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A.D. 1899

Date of Application, 22nd Mar., 1899

Complete Specification Left, 22nd Dec., 1899—Accepted, 3rd Mar., 1900

PROVISIONAL SPECIFICATION.

Means for Taking and Exhibiting Cinematographic Pictures.

We, FREDERICK MARSHALL LEE, of Oakfield, Walton-on-Thames, in the County of Surrey, Gentleman, and EDWARD RAYMOND TURNER, of 2, Claremont Villas, Montague Road, Hounslow, in the County of Middlesex, Gentleman, do hereby declare the nature of this invention to be as follows:—

- 5 The object of our invention is to produce and exhibit cinematographic pictures in such manner that they are seen in the colours of the originals. According to our invention we place between the object and the sensitised surface on which the pictures are taken the colour screens which are used in taking negatives for reproduction in colours the said screens being mounted so that they are rapidly and in succession brought into position to receive the photographic picture. This is most conveniently done by revolving the series of colour screens a supplementary shutter or opaque parts between the several screens being interposed at the intervals between the successive portions of film taking up their positions.
- 10 By adjusting the apertures of the screens the exposures for the several photographic negatives are regulated. Positives from the negatives thus taken are exhibited through a like moving screen and the several pictures corresponding to the different colour sensations being exhibited rapidly one after the other, present to the eye an appearance in form, movement, and colour, resembling the original from which the photographs were taken. The positives of the various
- 20 colour sensations may be exhibited singly in rapid succession, or two, or all of them may be superposed.

Dated this 22nd day of March 1899.

JOHNSONS & WILLCOX,
47, Lincoln's Inn Fields, London, W.C., Agents.

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COMPLETE SPECIFICATION.

Means for Taking and Exhibiting Cinematographic Pictures.

We, FREDERICK MARSHALL LEE, of Oakfield, Walton-on-Thames, in the County of Surrey, Gentleman, and EDWARD RAYMOND TURNER, of Lynwood, Queen's Road, Hounslow, in the County of Middlesex, late of 2, Claremont Villas, Montague Road, Hounslow, aforesaid, Gentleman, do hereby declare the nature of this invention to be as follows:—

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this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

The object of our invention is to produce, and exhibit, cinematographic pictures in such manner that they are seen in the colours of the originals. According to our invention we place, between the object and the sensitized surface on which the pictures are to be taken, the colour screens which are used in taking negatives for reproduction in colours, the said colour screens being mounted so that they are rapidly and in succession brought into position as each successive portion of the film is brought into position to receive the photographic picture. Positives (termed colour records) from the negatives thus taken, are exhibited through a like moving screen, and the several pictures, corresponding to the different colour sensations, being exhibited rapidly one after the other, present to the eye an appearance in form, movement, and colour, resembling the original from which the photographs were taken. The positives of the various colour sensations may be exhibited singly in rapid succession, or two, or more, of them may be superposed.

In the accompanying drawings we have illustrated arrangements according to this invention with reference to which we will describe the manner in which the invention may be carried into practical effect, but we do not limit ourselves to these precise arrangements.

Figure 1 is a vertical section shewing the apparatus for taking the negatives. Figure 2 is a vertical section shewing the arrangement for exhibiting the positives, and Figures 3 and 4 are face views of the screens through which the negatives are taken, and the positives exhibited, respectively.

Referring first to Figure 1. A is the camera in which the cinematographic film *a* on which the negatives are to be taken, is exposed before an opening *a*², behind the lens A². This may be arranged and operated in the usual manner. Mounted in bearings *b*, is a shaft *b*², having secured to it a bevel gear wheel *b*³ gearing with a bevel gear wheel *a*³, on the axis of the sprocket wheel *a*⁴ which is one of the ordinary sprocket wheels by which the film *a* is moved. The shaft *b*² has secured to it the colour screen B shewn separately in Figure 3 provided with the three coloured glasses, *viz.* a red glass R, a green glass G, and a blue-violet glass B.V. The parts at *c* are opaque, and by making these opaque portions greater, or less, in width, the exposures for the several photographic negatives are regulated. The wheels *a*³ and *b*³ Figure 1 are so proportioned that a glass of the colour screen is brought into position by the rotation of the disc B each time a fresh portion of film is exposed at the opening *a*² that is the disc B is rotated once for each three portions of film exposed, the opaque portions *c* shutting off the light as the margins of the colour records pass the aperture *a*². The upper part of the disc B, is shewn as being enclosed in a light excluding hood *d* or other provision may be made for the exclusion of light. In place of arranging the screen B inside the camera between the opening *a*² and the lense A² as shewn it may be arranged outside the lens as shewn in dotted lines.

Referring now to the apparatus for exhibiting the positives or colour records taken from the negatives as aforesaid. E Figure 2 represents a portion of a projecting lantern, *e* being the lamp and *e*² the condenser. *f* *f*² are the sprocket wheels over which the film of positives or colour records *g* is passed and by which it is traversed in front of the aperture *h*² in the diaphragm *h*. In a bearing *j*, is carried the shaft to which is secured the colour screen J, shewn separately in Figure 4, the said shaft being driven by gear wheels *j*², from a counter-shaft *j*³ having secured to it a bevel gear wheel *j*⁴ gearing with a bevel gear wheel *f*³ on the axle of the sprocket wheel *f*. At *i*¹, *i*², *i*³ are shewn the lenses by which the positives or colour records are projected upon the surface on which they are exhibited—the light passing direct through the lens *i*² and being reflected by the prisms *e*³, and mirrors *e*⁴, to pass through the lenses *i*¹ and *i*³. The screen J is made with three divisions with opaque portions *e*² between to exclude light between

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the successive positives or colour records. The gear f^3, j^4, j^2 is so proportioned that the screen J makes a third of a revolution as each of the three colour records g^1, g^2, g^3 , exhibited at the opening h^2 , passes from one position to the next that is to say as the three colour records pass so the screen J makes one
 5 revolution. The screen J is made as shewn in Figure 4 each division having in it the three coloured glasses arranged radially as shewn at R (red glass) G (green glass) B, V, (blue-violet glass). Say the portion of the screen marked $R^1 G^1 B, V^1$ is in position when the respective colour records g^1, g^2, g^3 , are before the opening h^2 the colour record g^1 requiring the light to pass through the red glass the
 10 colour record g^2 requiring the light to pass through the green glass and the colour record g^3 requiring the light to pass through the blue-violet glass, when the film moves a distance equal to one colour record the screen B moves through a third of a revolution and the glasses B, V^2, R^2, G^2 are in position so that the colour record g^1 is opposite red glass, the colour record g^2 opposite green glass
 15 and the colour record which has come into view above g^1 opposite blue-violet glass. When the film moves through a further distance equal to one colour record the screen will have moved through another third of a revolution and the glasses $G^3 B V^3$ and R^3 will be in position so that the colour record g^1 is still opposite red glass and the colour record next above it opposite blue-violet glass
 20 and the colour record above that opposite green glass, and so on as the film is traversed and the screen rotated. The screen may be arranged in any position between the condenser and the surface upon which the pictures are exhibited; for example, it may be arranged in the position represented by the dotted lines. In referring to the screens hereinbefore and in the claims we of course include
 25 in the expression "glass" any material sufficiently transparent for the purpose.

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

1. In combination with cameras for taking cinematographic negatives, a colour
 30 screen placed between the object and the sensitized surface and means for moving the screen synchronously with the movements of the sensitized surface; substantially as hereinbefore described.

2. In combination with cameras for taking cinematographic negatives, a colour
 35 screen consisting of a disc carrying the several coloured glasses and mounted upon an axis and provided with gearing by which the said disc is rotated synchronously with the movements of the sensitized surface; substantially as hereinbefore described.

3. In, or for, cameras for taking cinematographic negatives, a colour screen
 40 consisting of a disc carrying the several coloured glasses with opaque portions between; substantially as hereinbefore described.

4. In apparatus for exhibiting cinematographic pictures the combination with the projecting lantern and lenses and means for traversing the series of colour records, of a colour screen, and means for moving it synchronously with the
 45 movements of the said series of records, substantially as hereinbefore described.

5. In apparatus for exhibiting cinematographic pictures the combination with
 50 the projecting lantern and lenses, and means for traversing the series of colour records, of a colour screen consisting of a disc carrying the several coloured glasses and mounted upon an axis and provided with gearing by which the said disc is rotated synchronously with the movements of the said series of records; substantially as hereinbefore described.

6. In apparatus for exhibiting cinematographic pictures, the combination with
 55 the projecting lantern and lenses and means for traversing the series of records and an opening at which records corresponding to the several colour sensations are presented, of means for directing the light rays, passing through each, through the corresponding lenses, and a colour screen moved synchronously with the movements of the series of records; substantially as hereinbefore described.

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7. In, or for, apparatus for exhibiting cinematographic pictures, a colour screen consisting of a disc carrying series of coloured glasses arranged radially with opaque portions between each series and arranged to be moved synchronously with the movements of the series of records substantially as hereinbefore described:

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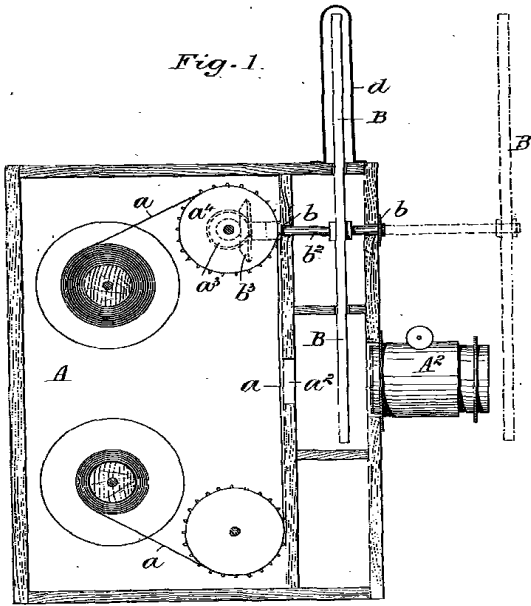
Dated this 22nd day of December 1899.

JOHNSONS & WILLCOX,
47, Lincoln's Inn Fields, London, W.C., Agents.

Redhill: Printed for Her Majesty's Stationery Office, by Malcomson & Co., Ltd.—1900.

SHEET 1

Fig. 1.



(3 SHEETS)
 SHEET 2

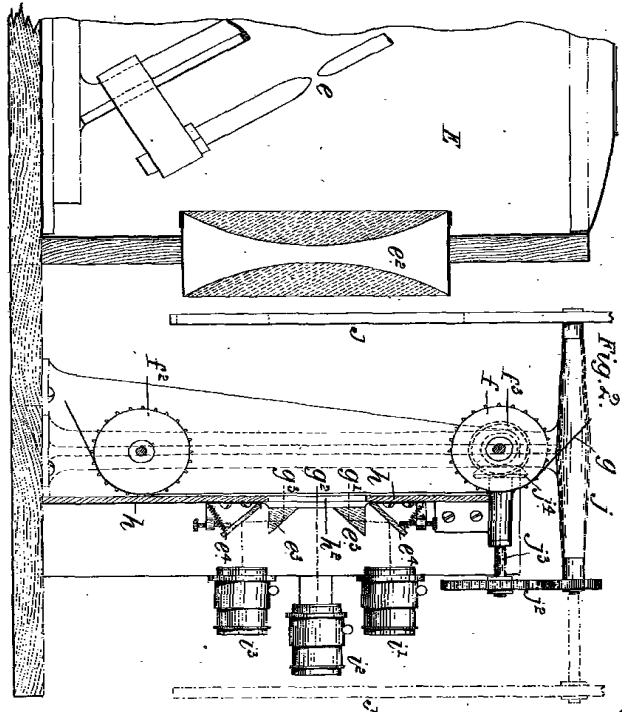


Fig. 2.

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Fig. 1.

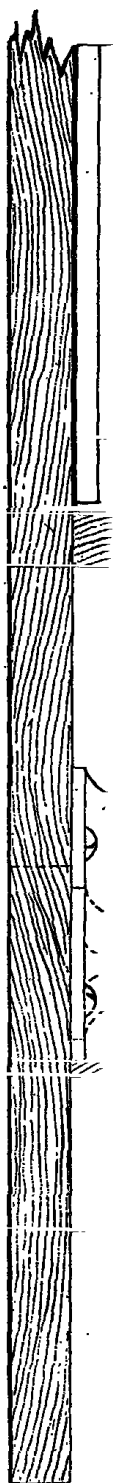
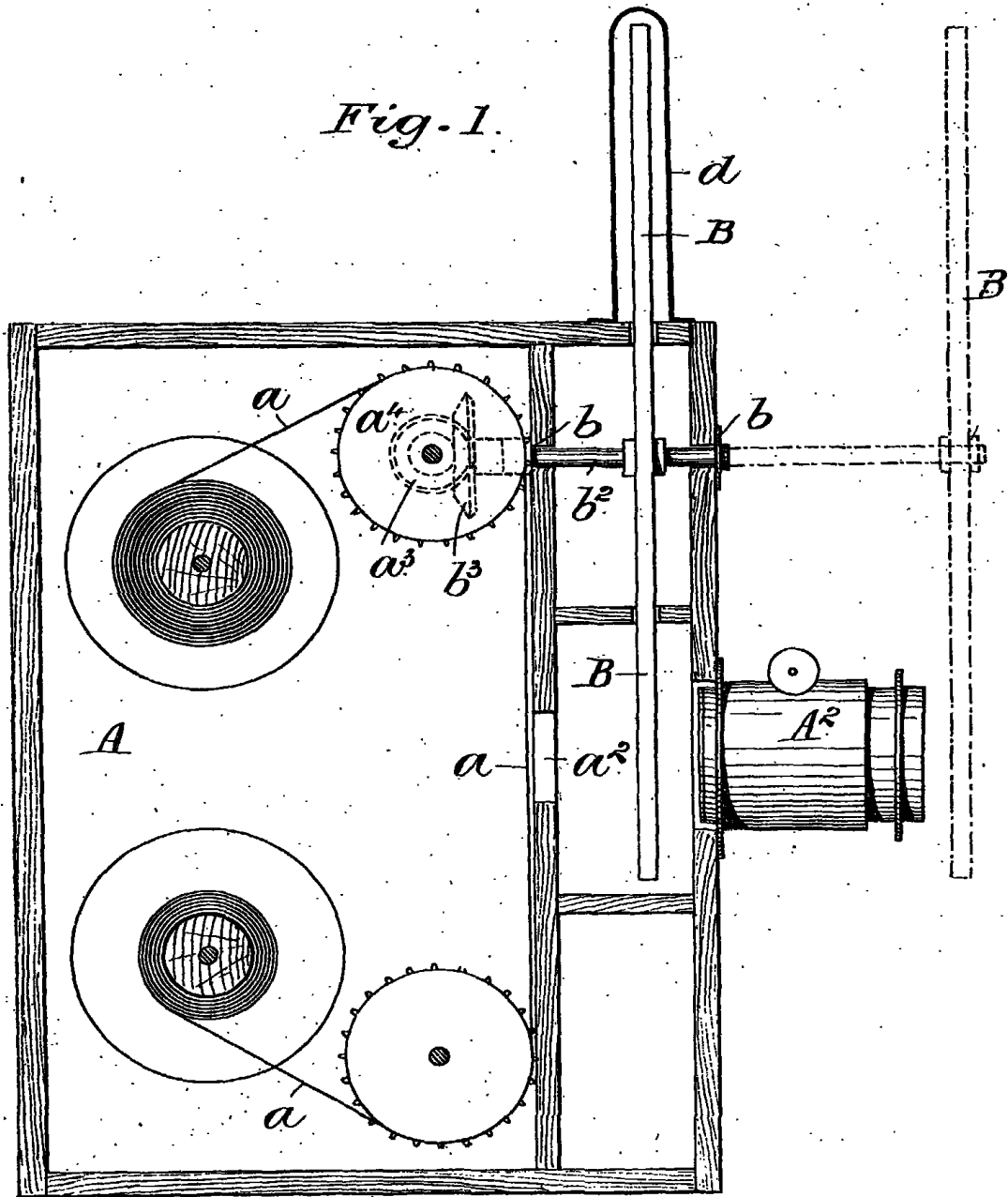


Fig. 3.

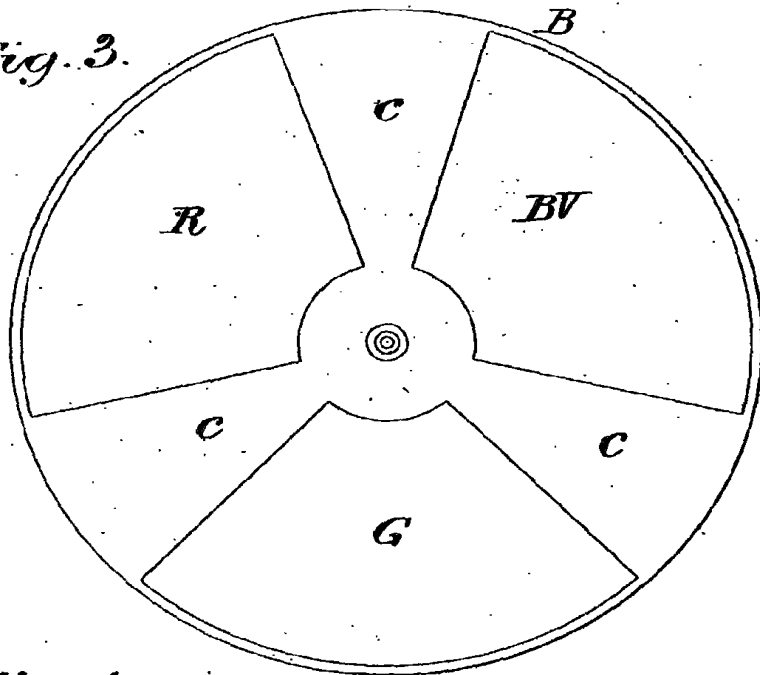
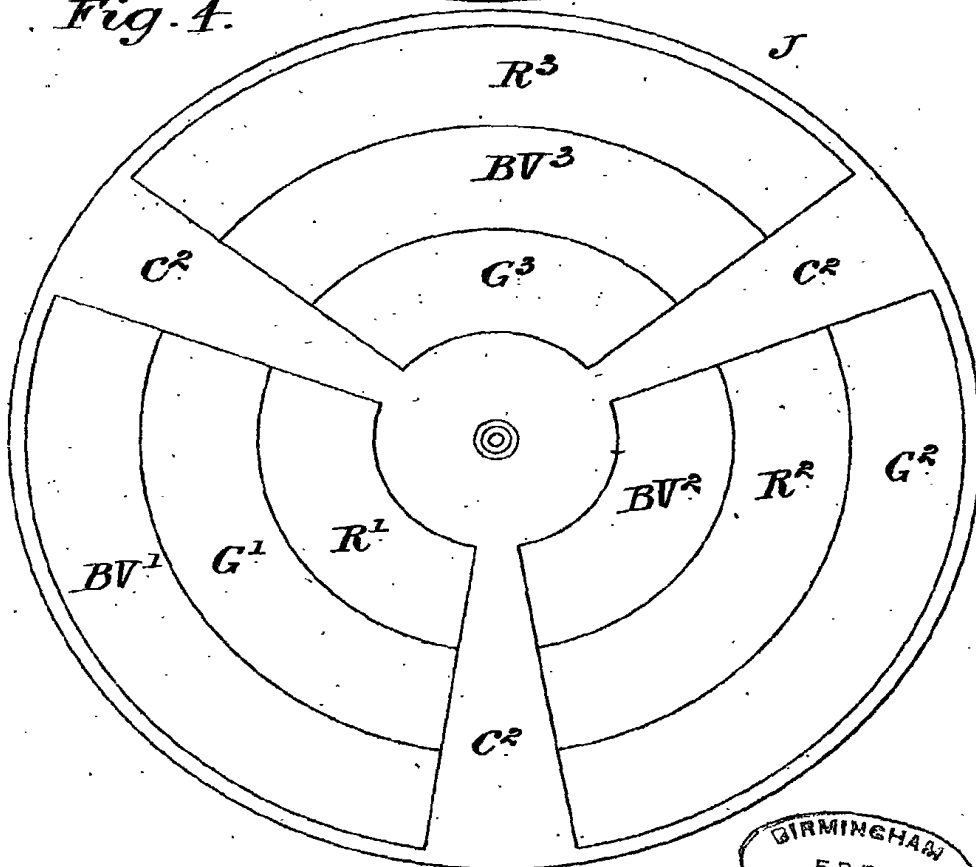


Fig. 4.



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