

No. 666,453.

Patented Jan. 22, 1901.

J. C. BAIRD.

LENS FOR SEMAPHORE SIGNAL LIGHTS.

(Application filed May 27, 1899.)

(No Model.)

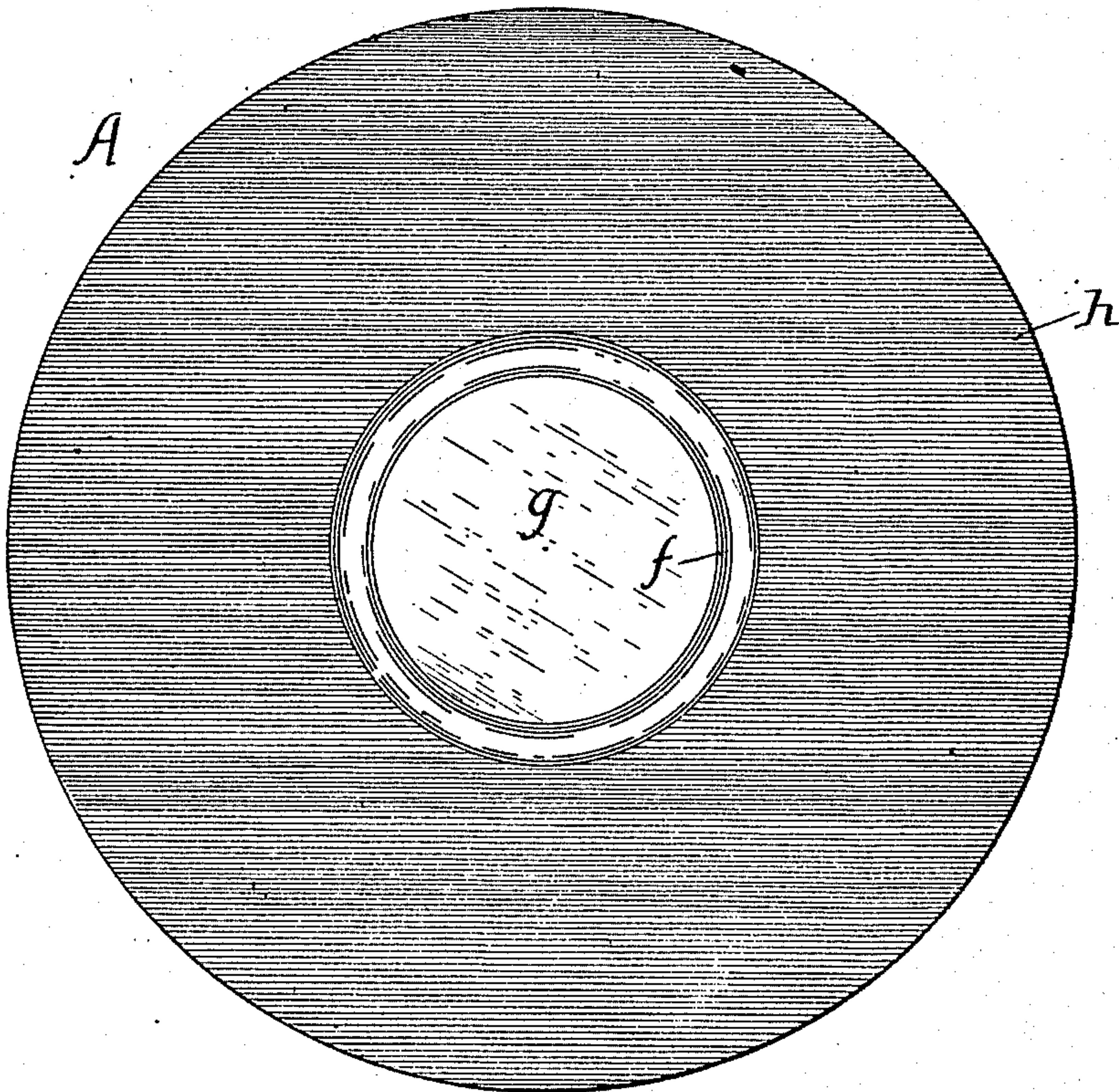


Fig. 1-

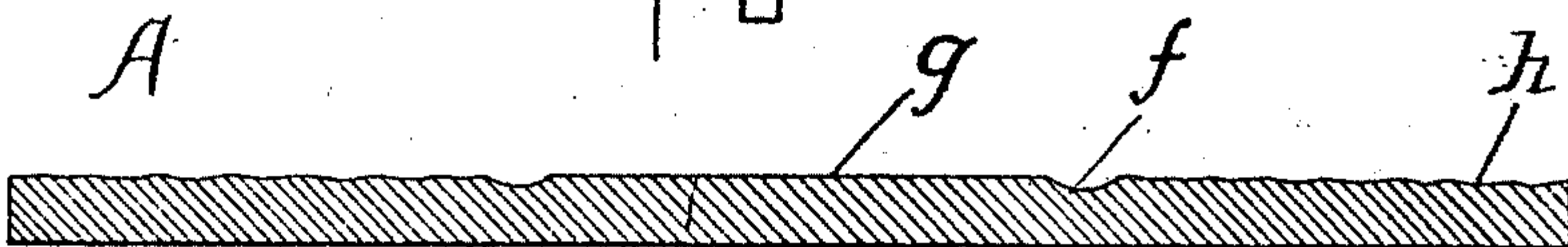


Fig. 2-

Witnesses:

Wm. Wilbur
T. J. Shute

Inventor:

John C. Baird,
By Wm. Shaw,
Att'y

UNITED STATES PATENT OFFICE.

JOHN C. BAIRD, OF BOSTON, MASSACHUSETTS.

LENS FOR SEMAPHORE SIGNAL-LIGHTS.

SPECIFICATION forming part of Letters Patent No. 666,453, dated January 22, 1901.

Application filed May 27, 1899. Serial No. 718,512. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. BAIRD, of Boston, county of Suffolk, State of Massachusetts, have made certain new and useful Improvements in Semaphore Signal-Lights, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a face or plan view of my improved glass panel for signal-lights, and Fig. 2 a central vertical transverse section of the same.

Like letters of reference indicate corresponding parts in both figures of the drawings.

My invention is designed especially to provide a colored panel for the semaphore signal-lights employed upon railways wherein the color shall be "fixed"—that is, shall give a brilliant light at a distance of a certain color and in which the shade shall not materially change as such distance increases or decreases.

Efforts have been made in many directions to produce a substitute for the white light in ordinary use for railway signaling to indicate "safety" or a "clear line" to the locomotive-engineers because of the numerous accidents resulting from mistaking near-by or "outside" lights for such signals and because of the fact that a broken panel would, particularly at great distances, produce the white effect. As the red and green lights were already in use for danger-signals, the authorities fixed upon yellow or amber as the only distinctive color available for this purpose; but great difficulties were experienced in utilizing this color because of the obstacles encountered in producing a stable yellow tint in the glass, the coloring-matter employed being usually vegetable because of the great expense attending the use of metal colors for producing a permanent yellow and such vegetable coloring fading rapidly. This expense arose principally from the fact that a compound of gold was deemed necessary to produce this color in glass. Moreover, even when at their best such lenses throw so light a shade of color at great

distances that they may readily be mistaken for white, while if the shade be made deeper to overcome this objection at short distances the signal will appear red, a yellow color ordinarily appearing of different shade to the observer as his distance therefrom varies, the spectral red in such color predominating as he approaches. By constant experiment, not only with the coloring-matter, but also with the construction of the panel-faces, I have succeeded in overcoming these objectionable features.

In carrying out my invention I make use of means which will be readily understood by those conversant with such matters from the following explanation.

In the drawings, A represents the panel, considered as a whole. This is preferably circular or disk-shaped, as shown; but it may of course be rectangular in form, if desired. The thickness of the panel is preferably about one-quarter inch, and I mix in the molten glass from which it is formed coloring-matter which is compounded with a metallic base, the formula for which is the resultant of a long series of experiments in order to obtain the requisite permanency and shade of color which have been found wanting in many of the devices for this purpose. In one face of the panel I form an annular groove *f*, inclosing a circular surface *g* of approximately two and one-quarter inches diameter, which I subject to a high polish. Outside this polished center the face of the panel is roughened or slightly corrugated at *h*. The rear face *k* of the panel is also polished smoothly over its entire surface. By these peculiarities of construction I attain a double object. The slightly-roughened surface increases refraction, which so influences diffusion of the light as to prevent the shade changing materially with the distance of the observer from the signals. As the structure of the human eye is such that the color of a signal does not usually appear the same at different distances, it is necessary for observation of the signal at great distances—say two miles—and yet maintaining the same strong yellow color that some rays be delivered direct. I find by a constant series of experiments that by employing the highly-polished center *g*, inclosed by the annular groove *f*, a concentrated beam or shaft

of yellow light is maintained with no failure of the green rays, which would give an appearance of red, and such beam is distinctly visible for a distance of practically two miles.

5 This I also have determined by experiment is not the result when the whole surface of the panel is roughened; but, nevertheless, such irregular or wavy surface surrounding said polished center as I have arranged it
10 serves to prevent radical change of color to the observer as he approaches the light, and particularly has this proved effective in maintaining the color to the eye under such adverse conditions as fogs, smoke, and unfav-
15 orable angles of vision, the light sustaining all the necessary strength and color for a signal-light under such circumstances.

I do not confine myself to corrugating or roughening the outer portion *h* of the panel-
20 face to any particular degree, only sufficient being necessary to produce a translucent effect, nor do I confine myself to using the particular size of polished center described, as it

may vary with the size of panel and other conditions, the purpose being to produce an approximately transparent effect at this point.

Having thus explained my invention, what I claim is—

1. A panel for railway signal-lights comprising a plate of glass colored in the mass, 30 one face thereof being provided centrally with a smooth transparent portion and the remainder of said face being roughened rendering the portion of the panel covered by such roughened part, translucent. 35

2. The signal-light panel, A, composed of glass colored in the mass, the rear face, *h*, thereof being a smooth surface; the annular groove, *f*, in its opposite face inclosing the smooth polished surface *g*, and the roughened 40 surface, *h*, substantially as specified.

JOHN C. BAIRD.

Witnesses:

WILLIAM G. REED,
JOHN F. PUTNAM.