

N<sup>o</sup> 26,671



A.D. 1906

Date of Application, 24th Nov., 1906

Complete Specification Left, 12th Apr., 1907—Accepted, 25th July, 1907

PROVISIONAL SPECIFICATION.

**Improvements in & relating to Kinematograph Apparatus for the Production of Coloured Pictures.**

I GEORGE ALBERT SMITH, F.R.A.S., Laboratory Lodge, Roman Crescent, Southwick, Brighton Animated Picture Maker do hereby declare the nature of this invention to be as follows:—

A practical method by which the well-known animated photographs or  
5 bioscope moving pictures may be projected in the colours of nature approximately instead of in black & white as usual. The method is based upon the well-known principles of 3-colour photography, but use is made of the principle of persistence of vision to effect the necessary superimposition of coloured images. In all previous attempts to apply the principles of 3-colour photography to  
10 animated pictures the difficulty of accurate superimposition has proved fatal to success. By my method 2 colours only are recorded, red & green, & these two records are exhibited in such rapid alternation that persistence of vision causes the colours to blend into one view, which appears in approximately correct colours. The steps of the process are as follows:—

15 1. An animated picture of a coloured scene is taken with a bioscope camera in the usual way, except that a revolving shutter is used fitted with properly adjusted red & green colour screens. A negative is thus obtained in which the reds & yellows are recorded in one picture, & the greens & yellows (with some blue) in the second, & so on alternately throughout the length of the  
20 bioscope film.

2. A positive picture is made from the above negative & projected by the ordinary bioscope projecting machine which, however, is fitted with a revolving shutter furnished with somewhat similar coloured glasses to the above, & so contrived that the red & green pictures are projected alternately through their  
25 appropriate coloured glasses.

3. If the speed of projection is approximately 30 pictures per second, the two colour records blend & present to the eye a satisfactory rendering of the subject in colours which appear to be natural.

The novelty of my method lies in the use of 2 colours only, red & green,  
30 combined with the principle of persistence of vision.

Dated this 22nd day of November, 1906.

G. ALBERT SMITH.

COMPLETE SPECIFICATION.

35 **“Improvements in, and relating to, Kinematograph Apparatus for the Production of Coloured Pictures”.**

I, GEORGE ALBERT SMITH, of Laboratory Lodge, Roman Crescent, Southwick, Brighton, in the County of Sussex, Animated Picture Maker, do hereby declare the nature of this invention and in what manner the same is to be performed,

[Price 8d.]



*Impts. in Kinematograph Apparatus for the Production of Coloured Pictures.*

to be particularly described and ascertained in and by the following statement:—

My invention has for its object to provide means whereby what are known as animated photographs, or bioscope moving pictures, can be exhibited so as to have the appearance of being in the natural colours, or approximately so, instead of being uncoloured, or requiring the photographs to be coloured by hand. It has been proposed to take, for such purposes, and exhibit, by kinematograph apparatus, photographs taken as three colour records requiring three times the ordinary number of pictures for a given subject, but it has been found that the persistence of human vision is not such that the series of three successive colour records, hitherto considered necessary for the exhibition of colours resembling the original, can be either taken, or exhibited, in the short space of time necessary to enable, on exhibition, the eye to retain, by persistence of vision, the impressions received from the three successive records so that the three colour sensations appear to be received by the eye at the same time.

I have found that persistence of vision is such, however, that only series of two colour records, (the records of one colour sensation alternating with those of the other colour sensation), are necessary to present to the observer the appearance of the picture being in its natural colours, or approximately so, and I have found that the red and green colour sensations are sufficient to give such appearance. As it is possible to take and exhibit series of two colour records with sufficient rapidity to comply with the requirements of persistence of vision as regards colour sensation, I can therefore provide means whereby so-called moving photographs, or bioscope pictures, can be taken, by photography, as colour records, and exhibited in apparently their natural colours.

According to my invention, negatives of records of two colour sensations alternating with each other are photographed by apparatus which may be generally of the usual character for taking kinematograph pictures, but red and green transparent filters, or screens, are employed which are alternately brought into position as the photograph is being taken so that a kinematograph negative is obtained in which there will usually be about double the ordinary number of pictures for a given subject, and in which negatives of records taken with the intervention of the red filter, or screen, alternate with those taken with the intervention of the green filter, or screen. The photographic material, or negative film on which the pictures are taken in the camera, will of course be coated with an emulsion which has been rendered sensitive to the action of red, yellow, green and blue light, such an emulsion being known to photographers as panchromatic emulsion. I then make a positive from the negative so obtained and this is used in a kinematograph apparatus, which may be of the usual kind except that it is provided with a device, or shutter, furnished with two coloured transparent screens, with the usual opaque parts between them, so adjusted as to conceal the change from record to record with the minimum of obliteration, the said coloured transparent screens being of a character respectively similar, or sufficiently similar, to those used in taking the records that the alternate red and green colour records are exhibited with the intervention of corresponding colour screens, that is to say, as each alternate colour record of the one character comes into position for exhibition, the correspondingly coloured screen will simultaneously come into position, and as each of the other alternate colour records of the other character comes into position for exhibition, the other correspondingly coloured screen will simultaneously come into position. A rotating shutter with two apertures, or transparent parts, and opaque parts between, of the smallest size possible to conceal the change from record to record, will be a convenient device for the purpose, if the apertures be covered by the respective coloured transparent screens.

*Impts. in Kinematograph Apparatus for the Production of Coloured Pictures.*

In order to comply with the requirements of persistence of vision as regards colour, it will be necessary to drive the apparatus, both in taking and exhibiting, at a greater speed than that employed with ordinary kinematograph apparatus, say at about double the speed. I have found that a speed which will cause  
5 about thirty successive pictures to pass the aperture per second gives good results, causing the persistence of vision of the observer to give him the impression that the colours obtained from the alternating records are superimposed, or blended, so that the moving picture appears to him to be in its natural colours, or approximately so.

10 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:—

1. In connection with kinematograph apparatus, the employment of a succession of but two colour records, the records of one colour sensation  
15 alternating with those of the other colour sensation so that the observer's persistence of vision causes him to apparently see superimposition, or blending, of the colours received from series of two colour records.

2. A kinematograph photographing apparatus for producing negatives of colour records, the said apparatus being provided with transparent filters, or  
20 screens, of only two colours, these filters, or screens, being brought into position, during the successive exposures of the films, to produce negatives of records of two colour sensations alternating with each other.

3. A kinematograph exhibiting apparatus provided with transparent coloured screens of only two colours and a series of two corresponding colour records  
25 alternating with each other, so that the records of one colour sensation and the corresponding screen are brought into position for exhibiting alternately with the records of the other colour sensation and their corresponding screen.

4. For use in kinematograph apparatus; records of two colour sensations  
30 only, the records of one colour sensation alternating with those of the other colour sensation.

Dated this 12th day of April, 1907.

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



**REVOKED PATENT.**

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Patent No. 26,671, of A.D. 1906, has been revoked by Order of the High Court.

THE PATENT OFFICE,  
26th April, 1915.

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