

May 16, 1939.

L. T. SACHTLEBEN

2,158,308

EXCITER LAMP FOR SOUND RECORDERS AND REPRODUCERS

Filed July 31, 1937

3 Sheets-Sheet 1

Fig. 1

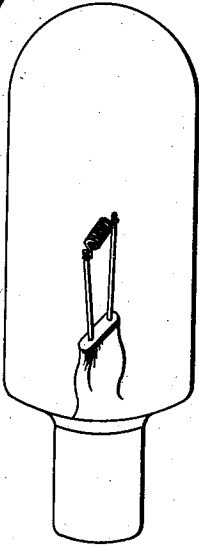


Fig. 2.

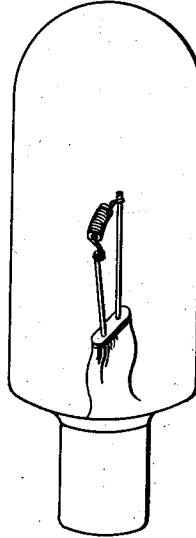


Fig. 3

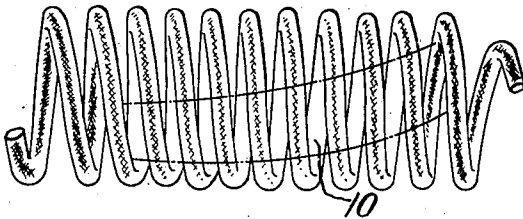


Fig. 4.

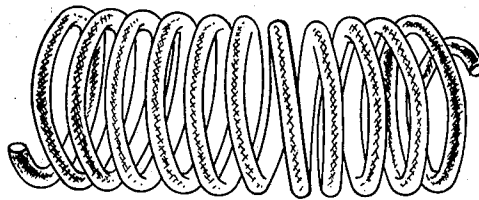
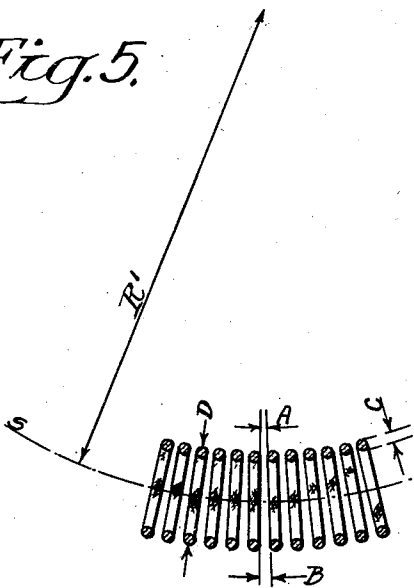


Fig. 5.



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Fig. 6.

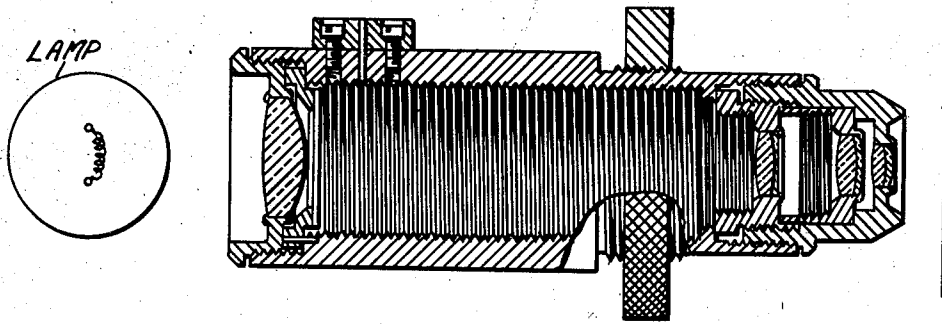


Fig. 7

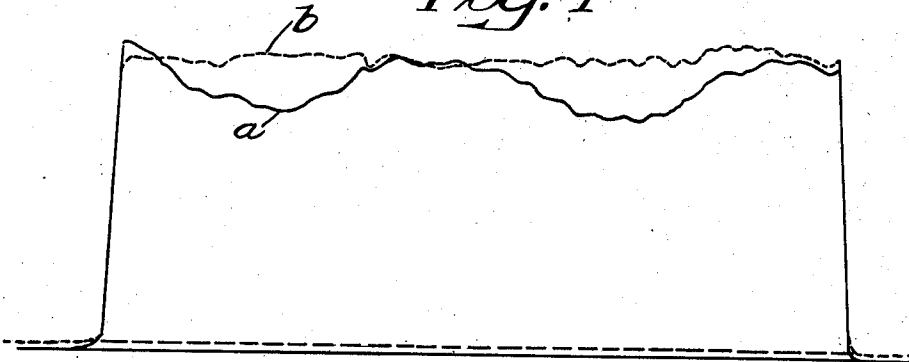
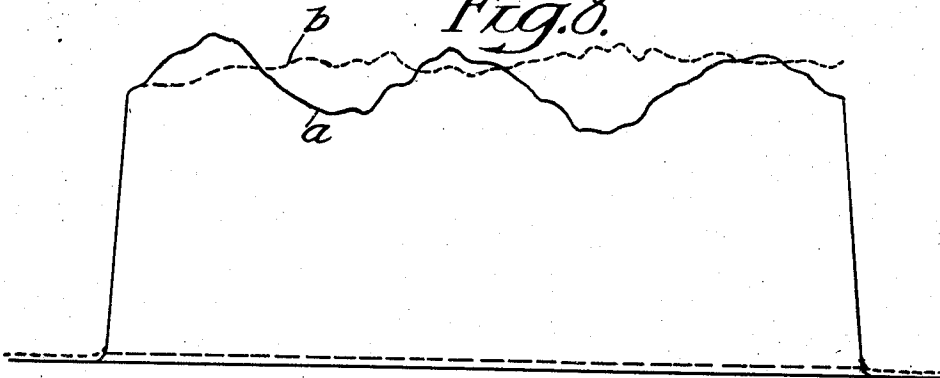


Fig. 8.



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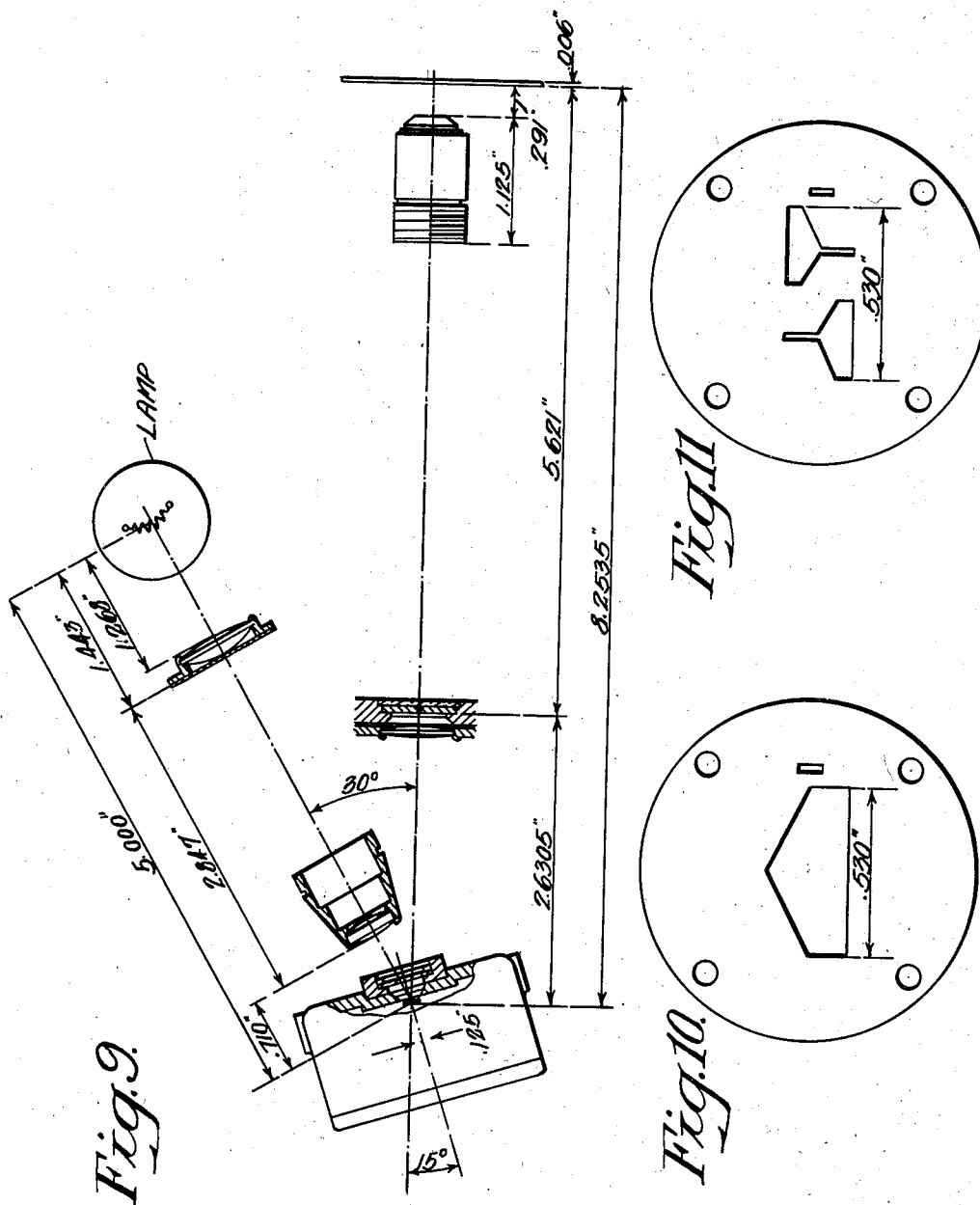
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EXCITER LAMP FOR SOUND RECORDERS AND REPRODUCERS

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UNITED STATES PATENT OFFICE

2,158,308

EXCITER LAMP FOR SOUND RECORDERS
AND REPRODUCERS

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Application July 31, 1937, Serial No. 156,681

2 Claims. (Cl. 179—100.3)

The present invention relates to an exciter lamp for sound recorders and reproducers, and more particularly, to a type of incandescent exciter lamp which produces a very uniform line of light, this application being in part a continuation of my application Serial No. 76,318, filed April 25, 1936.

It is customary for photographic sound recorders and reproducers to use an incandescent coil filament lamp and these lamps use from 5 to 10 amperes of current at from 5 to 10 volts, being provided with a corresponding heavy filament and producing a very high light intensity. Due to the coil constructions of the filaments, they have been subject to the disadvantage of producing non-uniform illumination of the optical or mechanical slit used in recording or reproducing. In the exciter lamp made according to my invention, I change the configuration of the filament from a straight coil to a curved coil and thereby secure a much closer approximation to uniform illumination.

The object of my invention is to provide an exciter lamp which when used to illuminate either an optical system or mechanical slit in apparatus of the class described will produce uniform illumination.

In the drawings, Figure 1 shows a conventional exciter lamp;

Figure 2 shows an exciter lamp constructed in accordance with my invention;

Figure 3 is an enlarged view of the filament of the conventional exciter lamp of Figure 1;

Figure 4 is an enlarged view of the filament of my exciter lamp;

Figure 5 is a greatly enlarged horizontal sectional view of the filament of my improved exciter lamp;

Figure 6 is a horizontal section through a commercial sound reproducing optical system showing my improved lamp in combination therewith,

Figures 7 and 8 are curves showing the relative performance of my improved lamps and typical straight-filament lamps of the prior art in an optical system,

Figure 9 is a horizontal sectional view of a commercial type of recording optical system employing my improved exciter lamp, and

the angle of view of the coil a greater or lesser amount of the interior of the filament coils is visible. At such angles that the interiors of the coils are visible through the exterior of the coils as indicated at 10, Fig. 3, the illumination provided is considerably brighter than where the interiors of the coils are not so visible, as indicated at 11.

The amount of this variation may be determined by directing light from the exciter lamp upon a narrow slit and rotating the lamp, measuring the light transmitted by the slit during the rotation. Curve A in Figs. 7 and 8 show the amount of this variation in the conventional lamp plotted against the angular rotation, the zero line representing the illumination in a plane perpendicular to the axis of the coil. Curve B is plotted in the same manner as curve A and represents the variation in illumination of my improved exciter lamp. It should be noted that my improved exciter lamp, although falling off slightly in illumination towards the ends of the region used, is free from the periodic variations of the older type of lamp.

When a lamp of the older type having the filament as shown in Fig. 3 and producing irregularities in illumination shown at Figs. 7 and 8 is used in sound recording by the variable area method, it causes variations in density of the record laterally of the sound track corresponding to the variations in illumination of the filament; likewise, when used in reproducing, these variations in illumination cause corresponding variations in the response of the photo cell at different amplitudes. Since the curves for different lamps of the older type are rarely the same but vary in both amplitude and position of the peaks, it will be apparent that the recording lamp will introduce certain distortions of density in the record and the reproducing lamp will add still different distortions, thereby producing distortions in amplitude and adding distortion frequencies which can be neither predicted nor compensated for, whereas my improved excited lamp avoids both of these difficulties.

Fig. 5 shows a commercial form of my improved filament, the dimensions of which for two different sizes of lamp are as follows:

Lamp	Application	A	B	C	D	Turns	R
10 v. 7.5 a.-----	Recorders and reproducers..	0.003" ±.001"	0.007" ±.001"	0.0095"	0.074" +.002" -.000"	11	3/8" approx.
10 v. 5 a.-----	Recorders and reproducers..	0.003" ±.001"	0.007" ±.001"	0.0075"	0.059" +.002" -.000"	13	1/4" approx.

Figures 10 and 11 show aperture plates adapted for use in the optical system of Fig. 9.

Referring now to the drawings and particularly Fig. 3, it will be apparent that, depending upon

In the application of my improved exciter lamp to a commercial sound reproducer, as shown in Fig. 6, the exciter lamp of the 10 v. 5 amp. type is used at a distance of .750 inch from the con-

denser lens, the slit beyond the condenser lens having a length of .420 inch. It will be apparent from the filament dimensions given above that the coil filament covers an arc of approximately 30° about its own center of curvature. The slot, however, subtends an arc of a little less than 25° as measured from the center of the curvature of the filament, and the arcuate dimensions of the filament are therefore more than sufficient to cover the entire aperture of the slit with coils whose average plane extends substantially perpendicularly thereto.

In the recording optical system of Fig. 9, the 10 v. 7.5 amp. lamp is used having a radius of curvature of approximately $\frac{3}{8}$ " and the filament is spaced from the condenser lens a distance of 1.268 inches, while the aperture shown in Figs. 10 and 11 have an overall width of .530 inch. In this case, the filament, as in the reproducing system, extends over an arc of approximately 30°, while the aperture subtends an angle as measured from the center of the curvature of the filament of only about 20°, and here again the average plane of the several filament coils is substantially perpendicular to each portion of the aperture over its entire width.

Having now described my invention, I claim:

1. Photophonographic apparatus comprising an aperture plate having an aperture, means for directing an image of said aperture toward a photophonographic film and means for illuminating said aperture comprising a coil filament incandescent lamp, the said coil filament being curved in an arc convex toward the said aperture and having a greater angular extent than the aperture as measured from the center of curvature of said filament.

2. Photophonographic apparatus comprising an aperture plate having an aperture, means for directing an image of said aperture toward a photophonographic film and means for illuminating said aperture comprising a coil filament incandescent lamp, the said coil filament being curved in an arc convex toward the said aperture whereby the coils on the convex side are spaced apart a greater distance than the coils on the concave side and having a greater angular extent than the aperture as measured from the center of curvature of said filament whereby light emitted from the outer faces of the coils on the convex side and the inner faces of the coils on the concave side is uniformly distributed over said aperture.

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