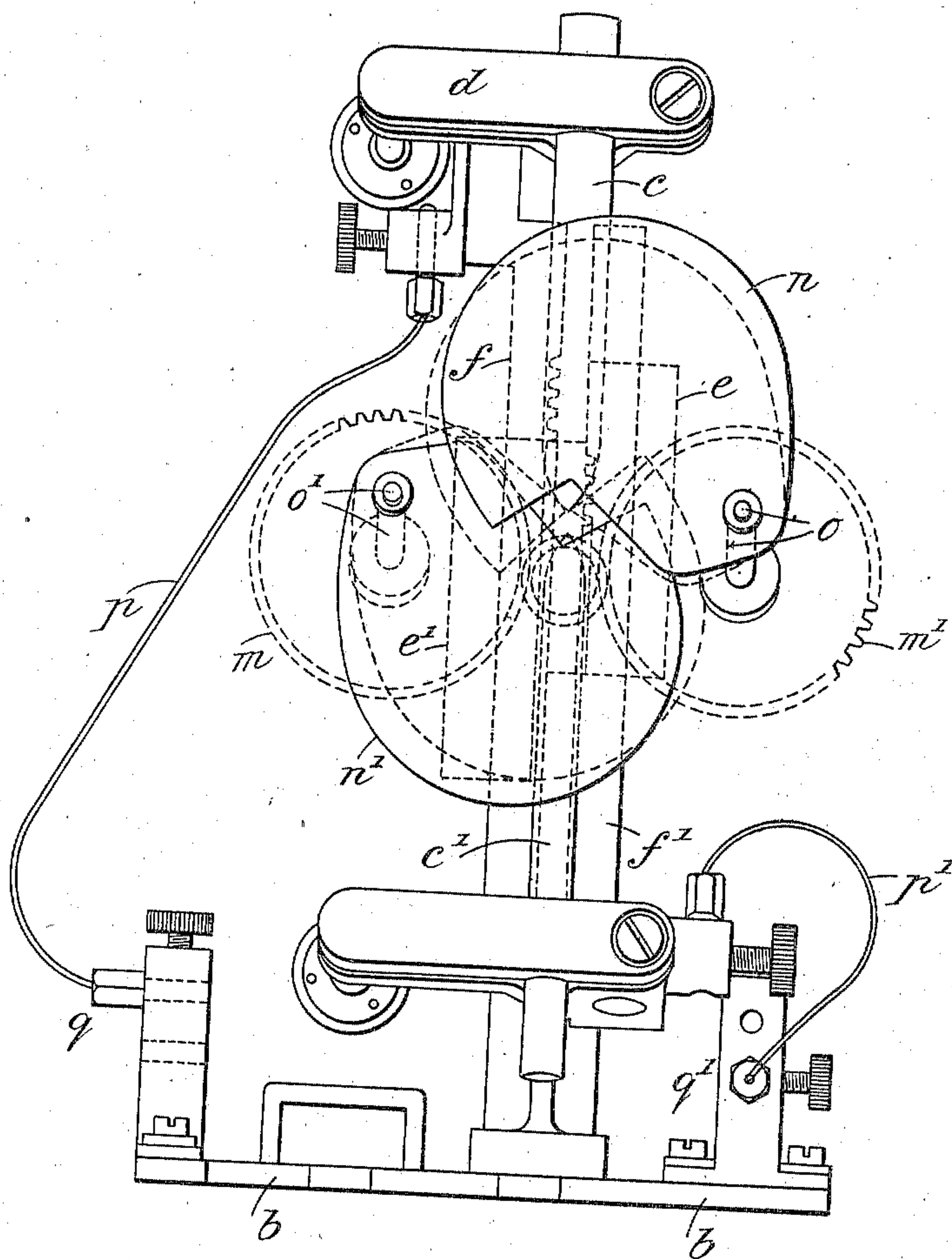


967,738.

T. J. DIGBY.  
ELECTRIC ARC LAMP.  
APPLICATION FILED SEPT. 8, 1908.

Patented Aug. 16, 1910.  
2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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INVENTOR:

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*Att'y*

**967,738.**

2 SHEETS—SHEET 2.



~~W. K. K.~~  
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# UNITED STATES PATENT OFFICE.

THOMAS JOSEPH DIGBY, OF LONDON, ENGLAND.

ELECTRIC-ARC LAMP.

967,738.

Specification of Letters Patent. Patented Aug. 16, 1910.

Application filed September 8, 1908. Serial No. 452,146.

\* To all whom it may concern:

Be it known that I, THOMAS JOSEPH DIGBY, electrical engineer, a subject of the King of the British Dominions, residing at London, England, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

My present invention relates to the electric arc lamps used for the illumination of theater stages and other places, where the light has frequently to be regulated for scenic effect. Such a lamp is disclosed, for instance, in the specification of my British Patent No. 21,879 of 1900, which describes a single shutter made of frosted gelatin or other translucent material. It has also been proposed to regulate the light passing through an aperture by a pair of shutters of semi-transparent material and gradually increasing thickness mounted on parallel axes and adapted to approach or recede from each other by turning the said axes in opposite directions, but unless the said shutters are made of special shape it is not possible to regulate the passage of light in such a manner that it forms a concentrated group of rays of approximately circular cross section and of variable width, which can be gradually reduced, before it is shut off altogether. In order to produce this effect I form in the edge of each shutter a notch, preferably of angular or V-shape, and of such a size and position that when the two shutters commence to overlap each other the two notches form together a single opening of a considerable size and of approximately square or diamond shape facing the source of light, and that by turning the two shutters toward each other so as to cause the shutters to overlap more and more, the width and depth of the said opening are gradually diminished to a point facing the source of light and finally the clear opening for the passage of light disappears altogether.

My invention consists in certain combinations of parts, including the said shutters and means for operating the same, as will be hereafter described and specified by the claims.

In the accompanying drawings, Figure 1 is a front elevation of an electric arc lamp embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is an axial section through the tubular shaft and the

tooth gear serving to operate the shutter plates.

In these drawings, *a* represents the frame of the lamp, *b* the base, *c*, *c*<sup>1</sup> the upper and lower carbons respectively, and *d* and *d*<sup>1</sup> the corresponding clamping devices for the carbons. The guides for the carbon holders are denoted by *e* and *e*<sup>1</sup>, the racks for operating the said guides by *f* and *f*<sup>1</sup>, and *g* is the small pinion gearing into the two racks. The small hand wheel *h* actuates the small pinion *g* by means of the solid shaft *i*, to regulate the carbons by means of the rack.

By the present invention I mount two thin plates *n* and *n*<sup>1</sup> separately on two projecting spindles *o* and *o*<sup>1</sup> in such a way that the plates are pivotally movable in front of the carbons *c*, *c*<sup>1</sup> of the lamp. Each of these plates is notched immediately in front of the point where the electric arc is required to be, and the plates are arranged to work close together in parallel planes with the plates overlapping each other. These plates are adapted, like a photographic shutter, to entirely cut off or permit a variable amount of light to pass the notched portions thereof, when they are simultaneously pivotally moved by the partial rotation of the spindles on which they are mounted.

The spindles are simultaneously turned toward or from each other by a comparatively large hand wheel *j* mounted on the back end of a tubular shaft *k* extending behind the lamp and revoluble in a suitable bearing *k*<sup>1</sup> in or attached to the frame *a* of the lamp. The tubular shaft *k* surrounds the solid shaft *i* mentioned above and carries at the end projecting from the bearing a toothed pinion *l*, which intermeshes with and drives two toothed wheels *m*, *m*<sup>1</sup> of equal diameter mounted on spindles *o*, *o*<sup>1</sup> revoluble in bearings also in or attached to the frame *a* at equal distances apart from but axially inclined to the central bearing, which carries the tubular shaft. It will be understood that by turning the large hand wheel the shutter plates *n*, *n*<sup>1</sup> are closed or opened to entirely obscure or vary the intensity of the light produced by the electric arc. The small hand wheel is thus adapted to regulate the carbons in the well known manner, while the large hand wheel varies the position of the plates.

Current is conducted to the clamping devices *d*, *d*<sup>1</sup> and through them to the carbons *c*, *c*<sup>1</sup> by insulated conductors *p*, *p*<sup>1</sup> as usual.



A guard  $r$  is screwed on the frame  $a$  to extend over the top of the toothed wheels  $m, m^1$  and is cut with oblique teeth placed at such an angle that they will mesh with the teeth of the pinion  $l$ , whose axis forms an acute angle with the axes of the wheels  $m, m^1$ . Owing to the oblique position of the pinion  $l$  with regard to the wheels  $m, m^1$ , the pinion is made wider than the said wheels.

What is claimed is:

1. In an electric arc lamp for theater stages, the combination with the carbons, of a pair of shutter plates situated in front of and approximately parallel to the carbons, said shutter plates being eccentrically pivoted on parallel axes situated right and left of the carbons, one shutter being situated also mainly above and the other mainly below a straight line intersecting the said axes and each plate having an approximately V-shaped notch at its inner edge portion close to the said straight line intersecting the axes of the plates and to the carbons, the plates being movable inwardly toward and partially over each other to control the dimensions of the opening formed by the notches of the plates, and mechanism for turning the said shutter plates on their respective axes simultaneously in opposite directions inwardly and outwardly.

2. In an electric arc lamp for theater stages, the combination of two notched shutter plates placed in front of the carbons and approximately parallel to the same, with a pair of parallel spindles mounted right and left of the carbons, each spindle carrying at the front end one of the said shutter plates and at the rear end a spur wheel, a pinion mounted between the said spur wheels

and gearing into the same, a tubular shaft carrying at the front end the said pinion and at the rear end means for turning the said shaft; a regulating shaft extending axially through the said hollow shaft and carrying at the rear end a hand wheel, while the front end carries a pinion, and mechanism adapted to be operated by the said pinion for regulating the distance between the carbons, substantially as described.

3. In an electric arc lamp for theater stages, the combination of a pair of carbon holders with a pair of racks facing each other and placed parallel to the carbons, each rack supporting one of the carbon holders, means for guiding the said racks in a straight line, a solid shaft carrying at one end a pinion situated between the said racks and gearing into the same and at the other end a hand wheel, a hollow shaft surrounding the said solid shaft and carrying at one end a small pinion in proximity to the pinion on the solid shaft and at the other end a hand wheel, a pair of tooth wheels gearing into the small pinion and mounted on a pair of spindles parallel to the hollow shaft on opposite sides of the same, a pair of shutters mounted on the said spindles and adapted to intercept a portion of the light emitted by the carbons, and a frame adapted to support the carbon holders and the regulating mechanism, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

THOMAS JOSEPH DIGBY.

Witnesses:

J. WETTER,  
EUSTACE H. BARKER.