PATENT SPECIFICATION

Convention Date (Germany): Jan. 17, 1931. **383,795**

Application Date (in United Kingdom): Jan. 18, 1932. No. 1480 / 32.

Complete Accepted: Nov. 24, 1932.

COMPLETE SPECIFICATION.

Improvements in Projecting Multi-colour Pictures.

We, I. G. FARBENINDUSTRIE AKTIENGESELLSCHAFT, a Joint Stock Company organised according to the laws of Germany, of Frankfurt a/Main, Germany, 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:—

In the Berthon process for reproducing multi-colour pictures recorded on linear lenticular films, it has frequently been proposed to avoid the use of a multi-colour filter by decomposing the white light into its spectral colours. According to known arrangements, the dispersing element which replaces the multi-colour filter is arranged in the course of the projecting light beam in a position remote from the film gate or in a position where it is reached by the projecting light beam after the light beam has passed through the film. The arrangements hitherto proposed involve the drawback that they cause either loss of light or an uneven illumination of the picture field, or that they require a special course of the rays unusual in the ordinary apparatus.

By the method of this invention the white light is decomposed into its spectral colours in a manner by which the said drawbacks are eliminated. It is based on the observation that, for producing in the image plane behind each of the lenticular elements of the film a luminous stripe appearing in different colours from one side of the element to the other, it is not necessary to interpose a real spectrum (which is produced by projecting an image of the source of light by means of a lens, the beams of light passing a prism before reaching the lens) in the plane that would be occupied by the multi-colour filter. The present invention consists in interposing in the normal path of the beam, in close proximity to the gate aperture, an optical system that disperses the light into its spectral colours, so that the source of light placed at the position which in the ordinary method of reproduction is occupied by the multi-colour filter appears, when viewed from the plane of the film, as a spectrum in the plane which would be occupied by the multi-colour filter, and of a size that corresponds with that of the multi-colour filter.

The process of this invention is particularly suited for projecting multi-colour pictures recorded on linear lenticular films.

Fig. 1 of the accompanying diagram shows a projection arrangement for the invention. By the mirror or condenser *a* the light of the arc lamp *b* is thrown on to the gate aperture *c*, behind which the lenticular film *d* is arranged with its embossed side turned towards the source of light. Directly in front of the gate aperture *c* there is placed the dispersing element in the form of a direct-vision prism *e*. In lieu of a single prism *e*, there may be used a number of narrow prisms of this kind (as shown for instance in Specification 24,276 of 1914, figure 3), in order to reduce as much as possible the extension of the prisms in the direction of the passage of the beam. The eye placed in the plane of the film *d*, sees a virtual image of a spectrum; the uniformly bright plane illuminated by white light that, in the absence of the prism *e*, is visible from the film plane through the gate aperture, has become a plane illuminated by the spectral colours, namely, if glass prisms of the ordinary dispersion are used, a broad blue zone, a somewhat narrower green zone and a red zone that is still narrower than the green zone.

The figure shows the direction in which the source of light (in the present case the mirror of the arc lamp) is seen when viewed through the prism, the radiation being supposed to contain only those wave lengths that correspond to the optical centres of the red band, the green band and the blue band of the spectrum. The remaining wave lengths composing the light of the source of light are grouped on both sides of these centres according to the extension of the different zones.

The dimensions of the prism *e* must be such that the breadth of the spectrum corresponds with the breadth of the otherwise required multi-colour filter. The prism *e* must disperse the light in such a

[*Price* 1/-]

manner that the colours red, green and blue are visible at a distance from each other that permits them to appear pure. The image of the mirror or the condenser *a* corresponding with the wave length 650μ must not, for instance, overlap with the image of *a* corresponding with the wave length 550μ.

The arrangement described involves the advantage that the light dispersing system is placed close to the gate aperture, so that the passage of the beam need otherwise not be altered, and that the light dispersing system may be kept within comparatively small dimensions. Moreover, its effect is independent of the illuminating device; the condenser or the mirror of the source of light must be adapted to the breadth of the multi-colour filter, which would be required for projecting the film in the usual manner. It is, of course, equally possible to construct the light dispersing system in some other form than that here indicated; for instance, there may be used a triangular prism or a set of such prisms, the path of the beams of light being changed correspondingly.

Most of the prismatic combinations disperse the light in such a manner that the blue part of the spectrum is considerably larger than, for instance, the red part. This is compensated by applying the arrangement according to this invention in photographing the pictures as well as in projecting them. If, however, a lenticular film, which has been exposed with interposition of the usual three colour filter, is to be projected by the method of this invention, it is necessary to use, in taking the pictures, a three-colour filter that corresponds with this peculiarity of the spectrum produced by a prism, that is to say the three-colour filter must comprise a very large blue stripe and a comparatively narrow red stripe (see Fig. 2).

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 method of projecting without a multi-colour filter multi-colour pictures recorded on linear lenticular films, which comprises interposing near the gate aperture in the normal path of the beam a light-dispersing optical element which, when viewed from the plane of the film, makes the source of light placed at the position which in the ordinary method of reproduction is occupied by the multi-colour filter appear as a spectrum in the plane that would be occupied by the multi-colour filter, and produces said spectrum in dimensions that correspond with those of the multi-colour filter.

2. A method according to claim 1, wherein the light-dispersing element is a direct-vision prism.

3. A method of projecting multi-colour pictures recorded on linear lenticular films, substantially as herein described with reference to the accompanying drawing.

4. Apparatus for projecting multi-colour pictures recorded on linear lenticular films, comprising a light dispersing optical element placed closely in front of the gate aperture and a source of light placed at the position which in the ordinary method of reproduction is occupied by the multi-colour filter, the dimensions of the light-dispersing optical element being such that it forms a spectrum in the plane that would be occupied by the multi-colour filter of dimensions that correspond with those of the multi-colour filter.

Dated this 18th day of January, 1932.

ABEL & IMRAY,
30, Southampton Buildings, London, W.C.2,
Agents for the Applicants.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1932

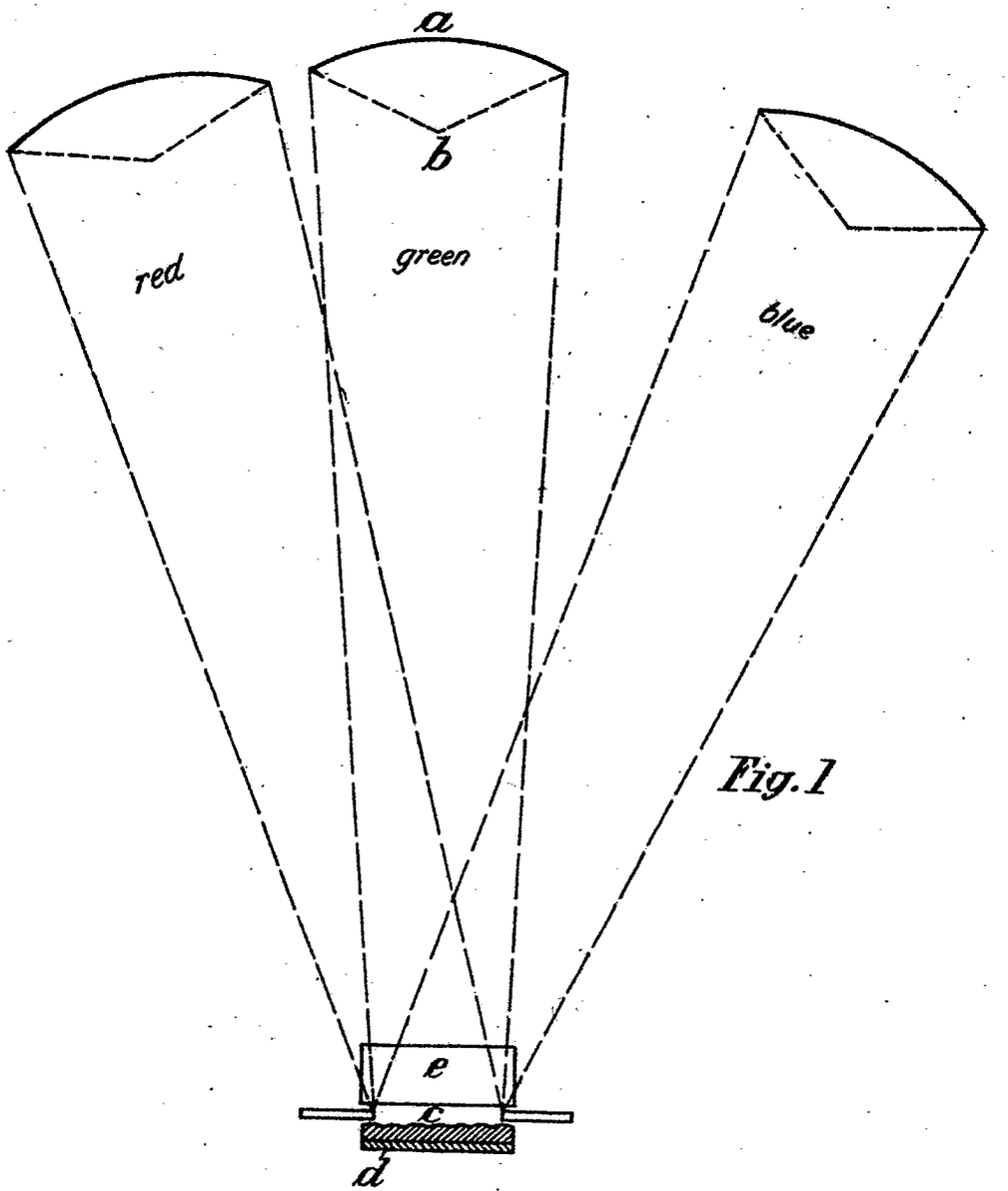
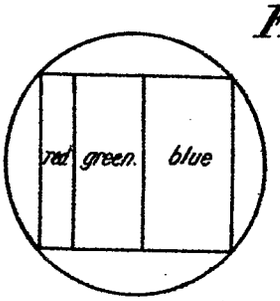


Fig. 1

Fig. 2



Malby & Sons, Photo-Litho