

N^o 24,809



A. D. 1911

(Under International Convention.)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in France), } 11th Nov., 1910

Date of Application (in the United Kingdom), 7th Nov., 1911

At the expiration of twelve months from the date of the first Foreign Application, the provision of Section 91 (3) (a) of the Patents and Designs Act, 1907, as to inspection of Specification, became operative

Accepted, 1st Feb., 1912

COMPLETE SPECIFICATION.

Apparatus for Photographing and Projecting Kinematographic and other Views.

We, RODOLPHE BERTHON, Engineer, and MAURICE AUDIBERT, Manufacturer, both of 7, Avenue Victor Hugo, Villeurbanne, in the French Republic, 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:—

The present invention has for its object to obtain upon one and the same surface monochrome proofs arranged in juxtaposition and printed in the fundamental colours which when projected onto a screen reproduce the object photographed in colours. With this object the invention consists in photographing instead of the scene itself a real or virtual image in space of this scene by means of an objective provided with prisms or mirrors which are arranged concentrically or uniformly in accordance with an axis of symmetry.

Owing to the possibility of modifying the position of this image in space as desired by displacing the optical element which produces it (an objective of very wide aperture or a well-corrected divergent lens) it is possible, without the necessity for touching the system of prisms or mirrors to modify as desired the aperture of the principal objective and consequently to regulate exactly the angular displacement of the three monochromes upon the sensitised film (this displacement is proportionate to the aperture) while at the same time ensuring perfect focussing. The exact superposition of the three monochromes can therefore also always be ensured even when the apparatus for taking the pictures is not identical with the projection apparatus.

On the other hand, the distance of the image in space from the principal objective being necessarily small and its relative dimensions being as small as desired (proportionately to the focus of the optical element employed) it is always possible to utilise a principal objective of relatively long focus and to give it a considerable aperture, thus reducing to the minimum the angle of deviation of the three monochromes and consequently the aberrations that the employment of prisms of considerable angle or very oblique mirrors always entails.

Finally, by imparting to the prisms or mirrors of the principal objective the

[Price 8d.]



Apparatus for Photographing and Projecting Kinematographic and other Views.

form of elements concentric with the axis of this objective itself, or by arranging the refringent elements in accordance with an axis of symmetry, any stereoscopic effect between the three monochromes is eliminated. The projection can therefore be effected on any desired scale without any danger of producing colour smudges upon objects located in different planes. This advantage is especially important in cinematographic projection where the enlargement is considerable. It should be noted also that the fact of photographing not the object itself but an image of this object in space, of itself contributes to eliminate the stereoscopic effect between the monochromes—the optical element which gives rise to the image photographed in space reducing the relief of the several planes in a large measure.

Various methods of carrying the invention into practice are illustrated by way of example in the accompanying drawing:

Figure 1 is a diagrammatic view of an apparatus for taking views, the front objective of which is constituted by convergent lenses giving a real and inverted image between the said objective and the principal objective, this image being then again taken by this latter and projected upon the sensitized coat in three monochromes by means of a divergent prism apparatus.

Figure 2 is a similar view of an apparatus for taking views in which the front objective is constituted by divergent lenses giving, in front of the said objective, a virtual image which is then taken again and divided into three monochromes upon the sensitised coat in the same conditions and by the same means as in the foregoing example.

Figure 3 represents a modification in which the real or virtual image obtained by the foregoing means is reflected and divided into three monochromes in juxtaposition by a system of mirrors.

Figures 4 and 5 represent to an enlarged scale, in front elevation and in section on the line 5—5 respectively, the concentric prism arrangement serving for obtaining three monochrome images upon the sensitised coat.

Figures 6 and 7 represent on an enlarged scale, in front elevation and in section on the line 7—7 respectively, the prism device serving to project the three monochrome images obtained by the foregoing means as a single coloured image.

Figure 8 represents a fragment of a cinematographic film printed by the means which form the object of the invention.

In the drawing A indicates the principal objective provided at its optical centre, with concentric prisms a a^1 , a^2 (Figures 4 and 5) a is the central prism; a^1 is an annular prism the inclination of which is exactly inverse to that of the foregoing; a^2 is a glass ring with parallel faces permitting of the normal operation without deviation of the peripheral zone of the objective. These elements as a whole are stuck to a glass a^3 with parallel faces.

These prisms can be arranged either in front of or behind the objective but sufficiently close for the three zones of rays to comprise the pencil coming from each point of the image photographed and traversing the objective. They may also be replaced by inclined mirrors m m^1 m^2 (Figure 3) the mirror m being inclined at 45° to the axis of the apparatus m^1 rather more and m^2 rather less. The sensitised coat E would then be parallel with the axis.

If the ring a^2 were prismatic and the three prisms directed at 120° the three images instead of being upon the same line, would occupy the three apexes of an equilateral triangle.

In front of the objective A is another objective B with convergent lenses b (Figure 1) or divergent lenses b^1 (Figure 2). This objective is intended to give a real or virtual image of the object D in space at C (Figure 1) or at C¹ (Figure 2) according to circumstances. There should be a sufficient aperture for the image C, viewed from the objective A, to be entirely comprised in the luminous zone proceeding from the objective A to the objective B as base. When a divergent lens objective is employed (Figure 2), the image C¹ is

Apparatus for Photographing and Projecting Kinematographic and other Views.

located slightly beyond twice the focal distance of the objective A; furthermore, this image is upright and not inverted; the divergent lens is itself substantially half way between the objective A and the image C¹.

E designates the sensitised coating upon which the three juxtaposed images c c^1 c^2 are formed. This sensitised coating may be on a plate, cut film or cinematographic film displaced by any convenient known means. In front of this sensitised coating a three-colour screen F of the fundamental colours is arranged (red f , green f^1 and blue f^2). This three-colour screen might be dispensed with provided that prisms a a^1 a^2 or mirrors m m^1 m^2 are employed which are coloured with the same colours as the screen.

The adjustment of the position of the objectives A and B relatively to the sensitised plate on the one hand and to the object on the other hand, is obtained by means of a known system of screws and racks which is not illustrated in the drawing.

The objective A and the objective B and the frame limiting the image C are carried by a single tube G capable of rotating through a certain angle around its axis with the object of permitting of directing the prisms relatively to the images without having to touch the prisms themselves.

The relative displacement of the images and the direction of the prisms are therefore regulated without touching the latter, the relative arrangement of which is established once for all with perfect precision.

Prisms H with inclinations h h^1 inverse to those which have given rise to the corresponding images can be placed in front of the sensitised coating and almost in contact therewith. A simple glass h^2 with parallel faces and of such thickness that the reflected image presents the maximum of sharpness is placed opposite the image produced without deflection. The prism and the glass can be cut in a single block as is the case in the example illustrated in the drawing.

It is not possible to utilise a prismatic block of this form for the objective for taking pictures owing to the stereoscopic effect which results from the asymetry of the prisms relatively to the optical axis. On the other hand there is no difficulty in fitting a prism of this kind to the projection objective as shown in Figures 6 and 7. A considerable gain in luminosity is even obtained by this means provided the source of light be regulated in such a manner that the pencil passing through each monochrome is projected exclusively upon the corresponding facet of the prismatic block.

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 device for obtaining upon one and the same surface, monochrome proofs in juxtaposition printed respectively in the fundamental colours, characterised by the combination of two objectives—a front objective serving to give a real or virtual image of the object, the other to take this image again so as to break it up into three monochromes projected onto the sensitised coat by means of a system of concentric prisms or mirrors interposed in the said objective or placed against it.

2. In a device of the type specified in Claim 1 a three-colour screen placed in contact with the sensitised coat with the object of obtaining images printed in the colours of the screen.

3. In a device of the type specified in Claim 1, the employment of coloured prisms or coloured mirrors placed in the objective or against it, with the object of obtaining images printed in the same colours.

4. In a device of the type specified in Claims 1 to 3 the employment of a prism with inverse inclinations to those which have given rise to the corresponding images, placed in contact with the sensitised film, with the object of erecting the rays that impinge upon it.

Apparatus for Photographing and Projecting Kinematographic and other Views.

5. A device for the projection of coloured images, either fixed or cinematographic, characterised by the fact that the prism arranged inside the objective or against it is constituted by juxtaposed elements instead of being constituted by concentric elements.

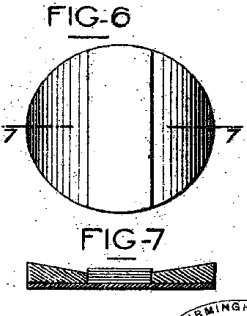
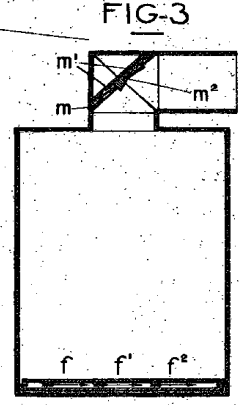
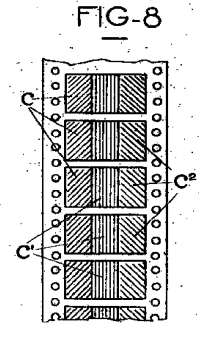
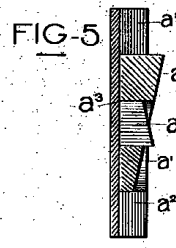
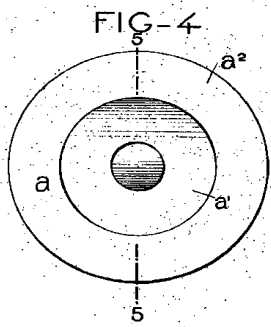
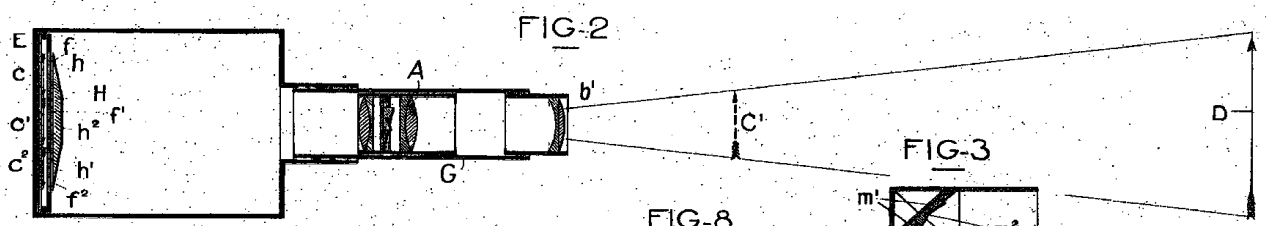
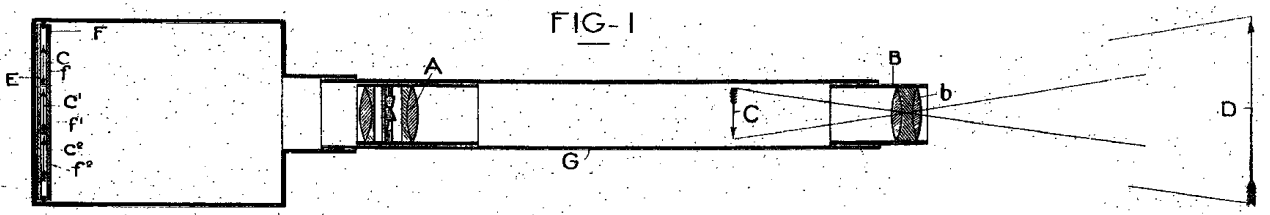
6. As a novel industrial product, the cinematographic films printed and projected by means of the device specified in Claims 1 to 5, these films being characterised by a very small angular aberration of the deflected images which do not present any relative stereoscopic effect. 5

Dated this 7th day of November, 1911.

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Agents for the Applicants.

10

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



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FIG-1

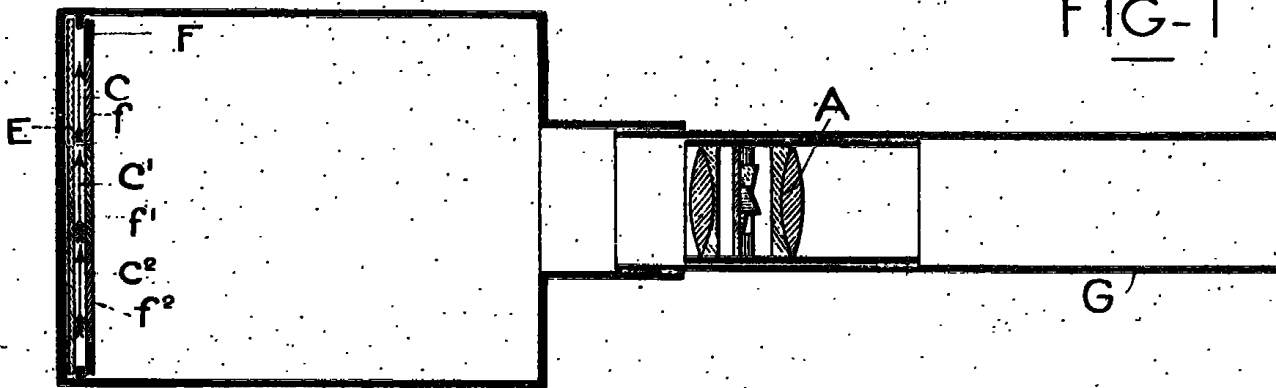


FIG-2

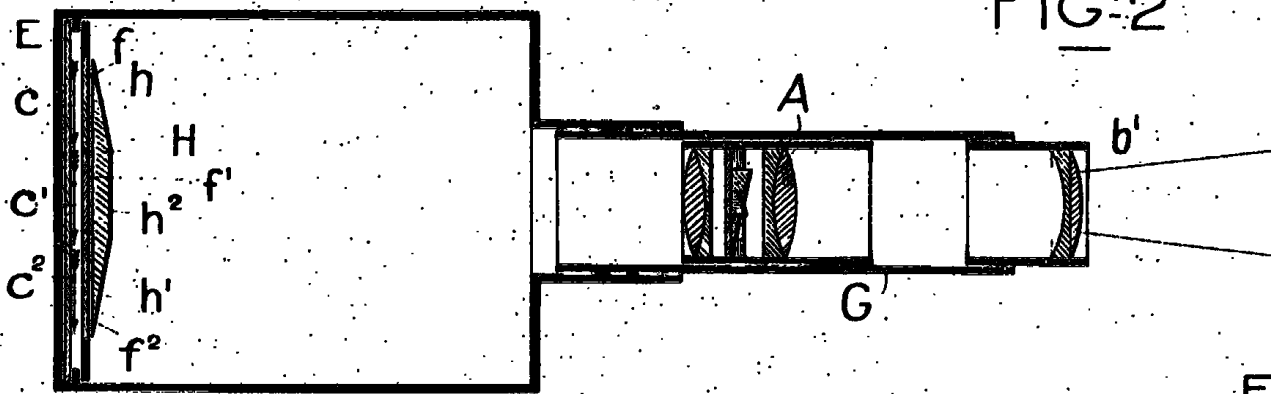


FIG-4

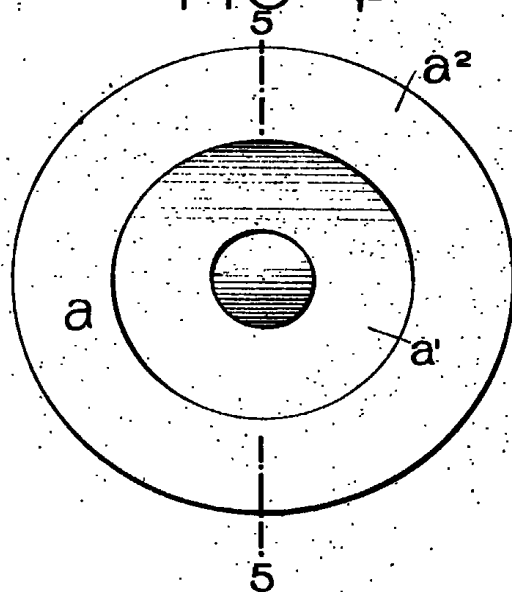
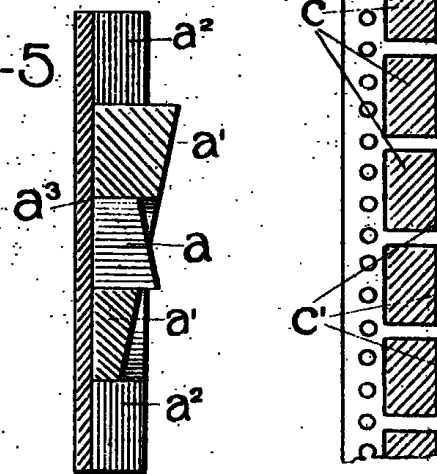


FIG-5



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

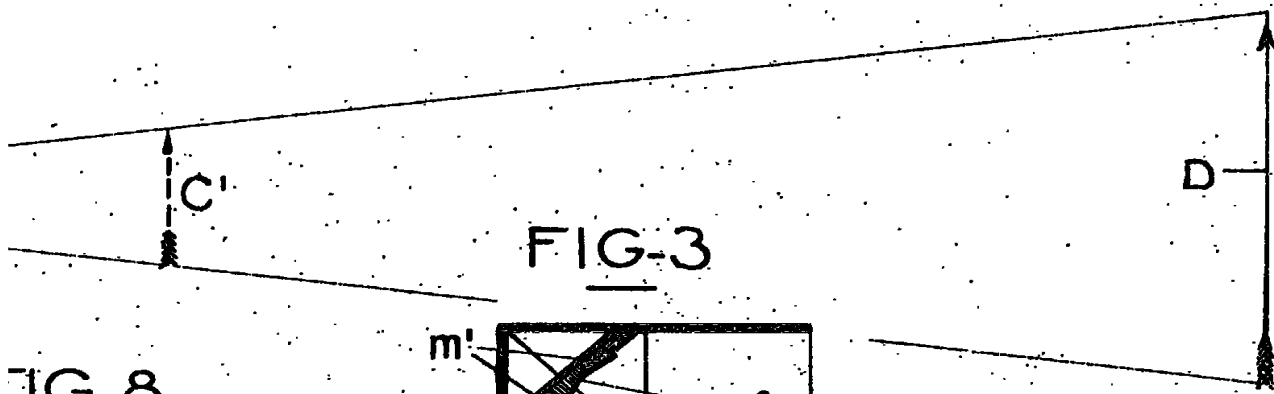
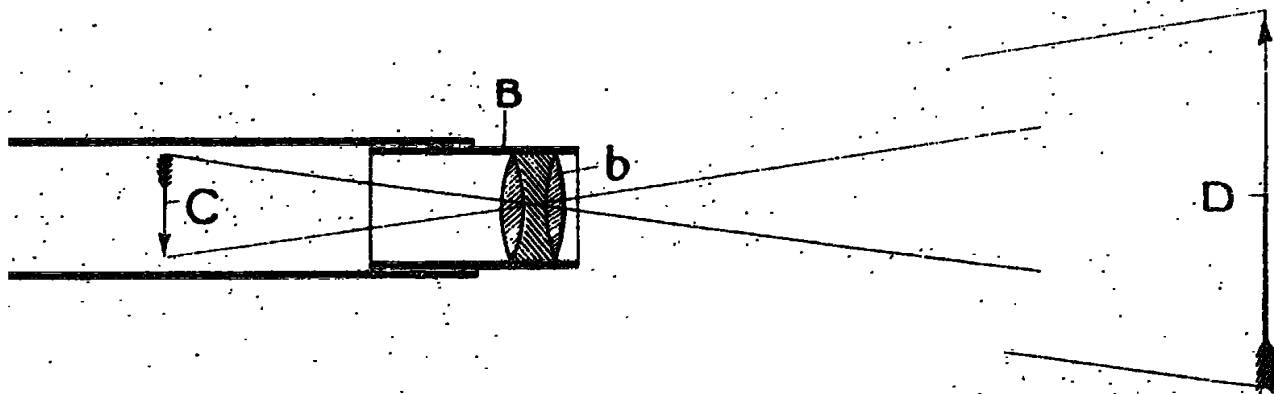


FIG-3

FIG-8

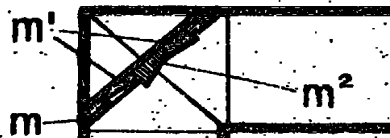
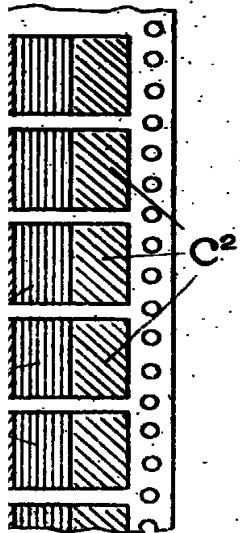


FIG-6

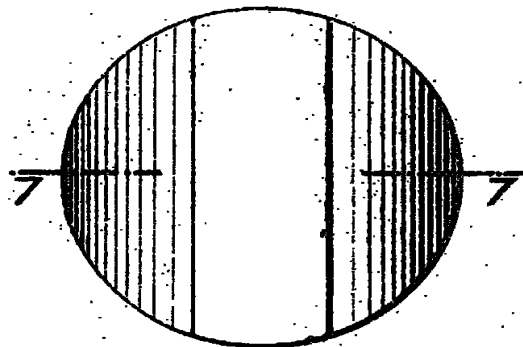
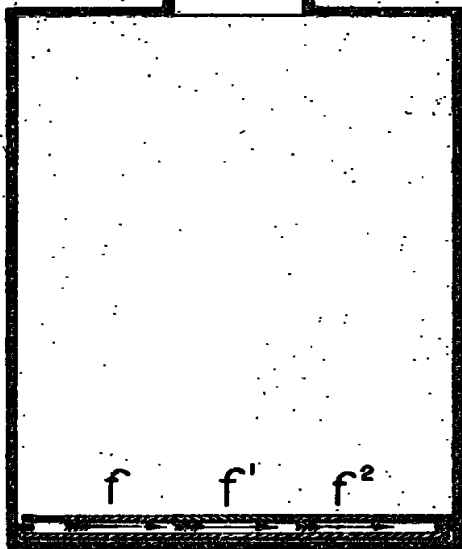


FIG-7



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