

N^o 1642



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PROVISIONAL SPECIFICATION.

An Improved Form of Camera for Colour Kinematography.

I, COLIN NOEL BENNETT, of 9, Morrab Road, Penzance, Cornwall, Journalist, do hereby declare the nature of this invention to be as follows:—

My colour kinematographic camera differs from other types in having two or more separate lenses fitted one over the other with their centres nearly or quite corresponding with the centres of a normal chain of kinematograph negative pictures as usually recorded on any ordinary kinematograph negative film that is to say having their centres distant from one another about three quarters of an inch in a vertical line from the ground upwards. Behind these lenses is the camera gate fitted with a mask having two or more holes one over the other according to the number of lenses employed, or there may be in the mask only one lengthened hole according as to which sort of mask may prove most convenient in practice. The intermittent movement of the camera is so adjusted as to pull the picture down two or more full picture lengths at each engagement or time of coming into operation. In front of or behind the lenses or wherever may be most convenient is placed a single or multiple shutter which may be of any kind suitable for kinematographic cameras. Shutters of a rotary or reciprocating type might for instance be adapted to the invention. Where a single rotary shutter is employed it would be made of sufficiently large size for the cut away sector to pass in front of the lenses of the camera as nearly simultaneously as possible. Each lens would take on the record of one of the colour sensation negatives of the two, three, or multi-colour set to be produced. For this purpose each would be fitted with its approximate colour filter. Thus to take the instance of a camera adapted to take two colour negatives the number of lenses would here be two, one of which might be fitted with a reddish and the other with a greenish colour filter. The shutter or shutters would be adapted to cover and uncover them quite or almost simultaneously while the gate mask will be double and the intermittent movement would shift the film double the usual length (or approximately one and one half inches) at each engagement. For three colour work the same system would be extended to three lenses three filters and a three picture shift. The camera would use negative stock rendered as sensitive as possible to all colours. The advantage claimed for the above arrangement over existing colour kinematographic cameras is that by its means fringing difficulties due to difference of movement phase of the moving subjects recorded in the different colour records is avoided or reduced to a negligible quantity.

I am aware that my system theoretically introduces parallax troubles but these I believe to be negligible for most subjects where lenses of fairly long focus are employed at so small a separation as I propose. I further reduce these troubles when apparent by fitting my lenses on centring screws by which the separation may be reduced to slightly less than the theoretical amount.

Dated this 21st day of January, 1911.

COLIN N. BENNETT.

[Price 8d.]



An Improved Form of Camera for Colour Kinematography.

COMPLETE SPECIFICATION.

An Improved Form of Camera for Colour Kinematography.

I, COLIN NOEL BENNETT, 9, Morrab Road, Penzance, Cornwall, Journalist, 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:—

My colour kinematograph camera differs from existing types in that with it I obtain the necessary colour sensation records simultaneously by means, firstly, of the employment of a film shifting movement pitched to at the least twice the usual amount of picture shift. In conjunction with the above is employed a battery of two or more lenses of equal focus and placed one above the other so that their centres are at approximately the distance apart of a single kinematograph picture; such lenses being employed in conjunction with stationary colour screens or filters placed either before, between, or behind the lens combinations, as may prove most convenient in practice.

Let me here say that I claim in itself no novelty in the use of more than one lens as a means of making simultaneous colour sensation negatives in colour kinematography. Neither do I claim novelty in the arrangement of them one above the other, nor for the employment with them of stationary colour screens, all such matters having been long admitted as of common knowledge. Neither do I in my invention contemplate the use of chromatically uncorrected lenses as set forth in Christensen's Patent No. 7514 1908 (Claims 1 and 2), nor need the disposition of the lenses in my camera involve the recessing or cutting away of any part of the glasses of such lenses (Christensen, Claim 3).

Also I claim no novelty for the idea of using one only sensitive surface on which to make the different colour sensation records, such usage having long been customary in colour photography and colour kinematography. Also I make no use of prisms in my colour kinematograph camera, which use of prisms constituted the essential feature of the Jumeaux Patent No. 3729/1903.

The novel feature of my invention is the employment of the extended picture shift movement in the manner about to be further described and in conjunction with two or more lenses provided with stationary colour filters as before stated. By the term extended (or multiple) picture shift I mean that the movement which draws down the film after each exposure, (otherwise known as the kinematograph camera escapement), shall, instead of operating so as to pull down the film the width of one picture only, operate so as to pull it down the distance of two or more pictures according as two or more lenses are used on the camera, this number of lenses being in itself determined by the number of distinct colour record negatives it is desired to make of each given movement phase.

Thus, in the case of a kinematograph camera intended for two colour negative making the arrangement would be substantially as shown in Fig. 1 of the illustration sheet attached hereto. In this, A and B are two lenses of similar equivalent focus mounted on a light-tight box-form mount E in front of the kinematograph camera gate H. Inside this box-form mount E may be fitted the stationary colour filters R (red) and G (green), the light tracks of the two lenses being for convenience kept apart by the internal division F, which partition need not however be continued right up to the gate mask. K L shows the opening of the gate mask, which opening is twice the length customary when taking an ordinary sized kinematograph picture. M is the film band travelling from the feed box (not figured) through the gate H, and N is the claw of the escapement action whereby the film is, by virtue of the before mentioned extended picture shift, pulled down the space of two pictures as the result of each engagement of such claw with the

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film perforations. It may be said that the adjustment of the pitch of a kinematograph escapement is a matter well understood in the trade, and therefore calling for no detailed description here. C, D, are rotary light shutters operating before the lenses A and B respectively, both shutters working in synchronisation as the result of being connected together by means of gear wheels, and which gear wheels are themselves actuated by the camera driving mechanism in the usual manner. The shutters C and D will also have their cut away sectors so adjusted that exposure of the film through lenses A and B proceeds at the same moment. Fig. 2 gives an enlarged front view of such a suitable adjustment of lenses and shutters. With such an arrangement as that described it follows that the effect of each exposure interval will be to impress upon the film stock M two distinct colour negative records, one being K the red record, and the other L the green colour record. Further the two records will be of precisely the same movement phase where there was movement in the original subject or subjects taken, and, the mechanism and lens centring being correctly adjusted, the red and green colour record negatives will further be spaced upon the film band at the usual distance apart of ordinary kinematograph pictures. Also by the above means it will be seen that a continuous sequence of colour negatives of regulation kinematographic size may be made upon a band of film stock of the usual commercial width, such negatives being correctly placed the one above the other without calling into requisition any prism or prisms whatsoever.

It is of course pre-supposed that the film stock employed for the purpose of making the colour records has been previously rendered sensitive to the bulk of the rays transmitted by the colour screens used in connection with the system of colour kinematography to which my invention has been in the particular instance adapted.

Supposing the camera to be arranged for three colour kinematography, it will be provided with three lenses of identical focus fitted to the camera front vertically one above the other, their centres being separated from each other by approximately the height of a kinematograph film picture. These three lenses will be provided respectively with the red, green, and blue-violet taking filters usual in trichromatic photography. The camera gate will be furnished with a picture mask allowing of the simultaneous photographing of the red, green, and blue-violet record negatives one above the other on the one band of ordinary width colour sensitive kinematograph film stock, while the intermittent escapement will be such that a three picture shift results from each time of its coming into operation, the latter being a simple matter connected with the adjustment of pitch of such picture escapement. Each lens of the trio will be provided with its own rotary shutter, the three shutters being inter-connected by suitable gearing so that all three of them revolve at the same speed and cover and uncover their respective lenses in synchronisation, or where accuracy in registration of identical movement phase in all three pictures is not quite so important one large rotary shutter covering and uncovering all three lenses at approximately the same time might be made to suffice.

The same proviso as to simplification of shutter mechanism applies also in the case of the camera as arranged for two colour kinematography. I also reserve to myself the right to adapt other forms of shutter to my invention, as for instance those forms of a reciprocating type. I however claim no novelty for such suggested arrangements of the light shutter or shutters apart from their use in connection with the multiple or extended picture shift.

Since my multi-lens system of obtaining the colour record negatives for colour kinematography does not take into account errors of parallax (such errors being normally but slight provided fairly long focus lenses are used) I include in my invention means of decreasing parallax errors where they may show themselves. Such means takes the form of making the centring of the lenses to and from one another adjustable within small limits. This may be effected by the same means as is usually employed in the centring of microscope sub-stage condensers,

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namely by means of a split ring and milled head screws; or other suitable means may be employed. By whatever manner adopted, the centring of the lenses may at will be altered to rather more than the full picture height. In this way, by introducing slight opposing parallax error into the rendering of distant objects the effect of the natural parallax in near objects will become less pronounced. 5

My invention does not deal with means of projecting the colour record positives printed from negatives produced in my improved form of multi-lens and multi-picture shift colour kinematograph camera, but many ways of projecting such positives are known both as applied to two and three colour kinematography.

Other advantages of my system as herein set forth are firstly, the record of each movement phase being identical in each colour sensation of the two, three, or multi-colour set, there will be no fringing of colours when projecting positives from negatives made with the camera herein described. Such fringing is commonly seen in the colour kinematography produced by those types of cameras making the various colour sensation records one after another, and where the natural objects photographed have been in a rapid state of movement, and the system of subsequent projection of the kinematograph positives has involved the production of the colour illusion through the medium of persistence of vision. Secondly, with my colour camera the rate of taking of each individual set of colour records irrespective of the number of such records comprised in the set will be the usual rate common in all kinematography, and not a specially fast one entailing correspondingly short exposures in picture making. 10 15 20

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:— 25

(1). The combination of a multi-lens and multi-picture shift system for the simultaneous production of the respective colour record negatives forming the component colour sensation records of a two-colour, three-colour, or multi-colour set, and of aggregations of such perfect sets in sequence upon a kinematograph film for use in colour kinematography. 30

(2). A colour kinematograph camera embodying the principle set forth in Claim (1).

(3). The system of obtaining compensation or partial compensation of foreground parallax errors, between one and another of the component colour record negatives of the complete set recording any one movement phase, by means of altering the centring of the lenses comprising the lens battery with which such set is recorded. 35

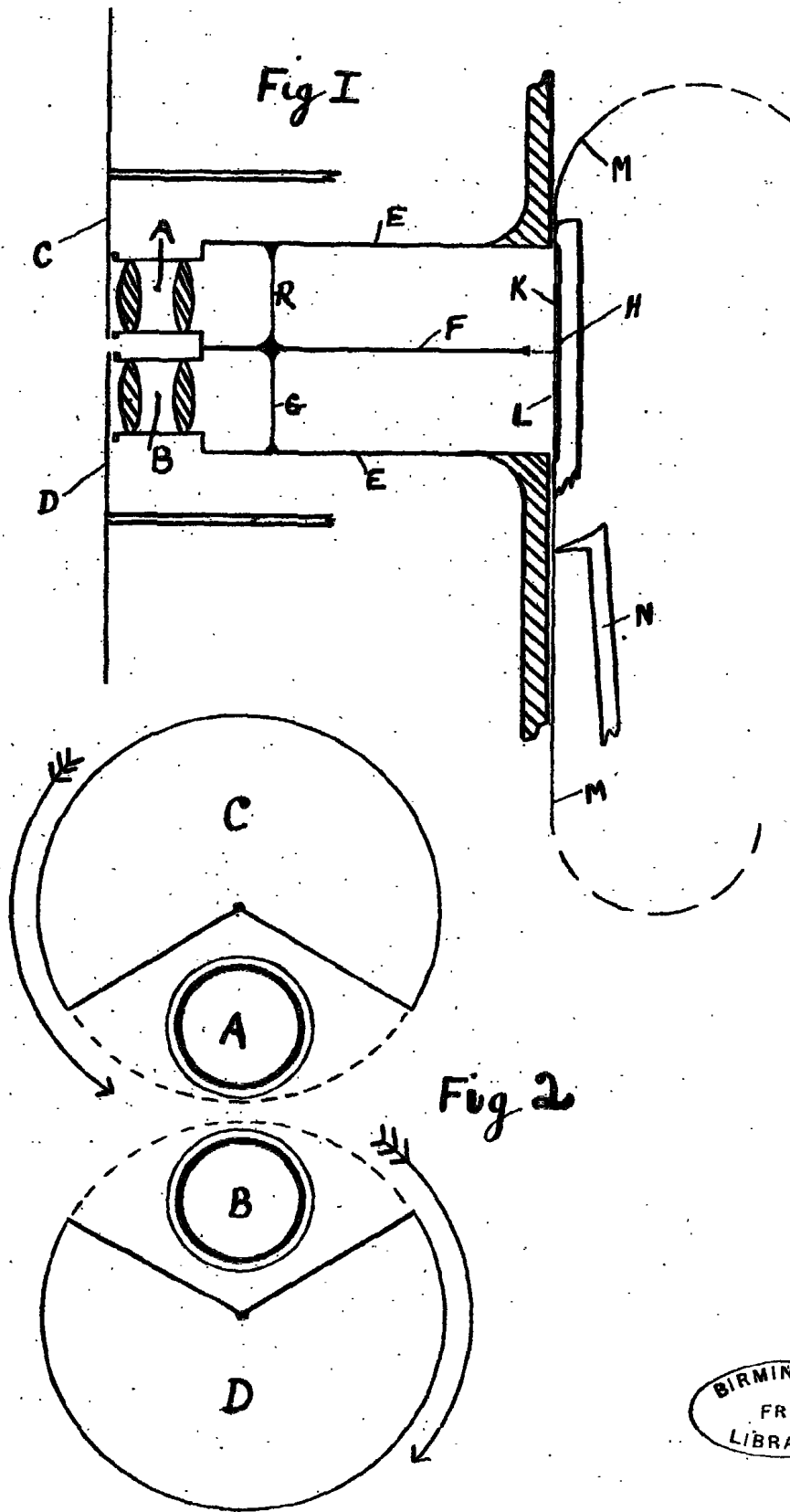
(4). The principle of a multiple picture shift as applied to colour kinematography for the simultaneous recording of full sized kinematograph negatives in sequence upon a single band of film stock, such being accomplished without the use of prisms. 40

(5). Any and all of the above.

Dated this 19th day of July, 1911.

COLIN N. BENNETT.

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



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