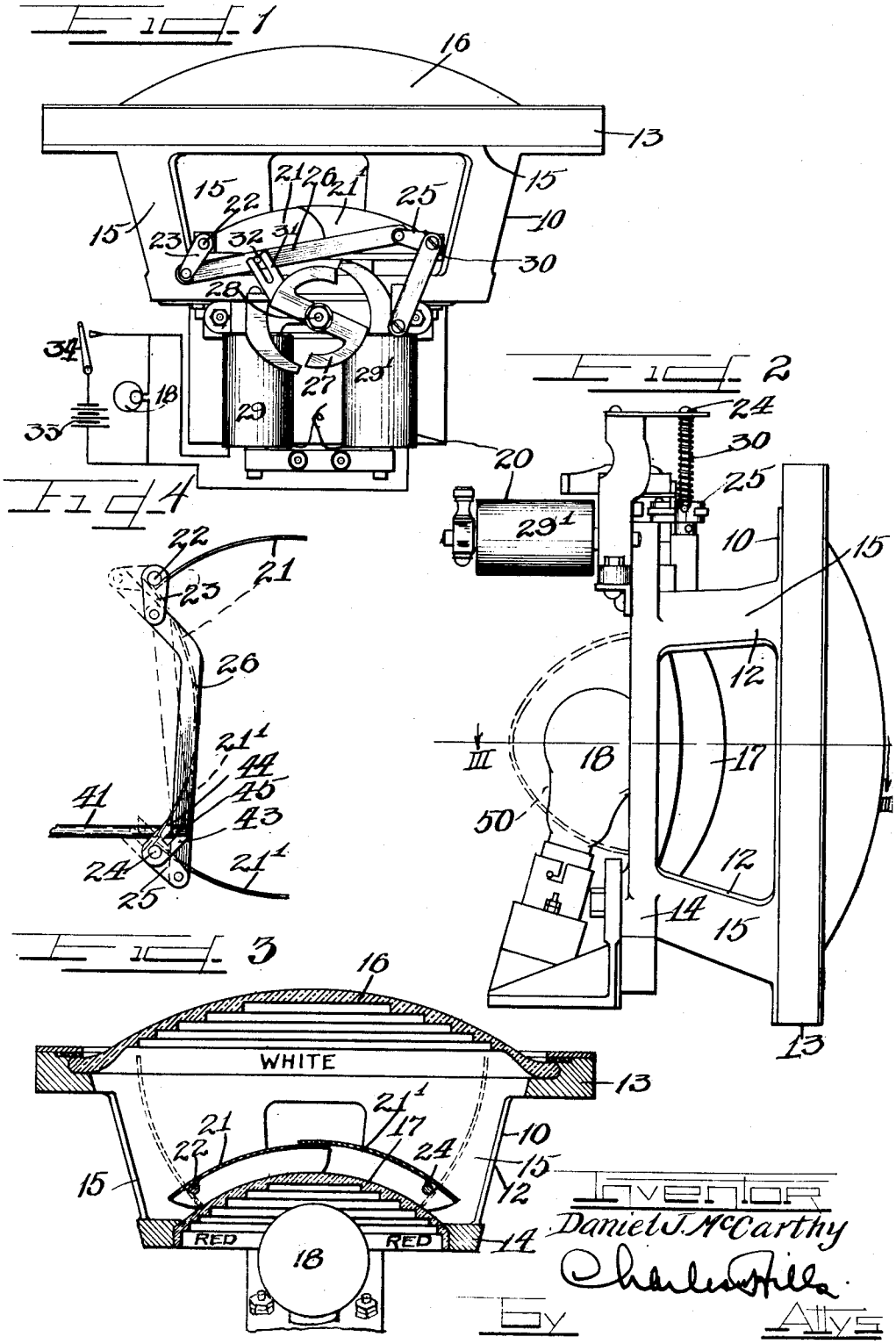
Dec. 31, 1929. D. J. McCARTHY 1,741,642

RAILWAY SIGNAL SYSTEM

Filed July 10, 1926 2 Sheets-Sheet 1



Inventor
Daniel J. McCarthy
Charles Hill
By
Attys

Dec. 31, 1929. D. J. McCARTHY 1,741,642

RAILWAY SIGNAL SYSTEM

Filed July 10, 1926 2 Sheets-Sheet 2

Fig. 5

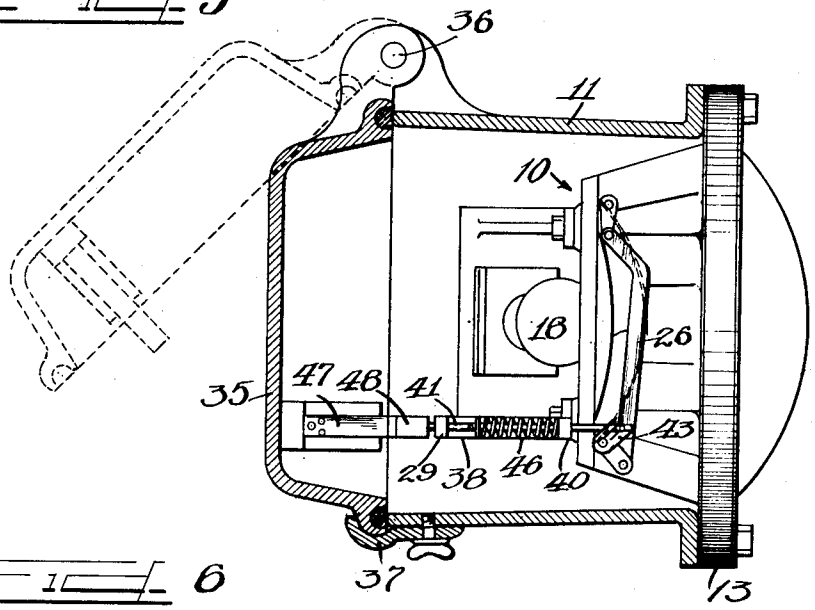


Fig. 6

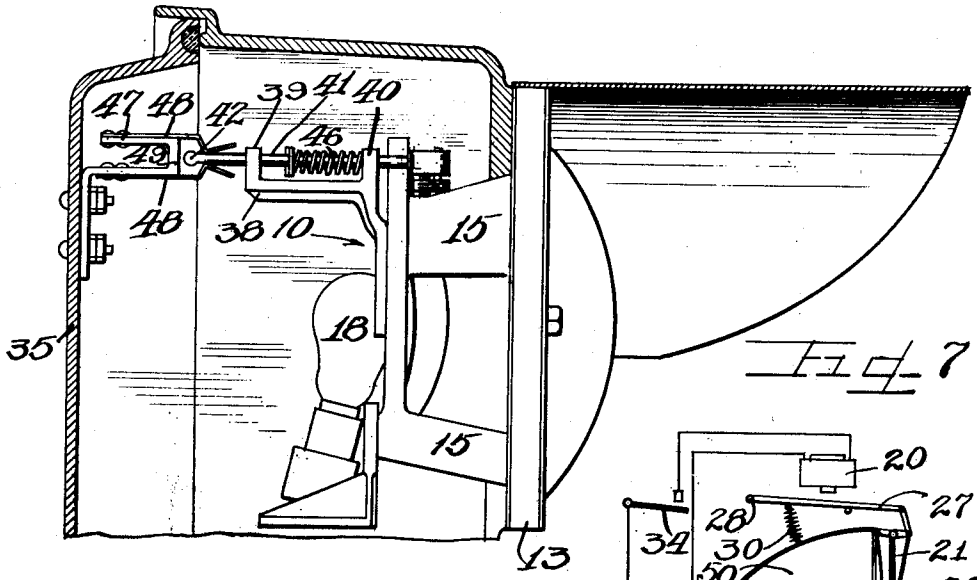


Fig. 7

Inventor

Daniel J. McCarthy.

Charles Fitch

By

Attys

Patented Dec. 31, 1929

1,741,642

UNITED STATES PATENT OFFICE

DANIEL J. McCARTHY, OF CARPENTERSVILLE, ILLINOIS, ASSIGNOR TO CHICAGO RAILWAY SIGNAL AND SUPPLY COMPANY, A CORPORATION OF ILLINOIS

RAILWAY SIGNAL SYSTEM

Application filed July 10, 1926. Serial No. 121,530.

The invention relates to railway signals and especially of that class of signals that are localized along a railway track, for directing and warning passing trains.

One of the objects of the invention is to provide reliable and efficient means to shroud or conceal the signaling lenses and reflectors at all times except when it is desirable that a signal shall be transmitted, thereby to prevent the possibility of a phantom signal being projected or propagated by reflection of light emanating from an extraneous source.

A more specific object of the invention is to provide doors or shutters, which normally obscure the color lens of a signal device when closed, and which are temporarily held open by an instrumentality, operable by electric current, and located in the same circuit with the electric lamp which supplies the light for the signal device.

A further object is to provide means to enclose the light reflecting parts within a signal casing automatically to prevent a phantom signal from being reflected therefrom when the outer casing is opened for repairs.

Other objects, advantages, benefits and refinements will hereinafter appear from a consideration of the following description and the accompanying drawings wherein:

On the drawings:

Figure 1 is a plan view of one form of a signal unit as it appears when taken from its enclosing casing, and showing an electric motor for opening the opaque shutters which normally cover the color lens and when the lamp is energized.

Figure 2 is a side elevation of the device.

Figure 3 is a central plan section taken on line III—III of Figure 2.

Figure 4 is an enlarged detail of shutter moving mechanism of the device as illustrated in Figure 5.

Figure 5 shows an enclosing casing in plan section and the means of automatically closing the shutters before the lens when the door to the casing is opened.

Figure 6 is a central vertical section of the same.

Figure 7 is a schematic diagram of circuits.

In all the views the same reference characters indicate similar parts. In optical instruments generally employed to project colored beams of light, in railroad signal systems, the light therefrom is projected by suitable reflectors or by lenses or lens combinations. The former type, in which a suitable parabola or other reflector is used to project the light, is preferable in so far as its capability to extend the beams of light is concerned, but it possesses the undesirable quality of operating to display phantom signals, that is to say, such an instrument will more readily exhibit a false signal that may originate from a beam of light directed into the signal device, from an extraneous source.

It is one of the important objects of the invention to provide an instrument in which such an eventuality cannot occur. A false or phantom signal proceeding from an instrument of the character about to be described is liable to prove to be disastrous to life and property. Some lens combinations possess this undesirable feature to a less degree than do some others, but they are all characterized to some extent by this lack of integrity.

Probably the most satisfactory lens combination is shown in the drawings wherein 10 is the signal unit and 11 is the containing casing. The frame 12 includes a larger metal ring 13 and a smaller metal ring 14 arranged and held in coaxial relation by connecting arms 15.

The larger outer lens 16 is contained in the ring 13. It is preferably clear glass. The lens 17 is the inner lens spaced from lens 16 and held in ring 14. Lens 17 is a color lens and give distinctive color for the signal indications. The source of light for producing the licit signal is the well known incandescent lamp 18. These lamps necessarily possess a globular or cylindrical envelope. The walls of the envelope reflect to a considerable extent thru the lens combination light rays coming from an exterior source and which impinge thereon.

For producing the legitimate signal the light rays from the light source 18 will pass

thru lenses 17 and 16 and will thereby be refracted into a beam of light of parallel rays. The light passing thru the colored lens 17 will have conferred upon it the characteristic color of the colored lens.

If the lens 17 be red the beam of light passing thru it will be red. If light be projected into and thru this lens combination from the front, and from an extraneous source of light, the rays of light therefrom will pass over the same course thru the lenses into the focal point of the lenses at which point lamp 18 is located. Some of the light will be reflected from the outer surfaces of lens 16 and the outer surface of lens 17. This reflected light will produce no ill effect, as it is colorless, but the light which passes inwardly thru lens 17 will be a colored light. These latter rays when they impinge upon the front surface of the glass envelope of the lamp 18 will be reflected back thereby and will again pass back thru the lenses and be projected as a colored beam thus producing a false or phantom signal when the lamp 18 is not energized.

It is to overcome the defects of signals heretofore in which the signal device is left open for entrance of light from an outside source that my invention is intended.

In Figs. 1, 2 and in Fig. 7 an electric motor 20 is energized, coincidently with lighting the lamp 18, to open shutters 21—21′ so that the intended signal may be displayed. The shutter 21 is secured to a shaft 22 to which is secured at one end an arm 23. Shutter 21′ is secured to shaft 24 to which is also secured arm 25. The arms 23 and 25 have their longer axes in planes angularly displaced about 45 degrees. The outer ends of arms 23 and 25 are connected together by a link 26.

In Fig. 1 the armature 27 of the motor 20 is oscillatable about the axis 28 when the electromagnets 29—29′ are energized to open the shutters in a manner plainly obvious. A helical spring 30, wrapped about the shaft 24, automatically closes the shutters 21—21′ when the electromagnets 29—29′ are deenergized and yieldingly holds the shutters closed to obscure the lens 17. The armature 27 carries a slotted arm 31 providing two forks between which is included a pin 32 which projects from the link 26. In Fig. 1 the shutters are closed and held closed by the spring 30. When the magnets 29—29′ are energized the armature 27 will be rotated about 45 degrees in clock-wise direction, which will move arms 23 and 25 and link 26 and open the shutters as shown in Fig. 4. These shutters will remain open only so long as the motor is kept energized. When the motor is deenergized by opening the electric circuit the spring 30 will close the shutters. The shutters are painted black so as to be substantially non-reflecting in character.

In Fig. 1 a source of current 33, shown for convenience as a battery, is to energize the lamp 18 and motor 20 when the switch 34 is closed. When the signal lamp is lighted the red lens is thus uncovered. In Fig. 1 the lamp 18 is shown in parallel circuit with the shutter closing motor. In Fig. 7 it is shown in series circuit with the motor.

The foregoing description concerns signal devices in which light from an extraneous source entering and passing thru the lenses from the front produces phantom signals. There is a probability that phantom signals may be transmitted from the signal device when the rear door of the casing is opened, by light from an extraneous source passing thru the lenses from the rear, and emanating from a point remote from the signal unit. To prevent this undesirable result arising from such a contingency, I have arranged means for automatically closing the shutters to cover the colored lens by the mere act of opening the casing door, and for opening the shutter again by the act of closing said door. This arrangement is shown more clearly in Figs. 5 and 6. A rear door 35 of the casing 11 containing the unit 10 is hinged at 36 to the casing and is held in closed position by clip 37 or otherwise. A bracket 38 is secured to the unit 10 and has two outstanding arms 39 and 40. These arms are perforated for a reciprocable stem 41. The stem has a knob 42 on its outer end. An arm 43 is secured to shaft 24 (see Fig 4). The arm is slotted to provide two parallel parts 44. A pin 45 extends from the stem and enters the slot between the two parts 44—44 of the arm 43. When the stem 41 is axially shifted it will open and close the shutters 21—21′ in an obvious manner. A spring 46 surrounds stem 41 and yieldingly holds the stem 41 in its outward position. When the stem is in this position the shutters are closed.

A spring clip device 47 is secured to the door 35. It has two spring arms 48 with out-turned ends to engage the stem 41 and between which to contain the knob 42. An abutment 49 pushes the stem or rod 41 inwardly against the resistance of the spring 46 when the door is being closed. This will move the arm 43 to position shown in Fig. 4, and open the shutters 21—21′ rendering the lenses 16 and 17 visible from the front of the unit.

The spring arms 48—48 grasp the knob 42 and will pull the stem 41 outwardly when the door 35 is being opened even though the spring 46 be broken or refuses to function for other reason.

The description has more particularly referred to signal units of the doublet lens type. When a parabola 50 is employed to project the light, the probability of a false signal being displayed by light proceeding from the rear when the door of the casing is opened, is less liable to occur but phantom signal phe-

nomenon from extraneous light passing thru the lenses from the front is more likely to occur. In Fig. 2 I have shown the parabola projector merely to indicate its relative position and not for the reason that it is desirable to use it in connection with a doublet lens unit.

Having described my invention, what I desire to secure by Letters Patent is:—

1. A railway signal unit having a colored lens; a pair of shutters; a casing enclosing the unit, and a door for the casing and means operable by the said door to close and open the shutters to obscure the lens when the door is opened and to expose the lens when the door is closed.

2. A railway signal unit having a frame for a lens doublet, the said frame including two spaced rings; arms connecting the rings; a lens in each ring and the rear lens being colored and a pair of shutters supported on said arms between the lenses movable to obscure the colored lens.

3. A railway signal unit having a frame for a lens doublet, the said frame including two spaced rings; means to hold the rings in spaced relations; a colored lens in the rear ring; a pair of shutters between the rings to obscure said colored lens when closed and means supported on the unit to close the shutters.

4. A railway signal unit having a casing; a door for the casing; a pair of axially spaced lenses in the casing, the inner lens of which is colored; a substantially opaque shutter between the lenses, operable to obscure the colored lens when closed and means operable by movement of the door to close the shutter when the door is opened.

5. A railway signal unit having a lens therein; movable shutter means to obscure and to expose said lens; a casing enclosing said unit, and a door of the casing co-operating with said shutter-moving means to move the shutter to obscure the lens when the door is open and to expose the lens when the door is closed.

6. A railway signal unit having a colored lens; a shutter movable to alternately obscure the lens and expose the lens; a casing enclosing the unit; a door for the casing, and connecting means, operable by movement of the door to close the shutter and obscure the lens when the door is opened, and to open the shutter and to expose the lens when the door is closed.

In testimony whereof, I have hereunto subscribed my name.

DANIEL J. McCARTHY.