



PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in or relating to Cinematograph Reproducing Apparatus

I, HARRY BURROWS, of 1, Brooklyn Crescent, Cheadle, Cheshire, England, a Subject of the King of Great Britain, do hereby declare the nature of this invention to be as follows:—

This invention concerns cinematograph reproducing apparatus and has for an object to provide apparatus whereby a story or cartoon can be presented on a relatively short length of film. Another object is to provide a simple form of apparatus which is particularly suitable for use as a toy.

According to the present invention, cinematograph reproducing apparatus comprises a film having a plurality of rows of pictures extending lengthwise thereof, the sequence between adjacent pictures in a row passing across the rows from one picture in the row to a picture in another row, and means for illuminating each picture in turn in the correct sequence.

Preferably the rows of pictures are formed on the same web of film.

Conveniently, a separate optical projection system is provided for each row of pictures, in combination with means for rendering each optical system operative to project the images of the pictures in the row associated with it at a single viewing point in the correct sequence. Alternatively, a single optical projection system may be used, means being provided for deflecting the light beam on to the appropriate row of pictures as desired.

In order that the invention may be more clearly understood, various arrangements thereof will now be described by way of example.

In a first embodiment of the invention, a relatively short length of cinematograph film of any standard size has formed thereon two rows of pictures. The pictures in one row alternate in the sequence of presentation with the pictures in the other row, so that as the film is traversed through the apparatus, the

beam of light to be focused on the screen is arranged to illuminate first a picture in, say, the upper row, and then a picture in the lower row. In order to achieve this switching of the projector beam, two projector lamps are mounted one above the other and each has its own respective lens system for illuminating the pictures in an associated row on the film. The optical systems are arranged to project their images at the same point on the screen, and the lamps are connected to the source of supply through contacts engaging a rotating contact plate having alternate conducting and insulating sectors, the arrangement being such that as one lamp is energised the other is extinguished. The sector is driven from the shaft of a motor which carries a friction wheel in engagement with the film to draw it through the apparatus, and the contact wheel in synchronism with the film so that each lamp is illuminated in turn as the picture in its associated row is brought into position for projection. Thus, the desired sequence of pictures on the screen is obtained.

In an alternative arrangement an oscillating or rotating shutter is interposed between the lamps and the film and is rotated in synchronism with the film so that the light beam from each lamp is alternately cut-off and allowed to fall on the associated row of pictures in correct sequence.

In a further alternative embodiment, the rows of pictures are illuminated from a single light source, and switching of the beam from one row to the other is effected either by a mask adjacent the surface of the film and movable in synchronism with the sequence of pictures to be projected, or alternatively a deflecting prism or mirror is oscillated in synchronism with the sequence of the pictures to be projected.

Various alternative arrangements other than those described above may be adopted

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as desired. Moreover, more than two rows of pictures may appear on the film, or the film may be composed of two or more webs each having one or more rows of pictures and rigidly secured in side-by-side relationship so that the pictures are projected in the correct sequence. Any convenient driving means may be adopted as desired to traverse the film through the apparatus.

By means of apparatus according to the invention, it is possible to produce a film having a playing time of approximately five minutes on a web 10" long. It will thus be seen that the complications inherent in reeling and unreeling of the film can be dispensed with for the purposes of a toy, thus providing an appa-

ratus which is conveniently simple for a child to operate. The lamps may be of a relatively low power and may be operated from a dry battery or from a transformer connected to the normal supply mains. The driving motor may be clockwork or electric as desired, or the film may be traversed by hand. A suitable amount of overlap between the successive presentations of images on the screen is provided in known manner to reduce flicker to a minimum value.

Dated this 22nd day of July, 1947.

For the Applicant:

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COMPLETE SPECIFICATION

Improvements in or relating to Cinematograph Reproducing Apparatus

I, HARRY BURROWS, a Subject of the King of Great Britain, of 1, Brooklyn Crescent, Cheadle, Cheshire, England, 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:—

This invention concerns cinematograph reproducing apparatus for use with films of the kind (hereinafter referred to as the kind described), having a plurality of rows of pictures extending lengthwise thereof, the sequence of pictures passing across the rows from one picture in one row to the corresponding picture or pictures in the other row or rows. It has for an object to provide apparatus whereby a story or cartoon can be presented on a relatively short length of film. Another object is to provide a simple form of apparatus which is particularly suitable for use as a toy.

It has already been proposed in the specification of Patent No. 460,704 to provide a cinematograph reproducing apparatus, for use with perforated films of the kind described having two rows of pictures, in which a separate lamp and objective lens is associated with each row of pictures, the two light beams, after passing through the film, being separated from each other by a light-tight partition within the casing. The projection lamps are mounted in a common chamber and means driven synchronously with a film feed sprocket is provided for illuminating the lamps alternately. No provision is made for focusing the light beams before they pass through the film, nor for independent adjustment of the projection systems to ensure the correct alignment of

the images produced by each.

According to the present invention, cinematograph reproducing apparatus for use with films of the kind described comprises a separate optical projecting system for each row of pictures having a respective condenser lens, objective lens and light source, and means for rendering each system operative in turn to present images of the pictures on the film in the correct sequence at a single viewing point. Preferably, at least one projection system is adjustable so that images projected by the respective systems may be accurately registered.

In order that the invention may be more clearly understood, one embodiment thereof will now be described by way of example with reference to the accompanying drawings in which:—

Fig. 1 is a longitudinal section on the line I—I of Fig. 3;

Fig. 2 is a perspective view of the objective lens assembly;

Fig. 3 is a plan view of the apparatus with the cover removed, and

Fig. 4 is a fragmentary view of a length of film for use with the apparatus.

Referring first to Fig. 4, a relatively short length, say, 10", of cinematograph film 1 of any standard size has formed thereon two rows of pictures 2a, 3a, . . . and 2b, 3b, . . . The pictures 2a, 3a, . . . in one row alternate in the sequence of presentation with the pictures 2b, 3b, . . . in the other row, so that as the film 1 is traversed through the apparatus 4, the beam of light to be focused on the screen is arranged to illuminate first the picture 2a in the upper row, and then the picture 2b in the lower row, as will be described more fully below.

In order to achieve this switching of the projector beam, two projector lamps 5a, 5b are mounted one above the other in the housing 4 and each has its own 5 respective lens system 6a, 7a and 6b, 7b for illuminating and projecting the pictures 2a, 3a, . . . or 2b, 3b, . . . in an associated row on the film 1. The optical systems 6a, 7a and 6b, 7b are arranged to 10 project their images at the same point on the screen (not shown) by providing adjusting means for the objective lenses 7a, 7b. These lenses are mounted in a common mounting 8 behind projection 15 apertures 9 in the front wall of the housing 4. The mounting is adjustable to a desired extent towards and away from the condenser lenses 6a, 6b to vary the throw of the projector, whilst the lens 7a 20 is mounted for independent vertical adjustment in the mounting 8 by means of a lens tube 10 which is supported on a leaf spring 11 anchored at its ends in grooves 12 in the mounting 8 and operative to urge the lens tube 10 against the 25 ends of a pair of adjusting screws 13 which project downwards through the top of the mounting 8. The screws 13 have conical points and are located side by side on a line at right angles to the axis of the lens tube 10 so that they form, with the spring 11, a three point mounting for the lens 7a.

The lamps 5a, 5b are connected to a 35 battery 16 in the base 14 of the housing 4 through contacts 15a, 15b engaging a rotating contact plate 17 having alternate conducting and insulating sectors 18, 19 respectively, the arrangement being such 40 that as one lamp 5a, say, is energised the other 5b is extinguished. The plate 17 is driven from a shaft 20 of a clockwork motor 21 which also drives a friction feed roller 22. The roller 22 cooperates with 45 a pressure roller 23 to engage and grip the film 1 so as to feed it past the condenser lens assembly 6a, 6b, the spindle 24 of the roller 23 being urged by a spring 25 towards the feed roller 22. A pressure 50 plate 26 keeps the film 1 pressed flat against the front surface of a mounting 27 for the condenser lenses 6a, 6b.

In operation, the feed roller 22 is driven fairly slowly. The film 1 is 55 inserted through a slot 28 in one side of the housing 4 and pushed behind the presser plate 26 until it is engaged by the feed roller 22 and pressure roller 23. These rollers grip the margin of the film 60 1 and draw it through the projector at a relatively low speed which is of the order of one inch per minute. The contact disc 17, however, rotates at a higher speed so that the lamps 5a, 5b are alternately 65 energised many times during the passage

of a vertical pair 2a, 2b, etc., of pictures on the film 1. These pictures thus slowly traverse the screen in rapid alternation to give the effect of animation, to be followed without any definite break by the next pair 3a, 3b, and so on. In this way, a film 1 of about 10" length lasts for approximately 10 minutes. It will thus be seen that the complications inherent in reeling and unreeling of the film can be 75 dispensed with for the purposes of a toy, thus providing an apparatus which is conveniently simple for a child to operate.

Since the timing register of the picture sequences with respect to the lamps 5a, 5b 80 is not critical, the use of a friction feed 22, 23 is permissible. This has the advantage of not requiring any skill to feed film into the apparatus 4. The projector is thus suitable for use as a toy. 85

A winding spindle 29 for the clockwork motor 21 passes upwards through the housing 4 and is accessible from the top thereof, thus avoiding the necessity of disturbing the projector on each occasion 90 when the motor is wound. A combined brake and switch lever 30 serves to stop and start the clockwork motor 21 and to control the circuit to the lamps 5a, 5b.

Various alternative detail arrangements other than those described above may be 95 adopted as desired. For example, independent controls for the motor and the lamps may be provided. Moreover, more than two rows of pictures may 100 appear on the film, or the film may be composed of two or more webs each having one or more rows of pictures and rigidly secured in side-by-side relationship so that the pictures are projected in the 105 correct sequence. Any convenient driving means may be adopted as desired to traverse the film through the apparatus.

The lamps 5a, 5b are of a relatively 110 low power and may, if preferred, be operated from a transformer connected to the normal supply mains. The driving motor 21 may be electric if desired, or the film 1 may be traversed by hand.

Having now particularly described and 115 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. Cinematograph reproducing apparatus for use with films of the kind described comprising a separate optical projecting system for each row of pictures having a respective condenser lens, objective lens and light source, and means for 125 rendering each system operative in turn to present images of the pictures on the film in the correct sequence at a single viewing point.

2. Cinematograph reproducing appa- 130

ratus according to Claim 1 wherein at least one system is adjustable so that images projected by the respective systems may be accurately registered.

5 3. Cinematograph reproducing apparatus according to Claim 2 wherein the objective lens of an adjustable optical system is mounted in an adjustable holder.

10 4. Cinematograph reproducing apparatus according to Claim 3 wherein the objective lens is mounted in a holder which is supported on its underside by a resilient member and engaged on its 15 opposite side by a pair of adjusting screws.

5. Cinematograph reproducing apparatus in accordance with any of the preceding claims in combination with a

driving motor and friction feed rollers 20 driven from the motor and operative to grip a margin of the film.

6. Cinematograph reproducing apparatus in accordance with Claim 5 wherein the driving motor is clockwork and has its 25 winding spindle accessible from the top of the apparatus.

7. Cinematograph reproducing apparatus according to claim 1 constructed and arranged to operate substantially as 30 described and as shown in the accompanying drawings.

Dated this 21st day of July, 1948.

For the Applicant:

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

