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PATENT



SPECIFICATION

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PROVISIONAL SPECIFICATION.

Improvements relating to Cinematography.

We, ARON HAMBURGER, of 51, Warwick Street, Regent Street, London, W. 1, Consulting Chemist, and WILFRED ERNEST LYTTON DAY, of 19, Lisle Street, Wardour Street, London, W. 1, Cinematographer, do hereby declare the nature of this invention to be as follows:—

5 This invention relates to methods of obtaining negatives for multi-colour cinematography, and has for its object to avoid the errors which inevitably arise through employing more than one photographic lens for the production of negatives, or employing the same lens at different times for their production.

10 The invention consists in employing two or more films disposed at right angles to one another, and each sensitive to different parts of the spectrum, one group receiving its image by refraction (preferably corrected), and the other by reflection, both groups being fed simultaneously, preferably by the same feeding cam.

15 The invention further consists in employing a suitable red filter on the refraction element, and a red sensitive film behind it, together with a film sensitive both to blue and green, or two films face to face, one blue and the other green sensitive, all the films being fed simultaneously, preferably by the same feeding cam.

20 The invention also consists in employing a movable reflection refraction element with a clear glass portion which can be brought into position for focussing.

25 In carrying this invention into effect in one form, by way of example, as applied to three-colour cinematography, a cinematograph camera is constructed on usual lines, but is provided with top and bottom spool boxes adapted for three films. Two of these films are arranged face to face, and are blue and green sensitive respectively. These films receive the image reflected from a refraction-reflection element constructed as described in Letters Patent No. 28,722/12 interposed in the direct beam of the lens. The third film is arranged at right angles to the films just referred to, and receives through a
30 red filter the refracted image, preferably after correction. The three films pass over the usual feeding mechanism, and will be in perfect register as they are exposed simultaneously.

The feeding mechanism consists of a guided sliding block reciprocated by a

right angles, which are moved synchronously by the same mechanism. The two sets of feeding fingers are carried up and down by the sliding block, and are connected so that they move into and out of connection with the film synchronously with each other. This is conveniently effected by providing a pin on one of the elements engaging an inclined slot in the other. The drunken cam acts therefore on one set of fingers, and this motion is communicated to the other set by the pin and slot device. Absolutely synchronous movement of the three films is thus attained. 5

The refraction element is arranged for correction of the images in the way described in Patent No. 28,722 of 1912. The refraction reflection element carries on its rear face the suitable red colour screen, conveniently of stained gelatine, and is supported on a slide provided with a mechanism for moving it from outside the camera into a position where the beam passes through the clear glass. The direct image may thus be readily focussed without difficulty, and the colour screen then moved into position for taking the negatives. 10 15

Dated this 14th day of November, 1918.

MARKS & CLERK.

COMPLETE SPECIFICATION.

Improvements relating to Cinematography.

We, ARON HAMBURGER, of 51, Warwick Street, Regent Street, London, W. 1, Consulting Chemist, and WILFRED ERNEST LYTTON DAY, of 19, Lisle Street, Wardour Street, London, W. 1, Cinematographer, 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:— 20 25

This invention relates to methods of obtaining negatives for multi-colour cinematography.

It has been proposed to employ a suitable reflector which, when the exposure takes place through a single lens, allows light to pass through it and also reflects light in other directions, so that more than one film can be exposed simultaneously, the movement of the separate films being effected by two separate claw or pin feed mechanisms geared together by bevel wheels. Now, a certain amount of backlash with consequent lack of synchronism is inevitable in such an arrangement, but we have found it to be absolutely essential in obtaining good negatives for multi-colour cinematography, to secure exact synchronisation between the movements of the films, and it is the main object of the present invention to provide means achieving this result. 30 35

The invention consists in film moving mechanisms for two or more films, in which a pin and slot is provided to interconnect the feed pin carriers, whereby accurate synchronism of the films' movements is effected. 40

The invention also consists in film moving mechanisms for two or more films, in which the pin carrying members are slidably mounted upon the same sliding block, motion being communicated between these members by a pin and slot or like connection.

The invention also consists in providing the apparatus for taking the two films synchronously with a movable reflection refraction element with a clear glass portion which can be brought into position for focussing. 45

The invention also consists in the improved cinematographs herein described.

Figure 2 a side view, and

Figure 3 is a plan showing the feed mechanism in detail.

Figure 4 is a plan showing filter in position.

Figure 5 is an elevation of filter, and

5 Figure 6 is a plan of frame supporting the filter.

In carrying this invention into effect in one form, as illustrated, by way of example in Figures 1, 2 and 3, as applied to three colour cinematography, a cinematograph camera is constructed on usual lines, but is provided with two film movements operating in planes at right angles to each other.

10 One plane is normal to the paper and passes through the line *a b* and there are two films sensitive respectively to blue and green and arranged face to face which pass over the driving sprocket *c* and are operated in this plane past the gate aperture *d* in the gate *e*.

15 These two films receive the image reflected from a refraction-reflection element constructed as described in Letters Patent No. 28,722/12 interposed in the axis *f g* of the beam of the lens, (see Figures 4, 5 and 6).

The other plane is normal to the paper and passes through the line *h i* and there is a single film which passes over driving sprocket *j*, and is operated in this plane past the gate aperture *k* in the gate *l*.

20 This film receives through a red filter the refracted image preferably after correction.

The feeding mechanism consists of a guided sliding block *m* shown in elevation in Figure 2 and in plan in Figures 1 and 3.

25 This block is connected by means of a rigid arm *n* with a frame *o* which receives a reciprocating motion by the uniform rotation of the cam *p*, suitable guides *q* being provided for guiding the block *m*.

The frame *o* carries extended tongues *r* operating in guides *s*.

The sliding block *m* carries two sets of feeding fingers *t* and *u* rigidly secured respectively to feed pin carriers *v* and *w*.

30 The feeder plate *w* carries a forked tongue *x* which engages with a drunken cam *y* mounted upon the shutter shaft *z* and also carries a slotted tongue *9* which engages a pin 10 on the feeder plate *v*.

By this pin and slot connection 9 and 10 synchronous movement of both feed pin carriers *v* and *w* is ensured on movement of either, backlash being 35 reduced to a minimum.

In operation, on rotation of shutter shaft *z*, the block *m* is reciprocated vertically by the action of cam *p* and at the same time the feed pin carriers *v*, *w* are reciprocated horizontally by the action of cam *y*.

40 The pins *t* and *u* are thus moved outwards into engagement with the cinematograph films at the top of the travel of block *m* and retained in this position during the downward movement of the block.

At the bottom of the travel of block *m* the pins are withdrawn simultaneously and remain in this condition during the upward travel of the block at the termination of which the outward movement of the pins recurs.

45 By this means absolutely synchronous movement of the three films is ensured and good registration obtained.

The refraction element is arranged for correction of the images in the way described in Patent No. 28,722 of 1912. The refraction-reflection element carries on its rear face the suitable red colour screen, conveniently of stained 50 gelatine. This is indicated in Figures 4, 5 and 6 in which 1 represents the refraction-reflection element carried on slide 2 provided with an operating rod 3. This rod carries a cam 4 enabling it to be retained conveniently in the raised position with the filter 1 in position adjacent to the apertures *k*, *d*. The slide 2 is guided by rods 6 supported in a frame 7, adjustment being pro-

The direct image may thus be readily focussed without difficulty, and the colour screen then moved into position for taking the negatives.

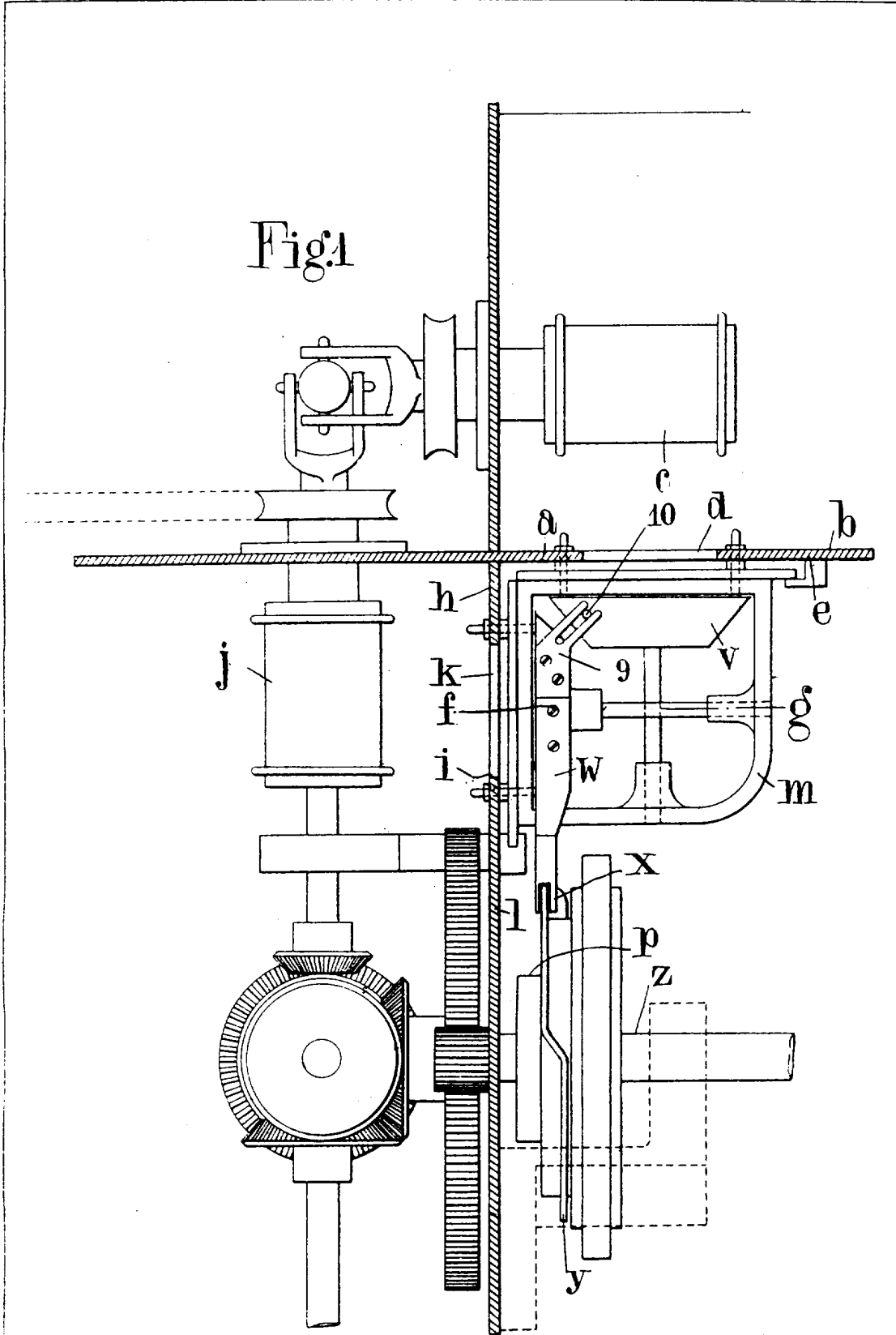
Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Film moving mechanisms for two or more films, in which a pin and slot is provided to interconnect the feed pin carriers, whereby accurate synchronism of the films' movements is effected. 5
2. Film moving mechanisms for two or more films, in which the pin carrying members are slidably mounted upon the same sliding block, motion being communicated between these members by a pin and slot or like connection. 10
3. Apparatus for exposing two films synchronously of the kind described having film moving mechanism for feeding two or more films as claimed in Claim 1 or 2 and a movable reflection-refraction element with a clear glass portion which can be brought into position for focussing. 15
4. The improved cinematograph apparatus herein described with reference to the accompanying drawings.

Dated this 14th day of May, 1919.

MARKS & CLERK.

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



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

136535. HAMBURGER & ANOTHER'S COMPLETE SPECIFICATION.

12 SHEETS.
SHEET 2.

