

No. 841,799.

PATENTED JAN. 22, 1907.

G. MARIS.

LAMP, &c.

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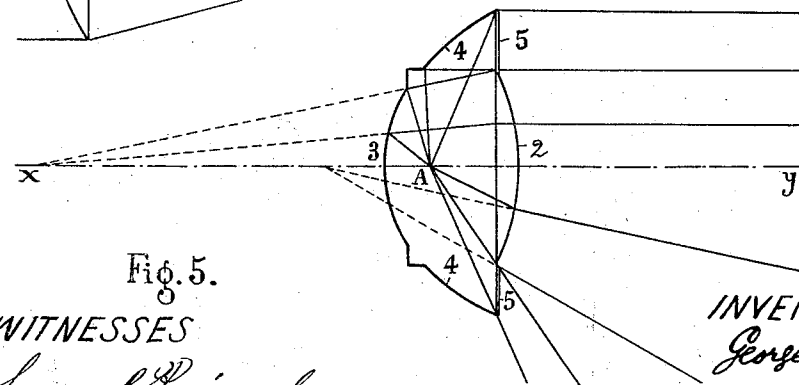
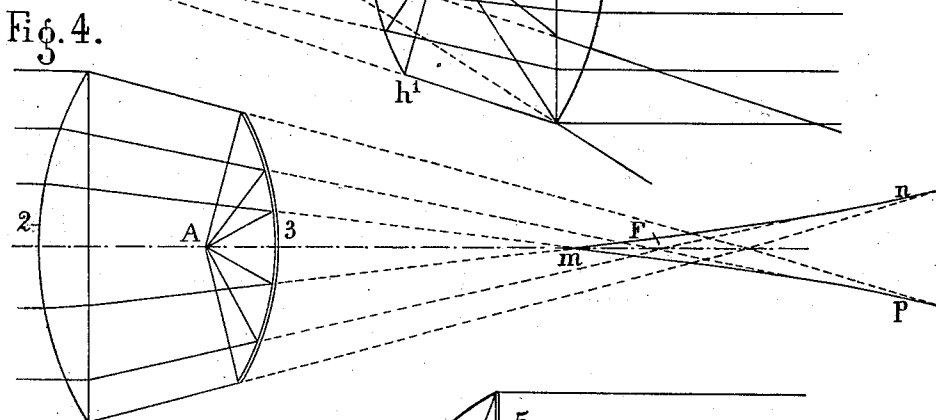
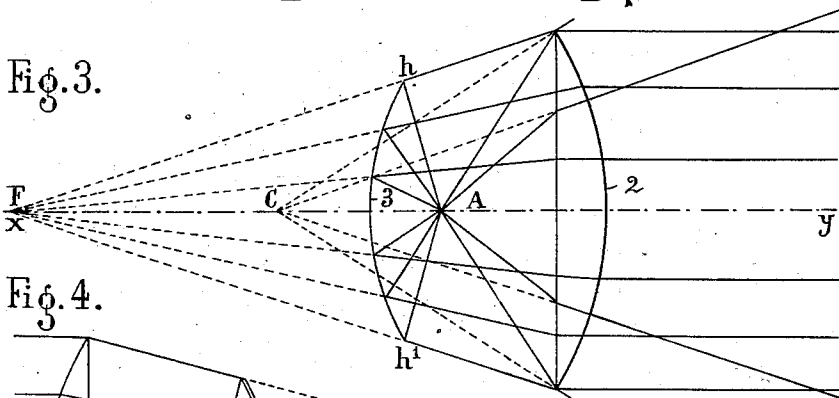
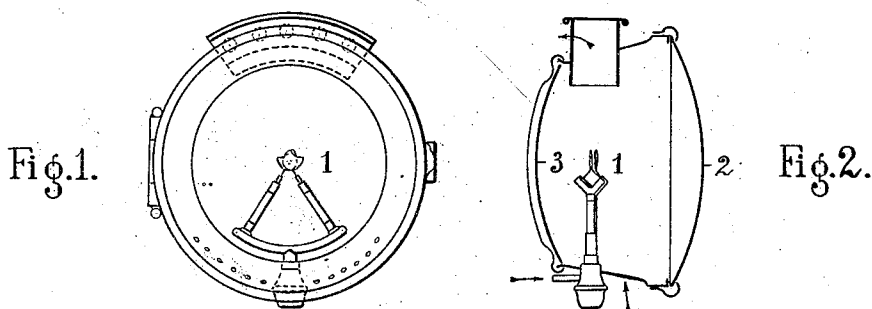


Fig. 5.

WITNESSES

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGES MARIS, a citizen of the French Republic, residing at 60 Boulevard Beaumarchais, Paris, France, have invented certain new and useful Improvements in Lamps or Devices for Projecting Light; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention consists in the employment of an optical system in connection with lamps used for projecting, under certain conditions, the rays proceeding from a source of light.

The following description shows, by way of example, the manner of applying this system to a projector containing an acetylene-gas flame and intended for automobile-vehicles, locomotives, boats, &c., with the object of lighting the route to be traveled over to a sufficient extent in front and to right and left.

In the accompanying drawings, Figure 1 is the front view of a projector; Fig. 2, a section of the same. Figs. 3, 4, and 5, are diagrams illustrating the optical system.

1 is an acetylene-gas flame arranged between a lens 2 and a reflector 3 placed behind the flame.

This invention is essentially distinguished by the combination of a lens and a reflector forming, with the source of light 1, an optical system diagrammatically illustrated in Fig. 3.

The lens 2 is a converging plano-convex lens, the focus of which is at F.

The reflector 3 is in the form of a hyperboloid, the meridian section of which is the hyperbola $h h'$, the focus of which, on the one hand, is in the point F, which is common to the lens, and, on the other hand, in the point A the geometrical center of the flame on the axis $x y$ of the projector.

In examining Fig. 3 it will be seen that all the luminous rays proceeding from the point A and comprised in the pencil of rays $h A h'$ are reflected by the hyperbolic reflector in the form of a conical pencil of rays the apex of which is the point F, the virtual focus of the hyperbola. The reflected pencil of rays comes onto the lens as if it proceeded from a luminous point placed at F. Under these conditions, in accordance with the properties of the converging lens, all the rays of this

pencil of rays are refracted parallel to the axis $x y$ and produce illumination at a distance. On the other hand, the luminous rays proceeding from the point A and directly reaching the lens are refracted thereby and in issuing therefrom form a more condensed pencil of rays than the initial pencil of rays. This refracted pencil of rays has its apex in the point c , which is in conjunction with the point A in relation to the lens.

As the point c is always behind the point A, the intensity of the pencil of rays projected outside is much greater under this system. This conical and powerful pencil of rays is intended to effectively light the route near the projector and over a larger extent than that lighted by the first pencil of rays intended for lighting at a distance.

The hyperbolic form can only be obtained with sufficient precision by means of metallic reflectors; but when acetylene is employed as a source of light the metallic reflectors are soon tarnished. The hyperbolic metallic reflectors may be replaced by a spherical mirror, Fig. 4, the reflecting-surface of which is protected against external changes. The meridian section of this surface is an arc of a circle which coincides with the hyperbolic arc. In this case the extensions of the rays reflected by the spherical concave surface and proceeding from the incident rays issuing from the point A inclose a virtually caustic surface, the meridian of which is a curve $n m p$.

If the focal distance of the lens be so determined that its focus F is situated in the interior of the apex of the caustic surface and at a distance slightly removed from the tangents to this caustic surface, the pencil of rays refracted by the lens will be sufficiently cylindrical and homogeneous. The aberrations, which, moreover, are but slight, are utilized for illuminating the route in the direction of its width. These aberrations do not diminish the range in the distance, which is insured by the employment of the hyperbolic reflector, as account must be taken of the superior reflecting and uniform power of the optical mirror compared with that of metallic reflectors and of the practical difficulties connected with securing very precise curves in such reflectors.

Moreover, a projector composed solely of an optical system formed by a lens and a

spherical mirror is much more simply kept up than such a system furnished with a metallic reflector, which is with difficulty preserved in a polished condition.

5 The casing which forms the body of the projector and connects the back reflector with the lens may be of a form suited to the purpose of the projector. It may have the form of a truncated cone, Fig. 2, polished or
10 not polished in the interior. This casing again may be of parabolic form, as shown at 4 in Fig. 5, in order to utilize the pencil of luminous rays for the purpose of reflecting the rays parallel to the axis $x\gamma$. In this case
15 the projector may be formed in front by an annular glass plate 5, through which the rays can pass. The lens 2, combined with the mirror 3, is set in the center of the glass plate

for the purpose of forming the optical system that distinguishes this invention. 20

What I claim, and desire to secure by Letters Patent, is—

A light-projector for automobiles and the like, distinguished by the combination of a hyperbolic reflector with a converging lens 25 having a focus in common with the external focus of the reflector, the source of light being placed in the internal focus of the hyperbolic reflector between the reflector and the lens, for the purpose described. 30

In testimony whereof I have affixed my signature in presence of two witnesses.

GEORGES MARIS.

Witnesses:

CHARLES FABER,
HENRI GABY.