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F. W. HOCHSTETTER.

LIGHT REGULATOR FOR PROJECTING MOVING PICTURES.

APPLICATION FILED MAR 24, 1919.

1,364,278. Patented Jan. 4, 1921.

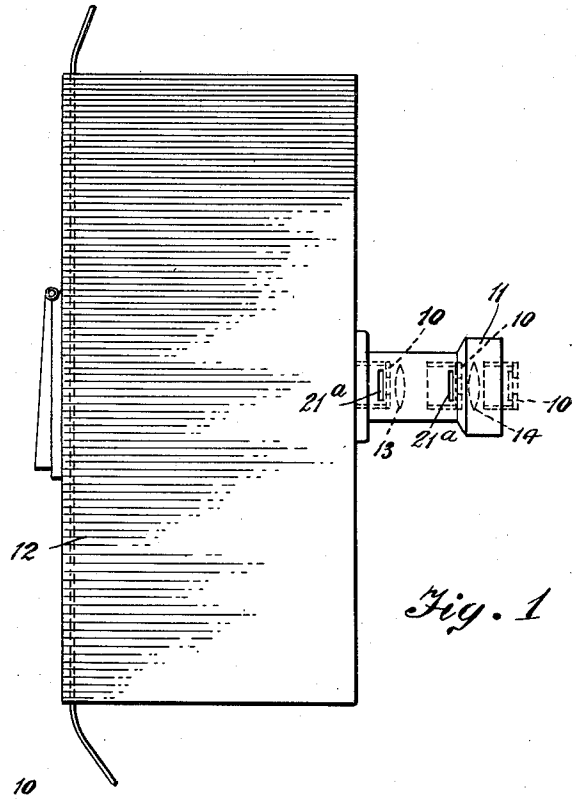


Fig. 1

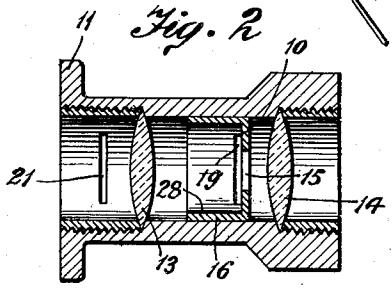


Fig. 2

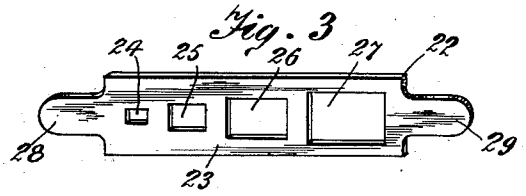


Fig. 3

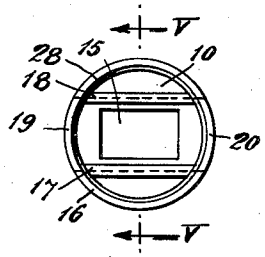


Fig. 4

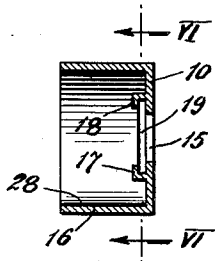


Fig. 5

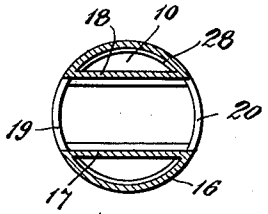


Fig. 6

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UNITED STATES PATENT OFFICE.

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LIGHT-REGULATOR FOR PROJECTING MOVING PICTURES.

1,364,278. Specification of Letters Patent. Patented Jan. 4, 1921.

Application filed March 24, 1919. Serial No. 284,862.

To all whom it may concern:

Be it known that I, FREDERICK W. HOCHSTETTER, a citizen of the United States, and a resident of New York, county and State of New York, have invented certain new and useful Improvements in Light-Regulators for Projecting Moving Pictures, of which the following is a full, clear, and exact specification.

This invention relates to a class of devices adapted to be used in conjunction with moving picture machines.

My invention has for its object primarily to provide a simple and efficient device designed to be employed on a moving picture projecting machine whereby all parts of the pictures when projected on a screen will be uniformly illuminated by the utilization of the direct rays of light passing through the condensers of the machine as well as utilizing partially the angularly directed rays of light, and which is of a form adapted to be adjusted so that the light employed in projecting the pictures may be regulated to meet various distances. The invention consists essentially of an apertured diaphragm adapted to be arranged in the path of projection of the pictures of a moving picture projecting machine so that the direct rays of light operative on the pictures will pass through the aperture, and adjustable on the diaphragm is a slide or element for cutting out the marginal rays of light.

Another object of the invention is to provide a reflector whereby part of the angularly directed rays of the light will be deflected so as to merge with the direct rays of light prior to passage through the diaphragm.

A practical embodiment of the invention is represented in the accompanying drawing forming a part of this specification in which similar characters of reference indicate corresponding parts in all the views, the said invention being more fully described hereinafter, and then pointed out in the claims at the end of the description.

In the drawing, Figure 1 is an elevation of a moving picture projecting machine showing the manner of employing in conjunction therewith one form of device embodying my invention.

Fig. 2 is an enlarged longitudinal vertical section taken through the lens barrel of the machine and also through the diaphragm of the device as applied thereto.

Fig. 3 is a perspective view of the adjustable element used in the device.

Fig. 4 is a rear elevation of the diaphragm used in the device.

Fig. 5 is a section taken on the line V—V of Fig. 4, and

Fig. 6 is a section taken on the line VI—VI of Fig. 5.

The device or regulator has a diaphragm, or plate 10 of a form and size to adapt it to be disposed interiorly of the lens barrel, as 11, of a moving picture projecting machine, as 12, so that the diaphragm will be in the rear, or between, or in front of the lens, as 13 and 14, of the machine, as shown in Fig. 1, and in the center of the diaphragm is an aperture 15 provided so as to be in the optical axis of the lenses. Projecting laterally from one face of the diaphragm 10 at its periphery is a flange, or wall 16 of a dimension similar to the size of the diaphragm for removably fitting closely the interior of the lens barrel of the machine. Extending interiorly of the flange 16 from the diaphragm 10 may be two parallel spaced guides, or grooved bars 17 and 18 arranged transversely of the diaphragm one below and one above the aperture 15 of the diaphragm, and through the flange of the diaphragm are two registered vertically disposed slots 19 and 20 which are also in register with the space between the grooves of the guide bars 17 and 18. Through opposite parts of the lens barrel of the machine may be registered vertically disposed pairs of slots 21 and 21^a one pair between the lenses and one pair between the machine and the rear lens.

When the diaphragm 10 with its flange is applied interiorly of the lens barrel of the machine these parts are arranged so that the slots 19 and 20 of the flange of the device will be registered with one pair of the slots 21 and 21^a of the lens barrel, as occasion requires, to allow a slide, or element, as 22, to be adjustably inserted through the registered slots of the lens barrel as well as through the slots of the flange of the diaphragm for cutting out the marginal rays of light from the condenser at the rear of the device by causing the passage through the aperture 15 of the diaphragm to be

varied in dimension. The adjustable element, or slide 22 has a substantially rectagular body portion 23 of a length considerably longer than the width of the lens barrel of the machine, and through the body portion of the adjustable slide are spaced openings 24, 25, 26, 27. All of these openings are preferably approximately rectangular to conform to the usual shape of the pictures of a film. These openings of the slide vary in sizes, the opening 24 being the smallest, the opening 25 being larger, the opening 26 being still larger, and the opening 27 being the largest. The openings are provided in the slide as well as being relatively arranged so that when the body of the slide is according y adjusted in the lens barrel of the mac ine and also adjusted in the guides 17 and 18 of the diaphragm of the device one of the openings of the slide may be registered with the aperture 15 of the diaphragm, and to permit the slide to be conveniently moved projecting from the ends of its body portion 23 are handles, as 28 and 29.

When the pictures from a moving picture film are projected on a screen positioned at a comparatively short distance from the projecting machine, the slide is adjusted so that its opening 24 will be in register with the aperture 15 of the diaphragm of the device as well as being in the optical axes of the lenses of the machine, and when the projection of the pictures is for a longer distance the slide is adjusted so that its opening 25 will be in register with the aperture of the diaphragm 10. When the throw of the pictures is for still longer distances the slide is adjusted in a like manner so that its apertures 26 and 27 will be respectively in register with the aperture of the diaphragm. By properly proportioning the dimensions of these openings according to the variations of distances of the screen from the projecting machine only such of the direct rays of light operative through the condenser or condensers will be admitted through the passage of each opening as will evenly illuminate the pictures appearing on the screen as well as producing a pronounced contrast between the high lights and shadows of the objects in the pictures.

While this use of the slide 22 will cause a portion of the marginal rays of the light to be cut-out, the angularly directed rays may be partially used in instances by providing a reflector, as 28. The reflector may be in the form of a mirror mounted on the inner surface of the flange 16 of the diaphragm of the device, or the reflector may be provided by making this flange of metal with a highly polished or silvered inner surface. The angularly directed rays of the light operative through the condenser at the rear of the device will be received in the reflector for being deflected so as to merge with the direct rays of the light for projection through the slide of the device, and in this manner these rays will be advantageously utilized for assisting in illuminating the pictures when projected.

In the foregoing description, I have embodied the preferred form of my invention, but I do not wish to be understood as limiting myself thereto, as I am aware that modifications may be made therein without departing from the principle, or sacrificing any of the advantages of this invention, therefore I reserve to myself the right to make such changes as fairly fall within the scope thereof.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. The combination with a lens barrel having a lens removably secured within one end thereof by means of a bushing having an internal configuration similar to the internal configuration of the barrel inwardly of the bushing and having pairs of registered side slots transversely therethrough forwardly of and rearwardly of said lens, of an apertured diaphragm removably positionable within the barrel at a point inwardly of the lens or within the securing bushing at the outer side of lens, and a slide adjustable on the diaphragm through the slots of the lens barrel and having a plurality of spaced apertures of varying size for being separately registered with the aperture of the diaphragm whereby the passage through the diaphragm may be varied in dimension.

2. The combination with a lens barrel having a lens removably secured within one end thereof by means of a bushing having an internal configuration similar to the internal configuration of the barrel inwardly of the bushing and having pairs of registered side slots transversely therethrough forwardly of and rearwardly of said lens, of an apertured diaphragm removably positionable within the barrel at a point inwardly of the lens or within the securing bushing at the outer side of the lens, a slide adjustable on the diaphragm through the slots of the lens barrel and having a plurality of spaced apertures of varying size for being separately registered with the aperture of the diaphragm whereby the passage through the diaphragm may be varied in dimension, and a reflector on the diaphragm for deflecting angularly directed rays.

3. The combination with a lens barrel having a lens removably secured within one end thereof by means of a bushing having an internal configuration similar to the internal configuration of the barrel inwardly of the bushing and having pairs of registered side slots transversely therethrough

forwardly of and rearwardly of said lens, of an apertured diaphragm removably positionable within the barrel at a point inwardly of the lens or within the securing bushing at the outer side of the lens, and a slide adjustable on the diaphragm through the slots of the lens barrel and having a plurality of spaced apertures of varying size for being separately registered with the aperture of the diaphragm whereby the passage through the diaphragm may be varied in dimension, said diaphragm having a marginal flange provided with slots for registration with the slots of the lens barrel.

4. The combination with a lens barrel having a lens removably secured within one end thereof by means of a bushing having an internal configuration similar to the internal configuration of the barrel inwardly of the bushing and having pairs of registered side slots transversely therethrough forwardly of and rearwardly of said lens, of an apertured diaphragm removably positionable within the barrel at a point inwardly of the lens or within the securing bushing at the outer side of the lens, a slide adjustable on the diaphragm through the slots of the lens barrel and having a plurality of spaced apertures of varying size for being separately registered with the aperture of the diaphragm whereby the passage through the diaphragm may be varied in dimension, said diaphragm having a marginal flange provided with slots for registration with the slots of the lens barrel, and said marginal flange having a reflecting inner surface so as to deflect angularly directed rays of light.

5. The combination with a lens barrel having a pair of spaced lenses removably secured within the ends thereof by means of bushings having internal configurations similar to the internal configuration of the barrel between the lenses and having pairs of registered side slots transversely therethrough between the lenses and outwardly of one of the lenses, of an apertured diaphragm removably positionable within the barrel at a point between the lenses or within the securing bushings at the outer side of either of the lenses, and a slide adjustable on the diaphragm through the slots of the lens barrel and having a plurality of spaced apertures of varying sizes for being separately registered with the aperture of the diaphragm whereby the passage through the diaphragm may be varied in dimension.

This specification signed and witnessed this 22 day of March, A. D. 1919.

FREDERICK W. HOCHSTETTER.

Witness:
FREDERICK CRYER.