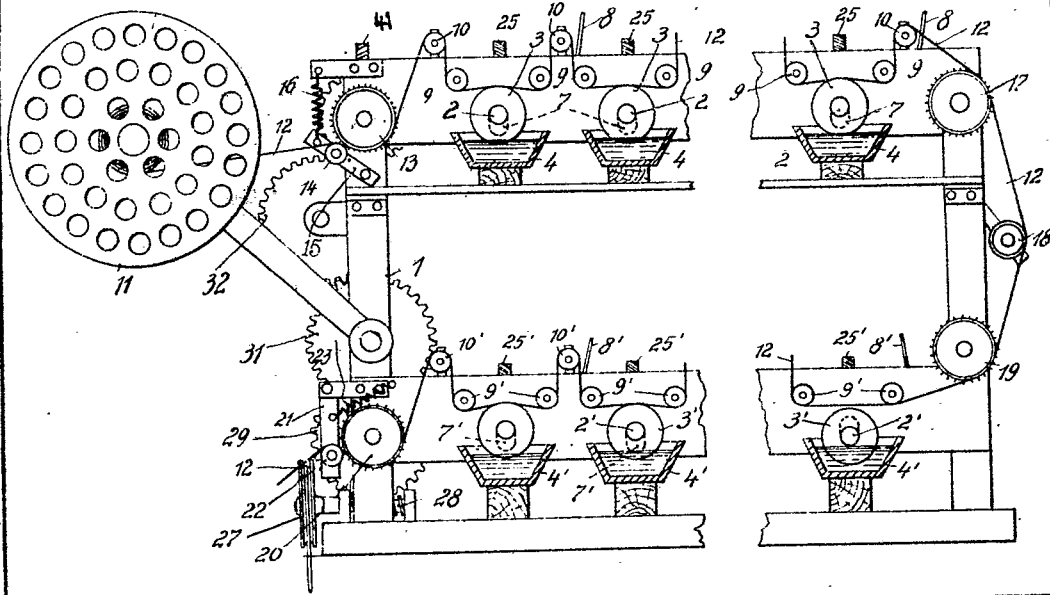
Dated this 15th day of October, 1929.

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FIG. 1.



[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 2.

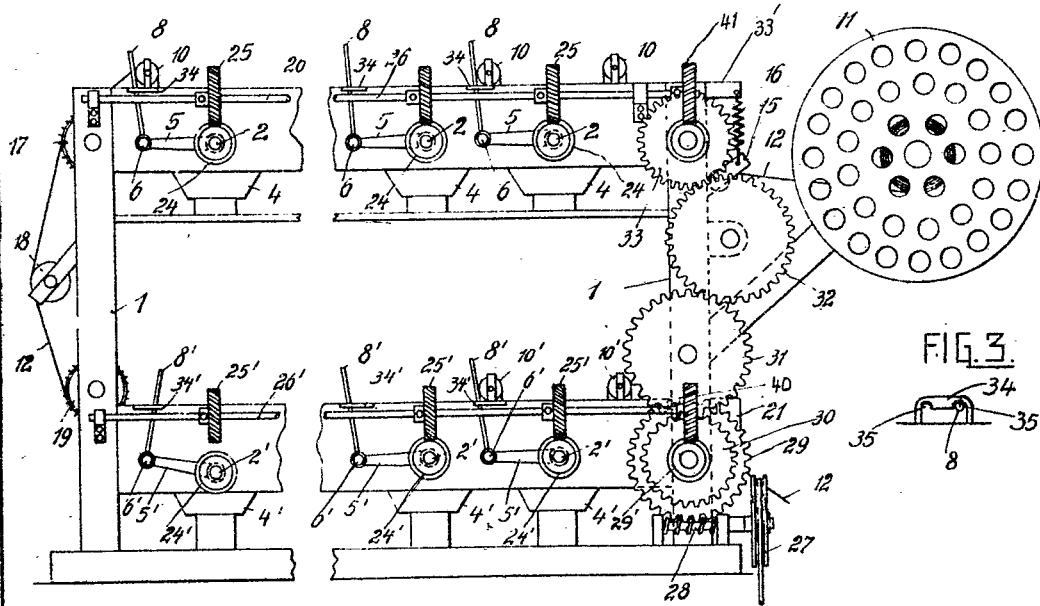


FIG. 3.