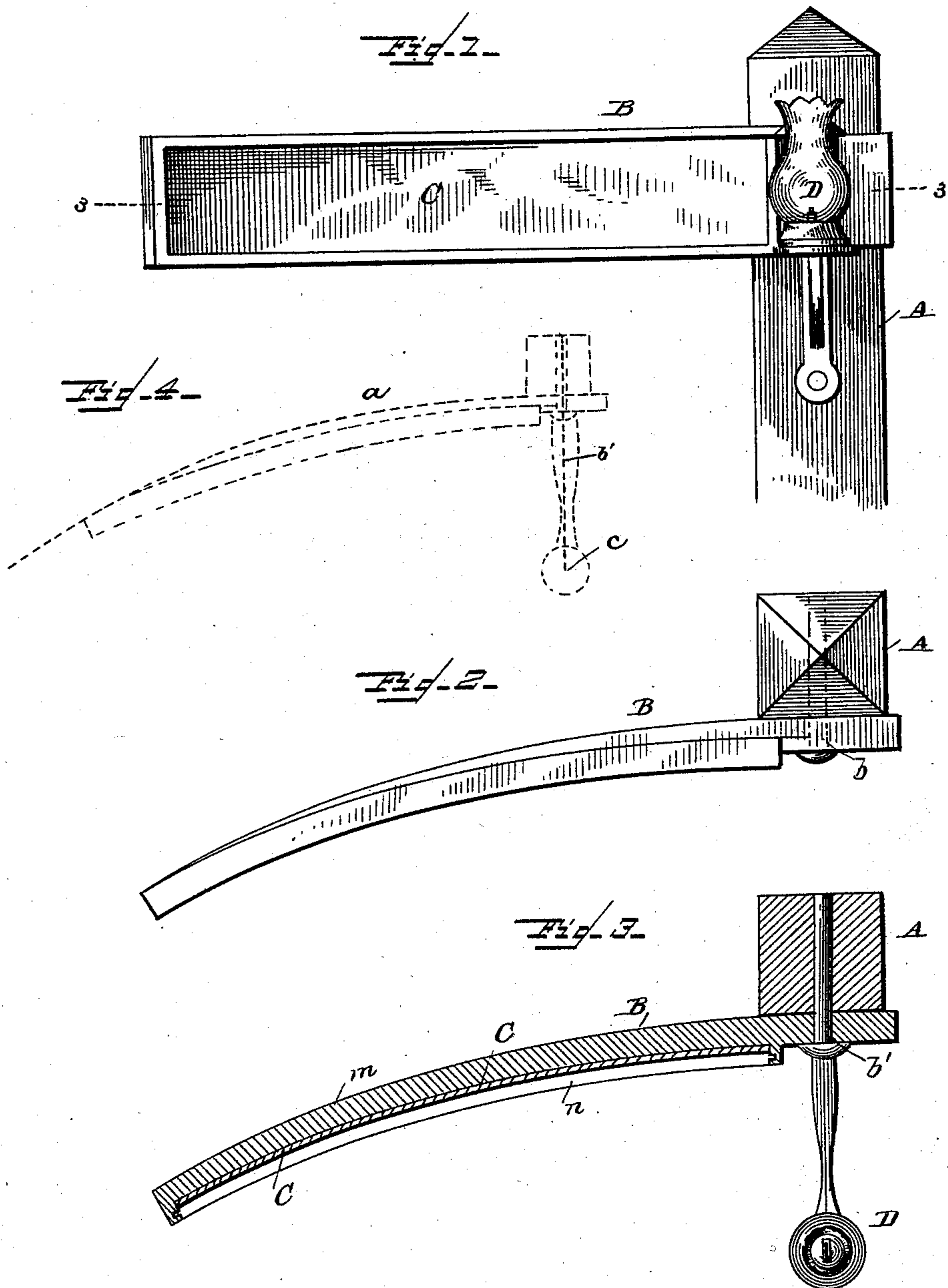


(No Model.)

C. H. KOYL.  
RAILWAY SEMAPHORE SIGNAL.

No. 384,170.

Patented June 5, 1888.



WITNESSES.

Edwin T. Jewell,  
Marvin A. Curtis

INVENTOR.

C. Herschel Koyle,  
by Marshall D. Miller  
his Attorney.

# UNITED STATES PATENT OFFICE.

C. HERSCHEL KOYL, OF SWARTHMORE, PENNSYLVANIA.

## RAILWAY SEMAPHORE-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 384,170, dated June 5, 1888.

Application filed March 9, 1888. Serial No. 266,712. (No model.)

*To all whom it may concern:*

Be it known that I, C. HERSCHEL KOYL, a citizen of the Dominion of Canada, and a resident of Swarthmore, in the State of Pennsylvania, have invented a certain new and useful Improvement in Signals for Railway and other Purposes, of which the following is a specification.

It is mainly my object to obtain a night signal to be used in conjunction with the semaphore now extensively used on railroads for day-signaling purposes.

The night-signals commonly employed for this purpose consist of various colored lights, the use of which is, on many accounts, objectionable, as is well known. It is my object to provide for this purpose an elongated beam of light of well-defined dimensions, the position of which, like that of the ordinary semaphore-arm, can be shifted from the vertical to horizontal. I am aware that attempts in this direction have before been made by others. In such instances, however, as have come to my knowledge there have been used for this purpose a series of detached reflecting-surfaces set at an angle to the light, with the effect of showing by reflection a series of separate lights, rather than a continuous band or elongated beam of light. Under my invention I make the reflecting-surface of the contour of the longitudinal section of a paraboloid, or approximately so. I mount or pivot this section in such manner that it shall be rotatable about an axis corresponding to the axis of the paraboloid, and I fix or place the light at a point corresponding to the focus of the paraboloid.

A reflecting-surface of the form specified has the property of making parallel all rays reflected by it, the consequence being that I obtain by this means a continuous band or beam of light of definite dimensions. In practice, in view of the fact that this band or beam should be of such dimensions that at the conventional distance at which the signal comes under the observation of the engineer it shall be wide enough to extend across the track to which it is appropriated and deep or broad enough to about cover the observation portion of the cab of the engine, it will be found desirable to slightly modify both the longitudinal and transverse curvature of the paraboloidal

section which forms the reflecting-surface, so that at such distance there will be sufficient divergence of the rays to produce a beam of the dimensions indicated. To accomplish this result, however, the modification in form of the reflector need be very slight, and it remains, to all intents and purposes, of the contour of the section of a paraboloid. By mounting or pivoting this reflector so that it will be rotatable about an axis corresponding to the axis of the paraboloid, and by placing the lamp or light at the focus of the paraboloid, an arrangement of parts is obtained by which the continuous band or elongated beam of light is produced in any position to which the reflector may be moved.

For railroad-signaling it will be found convenient and desirable to mount the reflector on or in the pivoted semaphore-arm, and it is in this connection that I have represented my improvement in the accompanying drawings, to which I will now proceed to refer in order that the manner in which my invention is or may be carried into effect may be better understood.

Figure 1 is a side elevation of so much of a semaphore as is needed to illustrate my invention. Fig. 2 is a plan of the same. Fig. 3 is a section on line 3 3, Fig. 1. Fig. 4 is a diagram illustrative of the theoretical considerations which are involved in the invention.

A is the post or standard, and B is the semaphore-arm, which is pivoted to said post and is operated by the usual means, which latter are not shown, inasmuch as they are well known and form no part of my invention.

The reflector which I employ is represented at C. It is mounted in or on the pivoted semaphore-arm B, as indicated, and moves with it. The reflector proper is made of silvered glass, burnished metal, or other proper reflecting material, the shape of which approximates closely to and is practically the same as that of the section of a paraboloid, the concave face of which is the reflecting-surface.

In the diagram, Fig. 4, *a* is a portion of a parabolic curve, of which *b'* is the axis and *c* the focus.

Divergent rays of light from a lamp or other light placed at the focus *c* will be reflected from the parabolic surface as rays parallel with one another, so that from a section of the parab-

loid (or approximately so) will be obtained a band or elongated beam of light of definite dimensions, which can be made to assume a vertical or horizontal or any intermediate position by shifting correspondingly the position of the section about an axis corresponding to the axis of the paraboloid. To this end, in the signaling device shown in Figs. 1 and 2, inasmuch as the reflector C is mounted on and moves with the pivoted semaphore-arm B, the axis  $b'$  of motion of the latter is so located with reference to the reflector that it will correspond or coincide with the axis of the paraboloid of which the reflector is a section, and the lamp D, or other source of light, is fixed or attached to the standard A in such position that it will be located at the focus of the paraboloid, of which C is a section and  $b'$  is the axis.

The reflecting-surface can be held in any suitable frame,  $m$ , of wood or other material, and said frame may, if desired, be fitted with a slide,  $n$ , for the purpose of covering the reflector during the day, which slide is, of course, to be withdrawn from over the reflector whenever the latter is required for use.

Having described my improvement and the best way now known to me of carrying the same into effect, what I claim herein as new and of my own invention is as follows:

1. In a signaling apparatus, the combination, with a support or standard, of a reflector having the shape or approximately the shape of the section of a paraboloid, as described, and mounted on or pivoted to said support so as to be rotatable about an axis corresponding to or coincident with the axis of the paraboloid, of which said reflector is a section, substantially as and for the purposes hereinbefore set forth.

2. The combination, in a signaling apparatus, of a support or standard, a reflector having the shape or approximately the shape of the section of a paraboloid, as described, and mounted on or pivoted to said support so as to be rotatable about an axis coincident with the axis of the paraboloid, of which the said reflector is a section, and a lamp or other source of light located on said support at the focal point of the said paraboloidal reflecting-section, substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 24th day of February, A. D. 1888.

C. HERSCHEL KOYL.

Witnesses:

W. W. DOUGHERTY,  
W. H. SCHLOENDORN.