

Dec. 28, 1937.

O. S. FIELD

2,103,251

LIGHT SIGNAL

Original Filed Aug. 10, 1926

4 Sheets-Sheet 1

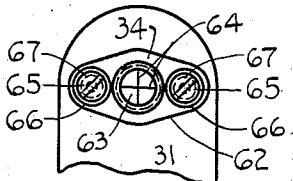


FIG. 7.

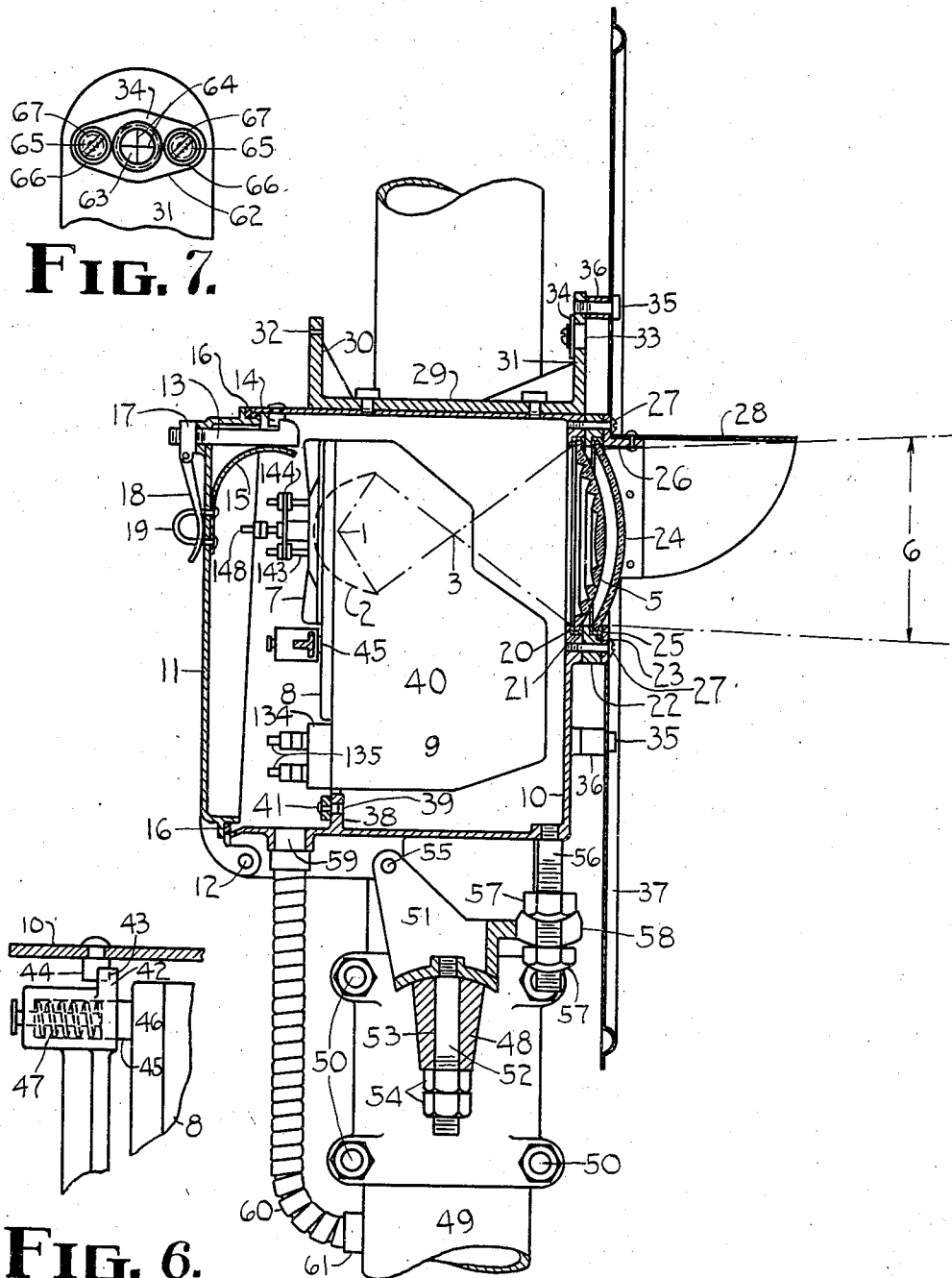


FIG. 6.

FIG. 1

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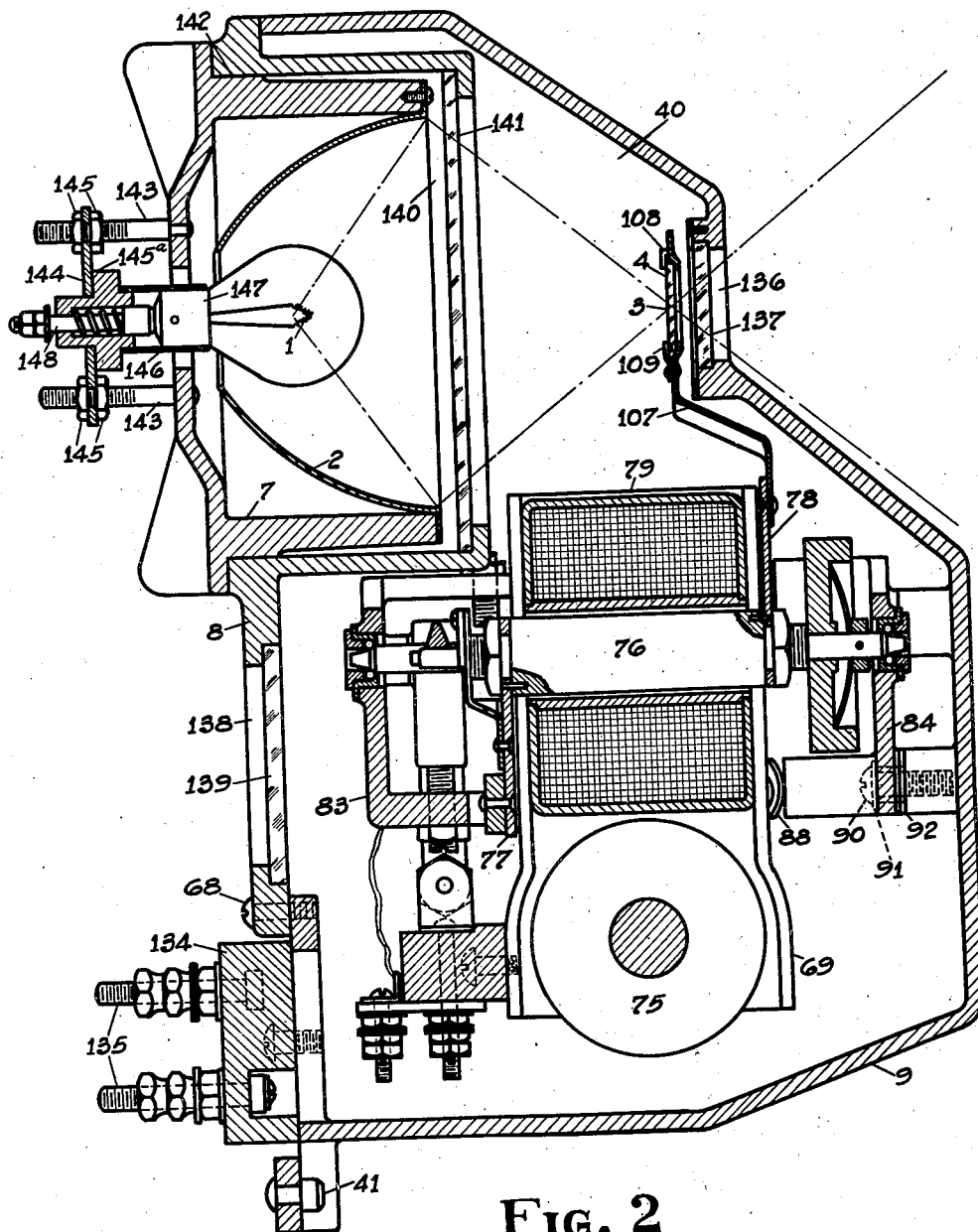
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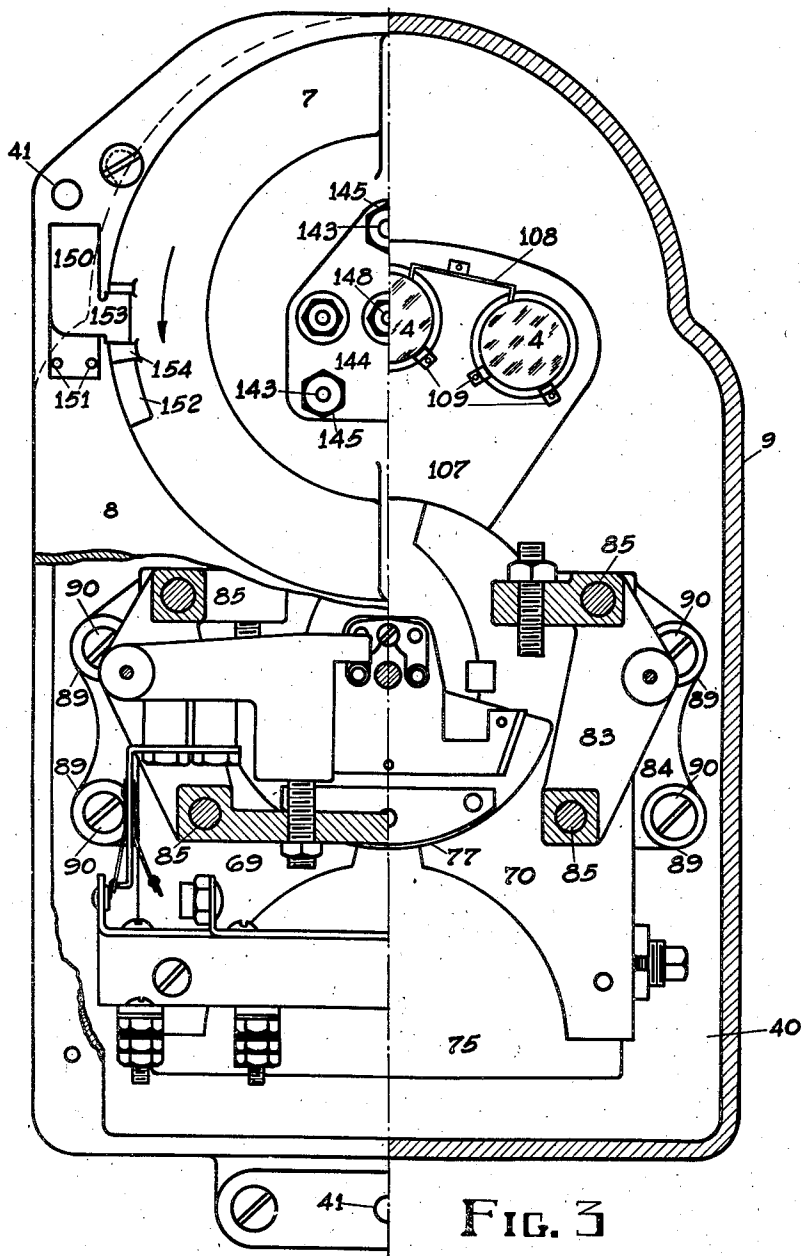


FIG. 3

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FIG. 4

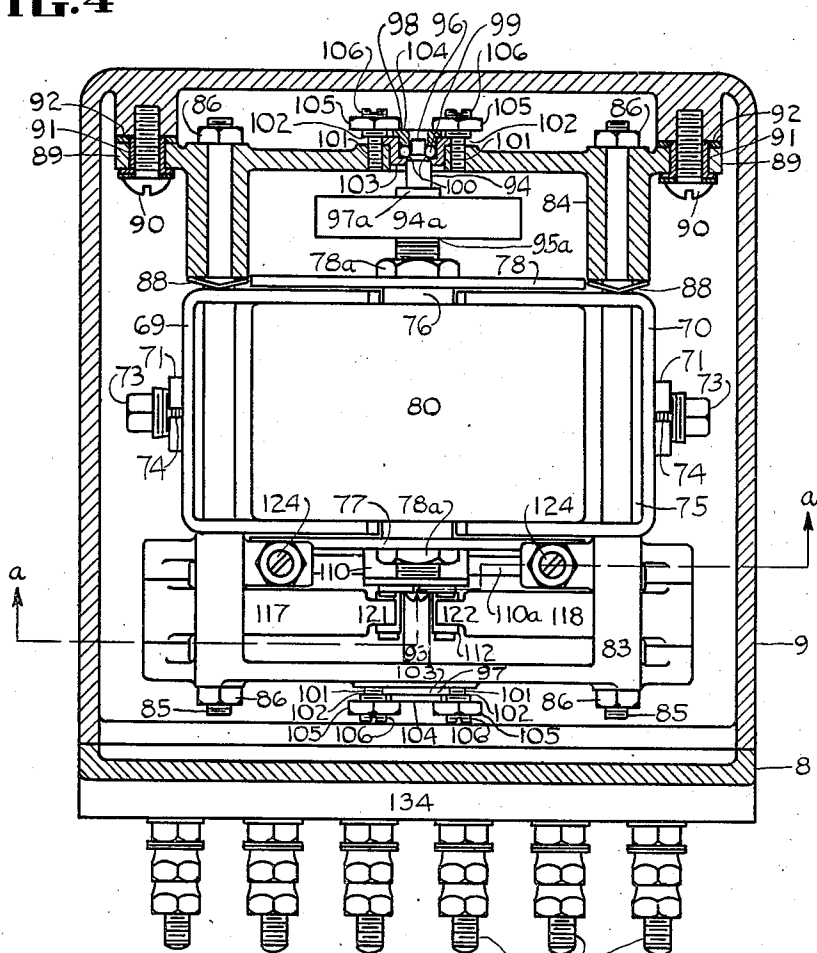
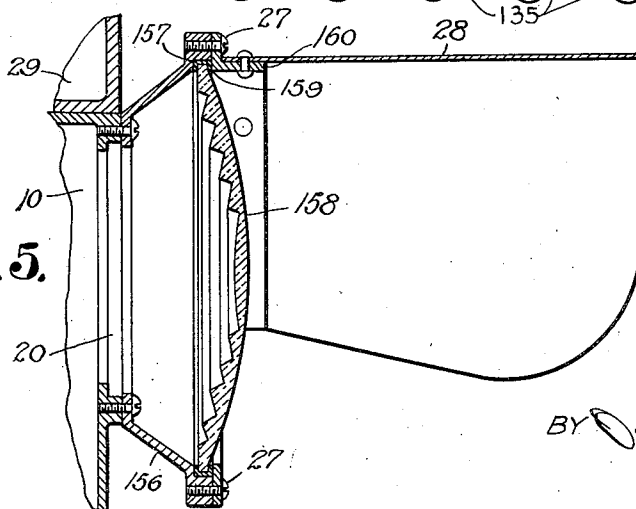


FIG. 5



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UNITED STATES PATENT OFFICE

2,103,251

LIGHT SIGNAL

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Original application August 10, 1926, Serial No.
128,437. Divided and this application Sep-
tember 8, 1931, Serial No. 561,802

7 Claims. (Cl. 177—329)

The present application is a division of my pending application Ser. No. 128,437, filed August 10, 1926, for "Light signals," which has matured into Patent Number 1,835,150.

This invention relates to new improvements in light signalling apparatus.

One object is to provide a signal which is extremely compact and which has a high degree of accessibility to its operating parts.

A further object is to provide an operating means for the signal which will have a minimum possibility of mechanical sticking, together with the characteristic of being readily inspected at any time without completely taking the mechanism apart.

A further object is to provide a signal which is of unit construction whereby various parts may be replaced or exchanged as may be necessary, thereby readily facilitating the maintenance of the apparatus. With these and other objects in view, as may be more readily apparent from the following specification, and appended claims, I will now proceed to describe one embodiment of my invention. In the drawings:—

Fig. 1 is a cross section through a signal in accordance with this invention, showing the interior mechanism in side elevation.

Fig. 2 is a cross section through the mechanism.

Fig. 3 is a transverse section through the mechanism.

Fig. 4 is a sectional plan of the mechanism.

Fig. 5 is a sectional view of a lens adapter attachable to the front of the signal.

Fig. 6 is a plan view of one end of a locking bar used to lock the mechanism in the signal.

Fig. 7 is an enlarged rear view of a sighting device.

The basic principle of the signal which comprises the utilization of a source of light together with means for concentrating said source through a second focal point, passing this light through a screen through this focal point and then projecting the same from a lens, is old in the art. The present invention consists more particularly of improved methods of construction and combination of the apparatus rather than in the basic light projection idea.

The optical principle above referred to in this embodiment comprises a source of light 1 in combination with an elliptical reflector 2 which is adapted to collect and concentrate the rays from the source of light 1 to a focal point 3. At this focal point colored spectacles or other screens 4 are movably mounted and have the effect of

changing the color or beam characteristic in accordance with the particular screen then intercepting the beam. The beam then diverges to cover a lens which is adapted to project the rays in a substantially parallel beam. In the present embodiment of the invention the source of light 1 and reflector 2 are carried in a holder 7 which is mounted in the cover 8 of the mechanism case 9, thereby making this part of the signal removable with the mechanism.

The construction of the signal generally is as follows:—an outer or main case 10 is provided and is equipped with a rear door 11 suitably hinged thereto at 12 and adapted to be blocked in place by means of a latch 13 which engages with the pin 14 in the case, being held in engagement by means of a spring 15. A sealing gasket 16 is provided in such a manner that it will be compressed when the nut 17 is tightened down over the latch member 13, thereby making the case substantially water tight. A hasp 18 and staple 19 are provided so that the case may be suitably locked to prevent unauthorized tampering with the mechanism.

The front of the main case is provided with a recess 20 in which is mounted a suitable lens 5 with a sealing gasket 21 adapted to exclude moisture and dust. Where it is considered desirable, a spacer ring 22 is provided which in its turn has a recess 23 adapted to carry a spreader cover glass 24, this also being properly gasketed as shown at 25. In order to hold this spreader glass in place, the combination hood and lens ring 26 is provided, the whole assembly being held together by means of suitable screws 27 which pass through the members into tapped holes in the main case.

Attached to the hood ring 26 is a suitable hood 28 adapted to screen the surface of the spreader glass, or the lens where the spreader glass is not being used, from the direct rays of the sun thereby substantially eliminating reflection of white light from these surfaces. On the top of the main case 10 a casting 29 is provided having upwardly extending parts 30 and 31 respectively. The part 30 is provided with a peephole 32 and the part 31 is provided with a hole 33 and a coating sight member 34 which will be described hereafter. The axes of the two holes 32 and 33 are arranged to be substantially parallel with the axis of the light beam.

Attached to the front of the signal case by means of suitable bolts 35 and spacers 36 is a suitable background 37 preferably made of sheet steel properly protected against corrosion. It is

the purpose of this background to provide a black contrasting surface around the light when the signal is viewed in the day time, particularly when the angle of vision projects above the skyline.

The interior of the case is suitably painted with a black paint of low reflecting qualities in order to substantially eliminate reflection of light from the interior of the signal. It is further provided with suitable lugs 38 having holes 39 located therein which are adapted to properly locate the mechanism 40 in relation to the lens 5. The mechanism 40 is provided with suitable studs 41 adapted to engage in the holes 39 for this purpose. When the mechanism 40 has been set in place as shown particularly in Figure 1, a locking bar, a portion of which is shown in Figure 6, is inserted. This locking bar is provided with an extension 42 at each end, this extension being provided with a suitable recess 43 adapted to engage locking pins 44 suitably riveted into the walls of the main case 10. The locking bar is further provided with plungers 45 adapted to engage the surface of the mechanism cover 46 and to be held in intimate contact by means of springs 47. From this construction it will be seen that by pressing forward on the locking bar, the springs 47 may be compressed and the recess in the extensions 42 may be forced out of engagement with the locking pins 44. The locking bar may then be moved laterally out of line with the locking pins, thereby releasing the mechanism for removal.

In order that the signal may be properly aligned along the track, a special bracket member 48 is provided adapted to be clamped to the signal pole 49 by means of suitable U bolts 50 or in any other desirable manner. The hinge supporting member 51 is provided and is equipped with a downwardly extending stud 52 adapted to pass through a hole 53 in bracket 48 and is provided with locking nuts 54, whereby the bracket member may be rotated about the member 48 and locked in any suitable position by means of the nuts 54. By this arrangement provision is made for adjusting the direction of the projected beam in a horizontal plane. In order to adjust the beam in a vertical plane, the mechanism is pivoted to the hinge member 51 by means of suitable pivots 55. The front end of the main case 10 is provided with a downwardly extending stud 56 equipped with adjusting nuts 57. A forwardly extending member 58 is adapted to pass between the nuts 57 thereby providing means whereby the signal may be adjusted and locked in a vertical plane.

A wire outlet opening is provided in the main case 10 at 59 and a flexible conduit 60 may be used to protect the wires passing out of the signal case to the pole 49 and then through the nipple 61 into the hole in the well known manner.

The sight 34, more clearly shown in Figure 7, consists of a mounting plate 62 which is adapted to carry a sighting glass 63, having cross hairs etched thereon as shown at 64. This sighting device is mounted on the member 31 by means of screws 65 and washers 66, the screws 65 passing through holes 67 in the sight member which are somewhat larger than the shanks of the screws, thereby permitting a slight adjustment of the position of the sight 34 to compensate for irregularities in manufacture and assembly, the sight being rigidly clamped in place by tightening the screws 65.

The interior mechanism 40 comprises a mechanism

case 9 equipped with a suitable cover 8 mounted thereon by means of screws 68. The mechanism proper comprises a 3 position motor element having a polarizing field structure together with a movable armature, as set forth in detail in the parent case, Ser. No. 128,437, filed 8/10/26. The field structure consists of two pole pieces or pole shoes 69 and 70, made of suitable flux conductive material.

The armature structure consists of a suitable core 76 preferably made of Norway iron and equipped with polar vanes 77 and 78 respectively adapted to coact with the pole shoes 69 and 70.

In order to properly support the armature structure front and rear bracket castings 83 and 84 are provided. These brackets are mounted on the pole shoes 69 and 70 by means of suitable studs 85 and clamping nuts 86, said studs passing through the brackets 83 and 84 and suitable holes in the pole shoes 69 and 70. In order to compensate for slight variations in manufacture deformed washers 88 of suitable spring material are placed on the studs between the pole shoes and the rear bracket 84 thereby taking up any variation in these parts. The rear bracket 84 also forms the supporting bracket for the mechanism in the case and for this purpose is provided with extending lugs 89 through which screws 90 pass into the case 9. The bracket 84 is suitably insulated from the case 9 by means of insulating bushings 91 and washers 92.

The polar vane 78 is equipped with the spectacle carrying member 107 adapted to carry spectacles 4 suitably mounted thereon by means of spring clips 108 and coacting clips 109. These spectacles can be of any suitable material or color that may be found desirable, it being the specific purpose to change the characteristic of the beam passing through them in accordance with the particular spectacle presented at the focal point. In the present embodiment of the invention three of these spectacles are provided for normal signal work, these being made of red, yellow and green glass respectively, the red glass being placed in the central position so that it will be coincident with the axis of the light beam when the mechanism is in the de-energized or neutral position.

A panel 134 of suitable insulating material is provided on the outside of mechanism case 9 whereby all electrical connections to the mechanism may be made to outside terminal posts 135 carried by panel 134 are shown more particularly in Figures 1, 2, and 4. The terminal posts 135 will, of course, be electrically connected by suitable wiring, not shown, to the various coils and contacts on the inside of the mechanism.

The case 9 is provided with an aperture 136 equipped with a plate glass cover 137 through which the rays of light emitted from the source 1 may pass. The cover 8 of the mechanism case is provided with an aperture 138 properly equipped with an inspection glass 139 whereby the mechanism may be seen and the contacts inspected without removal of this cover. Formed in the cover 8 is a recess or well 140 properly equipped with a sealing glass 141 which is adapted to complete the closure of the mechanism case. The reflector and light carrying member 7 is adapted to fit snugly in the well 140 as shown at 142 thereby aligning the reflector and light assembly with the axis of the signal. The member 7 is provided with suitable studs 143 arranged in triangular formation. Upon these studs a plate 144 is mounted by means of adjusting nuts 145

in such a way that the plate 144 may be moved longitudinally on the studs in equal or varying degrees thereby enabling the source of light 1 to be placed at the correct focal point of the reflector 2. The plate 144 is adapted to carry an insulating member 145^a to which is attached a socket collar 146 adapted to support the base of bulb 147. The member 145^a is further provided with a spring pressed stud 148 adapted to make electrical contact with the center contact of the bulb 147.

In order to make the reflector assembly readily removable from the signal mechanism it is arranged to hold it in place by means of spring clips 150 suitably attached to the cover 8 by means of rivets 151. Slots 152 are provided in the rear of member 7 whereby the member may be slipped into place, then rotated as indicated by the arrow in Figure 2, whereupon the spring end 153 will pass over a hump 154 formed on member 7 dropping into a notch formed thereon thereby locking the reflector assembly in place.

The operation of the mechanism is as follows: the field coil 75 is continuously energized, this forming the polarizing feature of the mechanism. In view of the balanced structure employed, this will not develop any torque to cause the armature to rotate. However, upon energization of the armature coil 79 the vanes of the armature will be caused to react against the pole shoes thereby causing the armature to rotate in a clockwise or counter-clockwise direction in accordance with the relative polarity of the armature current, thereby moving the respective spectacles into the axis of the light beam.

When it is necessary to employ a lens of different size to meet specific signal conditions, an adapter 156 is provided as shown in Figure 5. This adapter is conical in shape and is provided with a suitable recess 157 to carry the lens 158 which may be of any desired design and which is mounted in the groove 157 by means of a sealing gasket 159 being retained therein by means of the hood and lens ring 160 in a similar manner to cover glass 24 in Figure 1. It will be seen that if lenses of suitable focal length are selected that these adapters may be provided to accommodate lenses of any desirable size as the only controlling feature is the angle of emergency of the light ray from the second focal point. By taking advantage of this situation the signal may be readily modified in its lens size without in any way disturbing the focal adjustments or mechanism as it is apparent that all these adjustments will be identical no matter what size lens is employed in the signal.

While I have described one embodiment of the invention, it is well understood that many departures can be made from the specific details of the structure without departing from the spirit of the invention.

Having described my invention, I now claim:—

1. In a light signal, a housing adapted to carry a lens in the front thereof, a lens in said housing, lugs in said housing having holes formed therein, a mechanism casing containing mechanism adapted to control rays of light passing to said lens, a source of light for said lens carried by said mechanism casing, dowel pins on said mechanism casing adapted to fit the holes in said lugs, and locking means for said mechanism casing, comprising a bar having ears adapted to engage said housing and spring pressed studs adapted to hold the mechanism casing and source of light in accurate relationship to said lens.

2. In a light signal, a housing adapted to carry a lens in the front thereof, a lens in said housing, lugs in said housing having holes formed therein, a mechanism casing containing mechanism adapted to control rays of light passing to said lens, a light assembly including a source of light for said lens readily removably carried by said mechanism casing, focusing means for accurately locating said source of light at a point in space in said mechanism casing; spring means for locking said light assembly in place, dowel pins on said mechanism casing adapted to fit the holes in said lugs, and locking means for said mechanism casing, whereby it may be readily removed and replaced and maintain the accurate focal relationship of the various parts.

3. In a light signal, a housing adapted to carry a lens in the front thereof, a lens in said housing, lugs in said housing having holes formed therein, a mechanism casing containing mechanism adapted to control rays of light passing to said lens, a light assembly having a source of light for said lens and readily removably carried by said mechanism casing, spring means for locking said assembly in place, dowel pins on said mechanism casing adapted to fit the holes in said lugs, and locking means for said mechanism, comprising a bar having ears adapted to engage said housing, and spring pressed studs adapted to hold the mechanism casing and light assembly in accurate relationship to said lens.

4. In a light signal, in combination, a housing, a lens in the front of the housing, a door closing the rear of the housing, a mechanism casing in the housing, perforated lugs in the housing, dowel pins on the casing receivable in the lugs to accurately and readily removably position the casing within the housing, a light assembly, a socket in the casing for slidably and rotatably and removably receiving the assembly, a light source in the assembly, focus means for the source to position it at a point in space, mechanism in the casing for controlling light rays from the source to the lens.

5. In a light signal, in combination, a housing, a lens in the front of the housing, a door closing the rear of the housing, a mechanism casing in the housing, perforated lugs in the housing, dowel pins on the casing receivable in the lugs to accurately and readily removably position the casing within the housing, a light assembly, a socket in the casing for slidably and rotatably and removably receiving the assembly, a light source in the assembly, focus means for the source to position it at a point in space, mechanism in the casing for controlling light rays from the source to the lens, a spring pressed bar for latching the casing in the housing, and a spring ear for releasably holding the light assembly in a predetermined position in the casing.

6. In a light signal, in combination, a housing, a lens in the front of the housing, a door closing the rear of the housing, a mechanism casing in the housing, perforated lugs in the housing, dowel pins on the casing receivable in the lugs to accurately and readily removably position the casing within the housing, a light assembly, a socket in the casing for slidably and rotatably and removably receiving the assembly, a light source in the assembly, focus means for the source to position it at a point in space, mechanism in the casing for controlling light rays from the source to the lens, a spring pressed bar for latching the casing in the housing, a spring ear for releasably holding the light assembly in a

predetermined position in the casing, an outstanding flange on the light assembly, a slot in the flange for allowing the spring ear to pass therethrough when the assembly is slid into the casing, and a groove in the flange adjacent the slot to receive the spring ear upon a slight rotation of the assembly in the casing.

7. In a light signal, in combination, a housing, a lens in the front of the housing, a door closing the rear of the housing, a mechanism casing in the housing, a light assembly, a socket in the casing for slidably and rotatably and removably receiving the assembly, a light source in the as-

sembly, focus means for the source to position it at a point in space, mechanism in the casing for controlling light rays from the source to the lens, a spring ear for releasably holding the light assembly in a predetermined position in the casing, an outstanding flange on the light assembly, a slot in the flange for allowing the spring ear to pass therethrough when the assembly is slid into the casing, and a groove in the flange adjacent the slot to receive the spring ear upon a slight rotation of the assembly in the casing.

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