

June 16, 1953

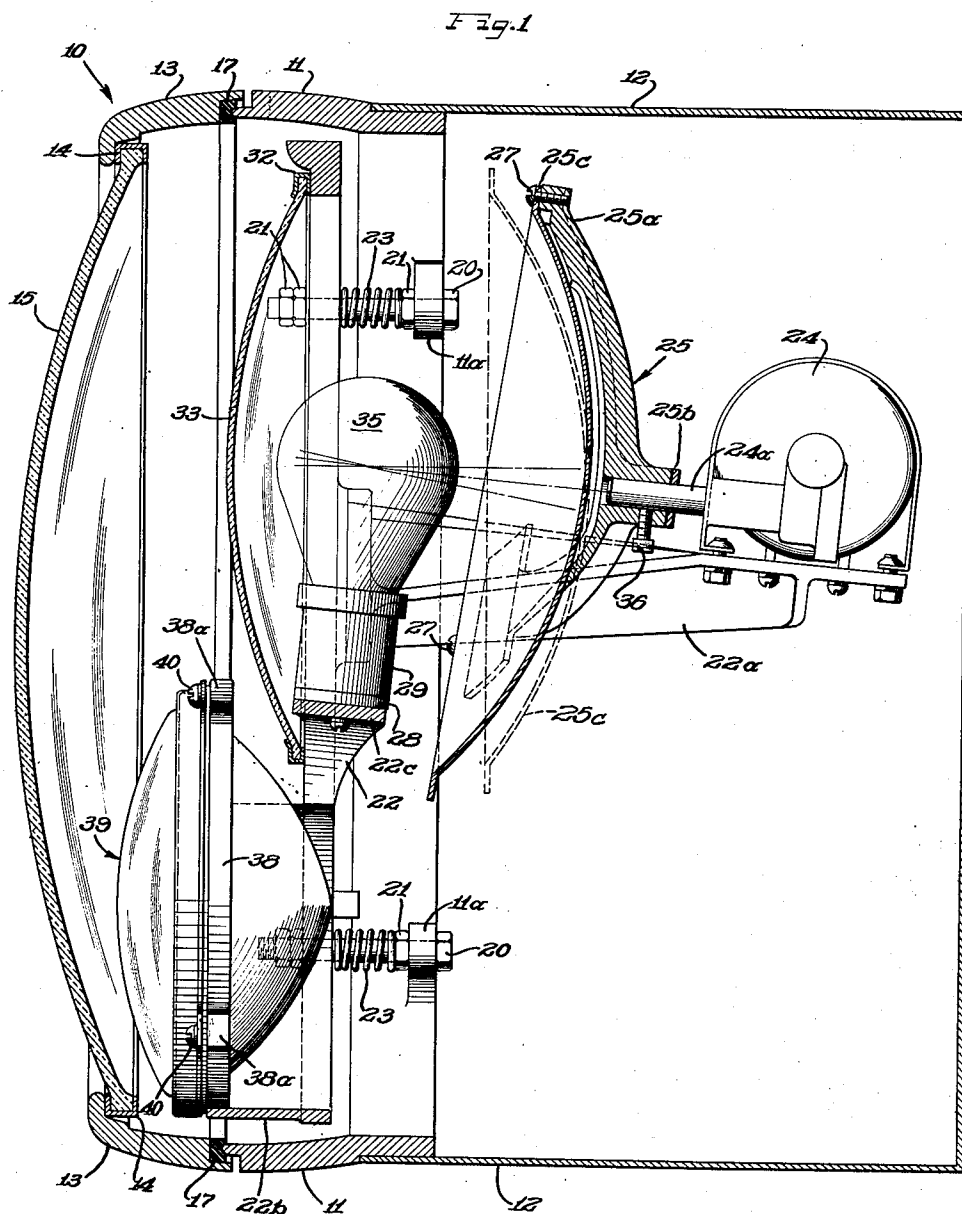
T. E. McDOWELL ET AL

2,642,522

ILLUMINATION APPARATUS FOR WARNING AND SIGNALING
PURPOSES AND HAVING HEADLIGHT AND WARNING
LIGHT UNITS ADJUSTABLE IN UNISON

Filed March 3, 1949

3 Sheets-Sheet 1



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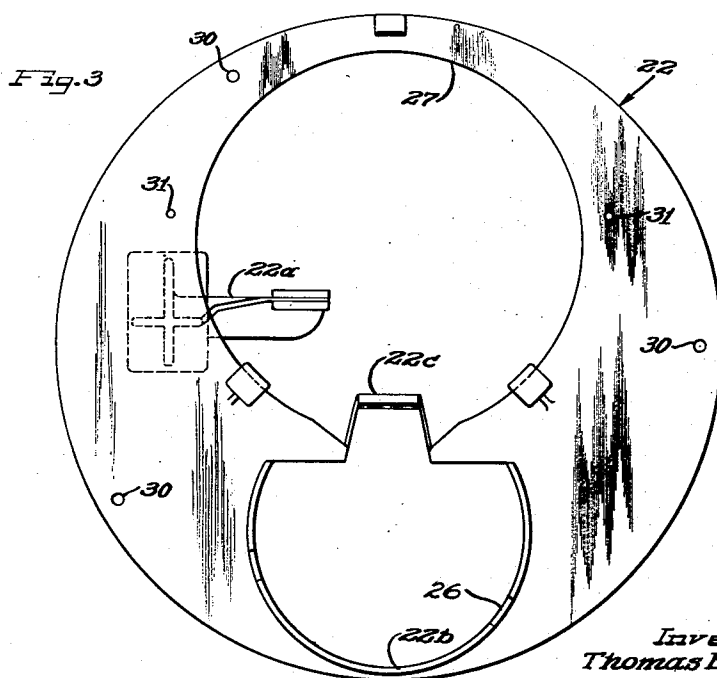
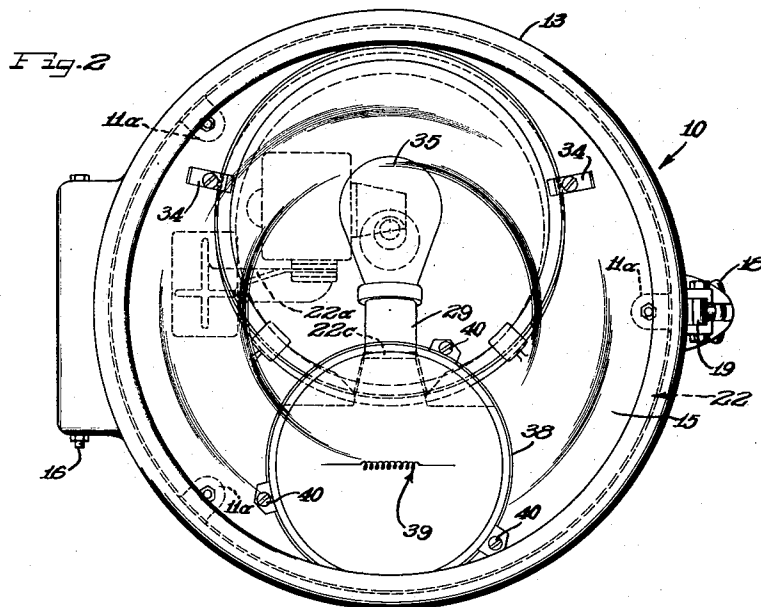
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Fig. 4

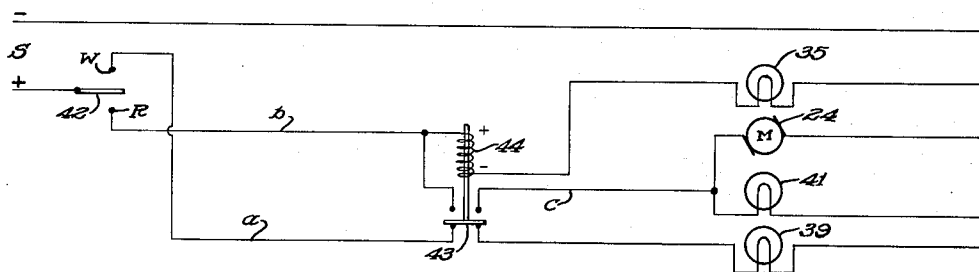


Fig. 5

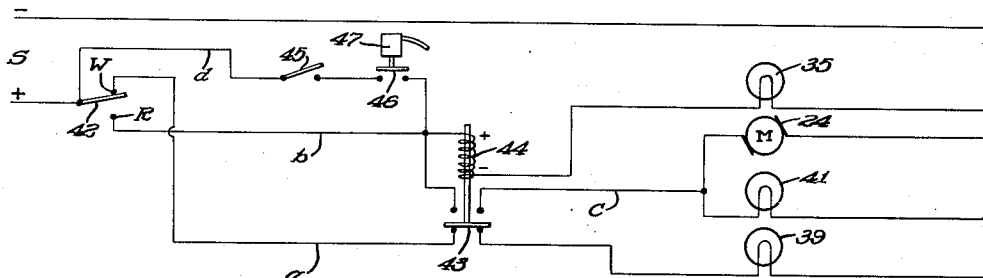
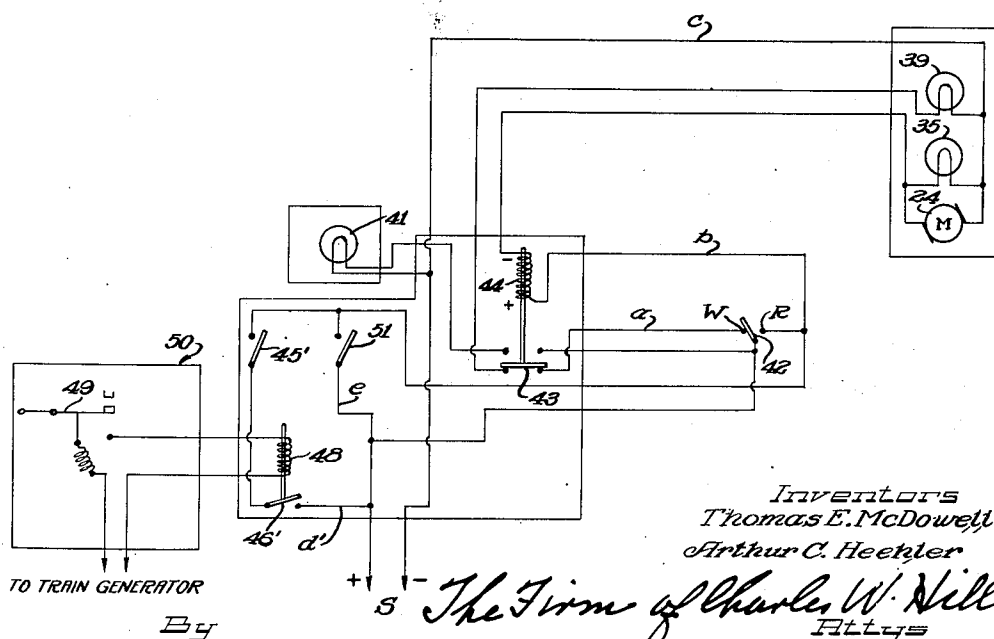


Fig. 6



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ILLUMINATION APPARATUS FOR WARNING
AND SIGNALING PURPOSES AND HAVING
HEADLIGHT AND WARNING LIGHT UNITS
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6 Claims. (Cl. 240—48)

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This invention relates generally to illumina-
tion apparatus, and more specifically, to light-
ing fixtures adapted to serve as warning lights
on vehicles such as railroad trains and the like
or as signal lights in various strategic locations.

Although the present invention may be of
general utility, it finds a particularly useful ap-
plication when installed on the last car of a rail-
road train or in a strategic location such as a
switching yard or the like. A lighting fixture
constructed in accordance with the teachings
of this invention includes a casing member
having a novel and improved lamp-carrying
structure. More specifically, the lamp-carrying
structure comprises a mounting plate and a
suspension mechanism whereby the mounting
plate may be fastened in adjustable assembly
in the fixture casing. The light fixture is pro-
vided with a seal beam headlight which is ar-
ranged on the mounting plate in spaced relation
to a second lamp unit. In the preferred em-
bodiment herein disclosed, the second unit may
be constructed to include a source of light and
a movable reflector unit spaced therefrom but
integrally assembled therewith. The spider sup-
port for the reflector is angularly disposed and
arranged in such a manner as to move in a con-
ically eccentric path with respect to a normal
longitudinal fixture axis, thereby permitting the
production of a movable beam of warning light.

Inasmuch as the instant invention contem-
plates the use of an adjustable suspension as-
sembly, it will be apparent that the mounting
plate may be aligned relative to the casing and
the optic axes of the projected beams of light
emanating from the headlight and the warning
light may be aligned, for example, upon any
desired point on the roadbed.

The instant invention provides a lighting fix-
ture which is uniquely adaptable for serving a
dual function, namely, as an auxiliary head-
light for backing up purposes and as a gyrating
warning light which may be of a distinctive
color for safety purposes as, for example, when
the train upon which the lighting fixture is in-
stalled slows down or comes to a full stop.

It is, therefore, an object of this invention to
provide an improved illumination apparatus
comprising a combination spotlight or headlight
and warning light suitable for use upon ve-
hicles or for use in fixed installations in stra-
tegic locations.

A further object of this invention is to provide
a combination fixed light and moveable warn-
ing light wherein the respective lamp units are

mounted on a common bracket suspended within
a casing structure for adjustable alignment rel-
ative thereto.

Another object of this invention is to provide
a combination headlight and warning light which
is readily adaptable for automatically controlled
operation.

A further object of this invention is to provide
a control system for a combination headlight
and warning light whereby the combination
light may be selectively operated as an auxiliary
backing up light and as a warning light.

Yet another object of this invention is to pro-
vide a control system for a combination light
fixture whereby the combination lights may be
selectively operated to produce a stationary beam
of light or to produce a gyrating warning light.

Another object of this invention is to provide
a control system for a combination light of the
type herein described which includes a pressure-
responsive control device whereby the combina-
tion light automatically produces a gyrating
warning light in response to the setting of brakes
on the vehicle upon which the combination light
may be carried.

A further object of this invention is to provide
a control system for a combination light which
includes elements responsive to the actuation
of a voltage regulator on the generator normally
carried by a railroad vehicle whereby the com-
bination light will be automatically operated to
produce a gyrating warning light upon reduction
of the speed of the vehicle below a predeter-
mined quantitative value.

Still another object of this invention is to
provide methods of controlling a combination
headlight and warning light whereby the com-
bination light may be operated to produce a sta-
tionary beam of light as and for backing up pur-
poses or to produce a gyrating warning light in
response to conditions indicative of a departure
from a normal condition.

It is believed that the methods of control
practiced with the instant invention will be
clearly understood from a description of the
apparatus provided for practicing the same.

Many other objects and advantages of the
instant invention will be manifest to those versed
in the art through reference to the following
detailed description and the accompanying draw-
ings in which we have shown, by way of example,
a preferred embodiment of a combination head-
light and warning light embodying the principles
of our invention.

On the drawings:

Figure 1 is a side elevational view partly in section of a combination light fixture embodying the principles of our invention;

Figure 2 is a front elevational view of the combination light fixture shown in Figure 1;

Figure 3 is a front elevational view of the novel and improved mounting plate incorporated in the instant apparatus;

Figure 4 is a circuit diagram illustrating one method of control which may be practiced with the instant apparatus;

Figure 5 is a circuit diagram illustrating an alternative method of control which may be practiced in the present invention; and

Figure 6 is a circuit diagram illustrating yet another method of control which may be practiced with the present invention.

As shown on the drawings:

Referring generally to Figures 1 and 2, a combination lighting fixture is indicated generally by the reference numeral 10 and includes a casing or body member 11 substantially of annular shape and adapted to receive in surrounding relationship therewith a drum-type casing 12. A door 13 having mounted therein a lens gasket 14 and a lens 15 is arranged to pivot about a hinge stud 16 affixed to one side of the body 11. The door 13 can be locked in sealed engagement with the body 11 by bringing a gasket 17 seated within an annular recess in the door into sealing contact with an appropriate abutment formed on the body 11 after which a wing latch 18 pivotally mounted on a latch stud 19 affixed to the door 13 may be locked to an appropriate grooved extension of the body 11.

The body 11 is provided on its inner peripheral surface with a plurality of inwardly extending lugs as at 11a which may have suitable openings formed therein.

Extending through the openings of each of the lugs 11a is a cap screw 20 suitably threaded along its shank portion to receive a plurality of jam nuts 21. A unit holder or mounting plate 22 is carried by the cap screws 20 in such a manner as to permit selective positioning of the mounting plates relative to the case body 11. To that end, the cap screws 20 may be provided with resilient spring members 23 which may be interposed between the lugs 11a and the mounting plate 22 whereby the mounting plate 22 is normally biased away from the lugs 11a. It will be readily understood that the cap screws 20 could also be provided with an additional jam nut 21 instead of a resilient member 23 and selective positioning of the mounting plate 22 relative to the case body 11 would still be possible.

The details of the mounting plate structure are best seen through reference to Figures 1 and 3. As shown on the drawings, the mounting plate 22 is substantially of a circular configuration and is provided with a rearwardly extending support arm as at 22a suitable for receiving in mounted assembly thereon a motor 24 and a reflector apparatus indicated generally at 25.

The mounting plate 22 is further provided with a forwardly extending flange portion 22b which surrounds an aperture indicated at 26. A second aperture 27 is also defined by the mounting plate 22 and lies in spaced relationship to aperture 26 and lies substantially on a co-linear axis extending vertically through the mounting plate 22.

The mounting plate 22 is shaped in such a manner as to define a platform portion 22c which lies at a point between the extremities of the

aperture 26 and the aperture 27 and is adapted to receive a lamp adaptor 28 and a suitable socket 29 in firm assembly therewith.

As may be seen on Figure 3, the mounting plate 22 is provided with a plurality of suitable openings 30 for receiving the cap screws 20 as well as additional openings 31 adapted to hold a lens gasket 32 carrying a lens 33 by means of a plurality of screw-mounted lens clips 34. The lens 33 may be made of glass or plastic of any desired color and is preferably of clear red glass for use as a warning light.

The reflector apparatus 25 mounted on the support arm 22a is aligned in such a manner that the rays of light emanating from a bulb 35 which may be turned into the socket 29 will be reflected beyond the bulb 35 and through the lens 33.

The reflector apparatus 25 includes a reflector spider 25a and a reflector stop collar 25b which is rotatably carried by the motor shaft 24a and securely locked thereto by means of a set screw 36. A substantially parabolic reflector 25c is mounted within the reflector spider by means of lock washers and reflector mounting screws 27 received by the arms of the reflector spider 25a.

It will be noted that the support arm 22a and the platform portion 22c are arranged to lie on an angularly displaced plane so that the axis of rotation of the shaft 24a is slightly inclined relative to the longitudinal axis of the fixture 10. The reflector spider 25a is constructed in such a manner as to have the bore of the stop collar 25b angularly eccentrically disposed relative to the peripheries of the arm portions of the spider. Hence, when the shaft 24a is rotated by the motor 24, the arms of the reflector spider will move in a conically eccentric path with respect to the normal longitudinal fixture axis. This arrangement permits the motor 24 to rotate the reflector 25 to oscillate in such a manner as to produce a gyrating beam of light.

Referring further to Figures 1, 2 and 3, the fixture 10 is provided with a lamp ring 38 which is of a generally annular configuration and has a plurality of extending boss portions 38a. The lamp ring 38 may be seated within the flange 22b of the mounting plate 22. A sealed beam lamp unit 39 may be mounted within the lamp ring 38 by means of a plurality of fastening means 40.

It will be apparent that the mounting plate 22 is actually adjustably suspended within the case body 11 and adjustment of the mounting plate relative to the body of the fixture will result in a selective positioning of the optic axes of the projected beams of light emanating from the sealed beam lamp unit 39 and the gyrating warning light.

Turning now to Figures 4, 5 and 6, schematic wiring diagrams are shown illustrating how the present combination light fixture 10 may be controlled under different operating conditions.

It will be apparent that one or more pilot lights may be remotely located from the fixture 10 and arranged to afford convenient visible signals representative of the operating status of the various elements of the fixture. A preferred arrangement will be set forth in greater detail presently.

Referring first to Figure 4, the bulb 45, the motor 24, the sealed beam unit 39 and a pilot light 41 are shown interposed in an electric circuit connected to a suitable source of power indicated by the reference character S. A selector switch 42 is provided which may be selectively actuated to the position W for white operation and to the position R for red operation. If the

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switch 42 is moved to position W, the current will flow from the positive terminal of the source S into a lead *a* through a two-position switch 43 to energize the sealed beam lamp unit 39. If the switch 42 is moved to the R position, current will flow into a lead *b* and will operate to energize a series relay coil 44 interposed therein. The series relay coil 44 controls the relay switch 43 and actuates it to a second position whereby the electrical circuit in lead *a* is broken and an electrical circuit in a lead *c* will be completed. Hence, current will flow from the lead *b* through the relay switch 43 and into the lead *c* to energize the motor 24 and the pilot light 41. Current will also flow through the relay coil 44 to energize the bulb 35. Thus, the stationary beam of light produced by the sealed beam lamp unit 39 will be extinguished and a gyrating warning beam of light will be produced.

It should be noted that when the relay coil 44 is deenergized, the circuit through lead *e* is opened thereby extinguishing the pilot light 41. If the bulb 35 burns out, the relay coil 44 is also deenergized and energization of the motor 24 or the pilot light 41 is precluded. In such event, the circuit can be restored to normal operating condition only by the replacement of the burned out bulb with an operative bulb 35. It will be evident that this arrangement permits the pilot light 41 to be a positive and reliable signal under all conditions since energization of the pilot light will occur only when a warning light is being produced.

Referring now to Figure 5, a modification of the basic circuit shown and described in connection with Figure 4 is provided in the form of an additional lead *d* which may be connected on the source side of the selector switch 42 and to the lead *b* thereby by-passing the selector switch 42.

Interposed in the lead *d* is a manual switch 45 and a switch 46 controlled by a pressure-responsive device 47. The pressure-responsive device 47 may be incorporated into the conduits of a fluid brake system such as is normally provided upon a railroad train or the like and may be adapted to respond to variations in air pressure occurring in the conduits of the fluid brake system such as occur upon the application of brakes upon slowing down the train or coming to a full stop. It will be evident that this particular arrangement provides for a domination of white operation by red operation. This is true because even though the selector switch 42 is moved to position W whereby the sealed beam lamp unit 39 is energized to produce a stationary beam of white light, if the manual switch 45 is closed, actuation of the pressure-responsive device 47 will close the switch 46, thereby completing the electric circuit. Current will flow through the lead *d* into the lead *b* to energize the series relay coil 44. The series relay coil 44 will, in turn, actuate the relay switch 43 to its second position thereby extinguishing the sealed beam lamp unit 39 and energizing the bulb 35, the motor 24 and the pilot light 41.

It will, of course, be understood that the pressure responsive device 47 indicated in schematic form only may be of the type incorporating a manually operable reset plunger. Thus, the light will continue to be energized until such a time as the device 47 is manually reset or other provision is made.

In Figure 6, a schematic circuit diagram which is somewhat similar to that shown in Figures 4 and 5 is shown; however, the circuit shown in Figure 6 is adopted for automatic control by a

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voltage regulator of a conventional railroad generator. Thus, it may be seen that the selector switch 42 is by-passed by a lead *d'* in which is interposed a relay switch 46' controlled by a series relay coil 48 and a manually controlled switch 45'.

The series relay coil 48 is connected in circuit with a reverse current contactor 49 of a conventional voltage regulator 50 normally incorporated as a part of the usual control device for a train generator.

It may be noted at this point that train generators are generally arranged so as to permit actuation of a voltage regulator in response to attainment of predetermined quantitative values of speeds by the railroad vehicle carrying the generator set. Thus, it is contemplated that the reverse current contactor 49 may be actuated in response to slowing down of a railroad vehicle below a critical speed which will be of the same quantitative value as the critical speed of the voltage regulator 50.

When the series relay coil 48 is deenergized, the switch 46' will be closed, and if the manual switch 45' is also closed, current will flow through the positive terminal of the source S into the lead *d'* and through the switch 46', through the switch 45' and into the lead *b*. The series relay coil 44 will then be energized and even though the selector switch 42 is in the W position as and for producing a stationary beam of light, the relay switch 43 will be actuated to its second position, thereby extinguishing the sealed beam lamp unit 39 and energizing the motor 24, the bulb 35 and the pilot light 41 to produce a gyrating beam of warning light.

As shown in Figure 6, the control circuit may also be provided with an additional manual switch 51 in a lead *e* connected across the positive terminal of the source S and the lead *d'* in such a manner as to permit selective by-passing of the automatically controlled switch 46', the manual controlled switch 45' and the selector switch 42. Thus, when the switch 51 is closed, current will flow from the positive terminal of the source S into the lead *b* and will produce a gyrating beam of warning light in accordance with the method previously described.

While we have shown particular embodiments of our invention, it will, of course, be understood that we do not wish to be limited thereto since many modifications and alternative constructions may be made without departing from the spirit or scope thereof.

We claim as our invention:

1. Illumination apparatus comprising a generally cylindrical casing having a clear lens in one end thereof, a plurality of circumferentially spaced bosses extending radially inwardly into said casing, a plate-like bracket in said casing, a corresponding plurality of circumferentially spaced adjustable mounting means between said bracket and said bosses, said bracket carrying a sealed beam lamp unit to project a stationary beam of light through said clear lens, said bracket carrying a source of light adjacent said sealed beam lamp unit and having a pedestal portion behind said source of light carrying a motor, said motor having a movable reflector connected thereto to collect and focus the rays of light from said source of light to project a movable beam of light through said lens, the adjustment of said bracket adjusting in unison only the projection axes of both of said beams of light.

2. Illumination apparatus comprising, a casing having an open end, a bracket in said casing,

said bracket having a first opening therein receiving a sealed beam lamp unit, retainer means to hold said sealed beam lamp unit in firm assembly with said bracket to project a relatively stationary beam of light through the open end of the casing, said bracket having a second opening therein adjacent said first opening, a colored lens mounted on said bracket over said second opening, a pedestal portion on said bracket in said second opening and carrying a light source thereon, and a second pedestal portion on said bracket behind said second opening and carrying a motor having a movable reflector connected thereto to project a movable beam of light through said lens and out of the open end of said casing, and adjustable mounting means supporting said bracket in said casing to adjust the projection axes of both of said beams of light in unison only.

3. Illumination apparatus, comprising, a casing having an open end, a bracket in said casing and carrying a light unit to project a relatively stationary beam of light through said open end of said casing, said bracket having a pair of pedestal portions spaced from each other longitudinally along the axis of said casing and spaced laterally with respect to said light unit, a light source on one of said pedestal portions and a motor having a movable reflector connected thereto mounted on the other of said pedestal portions and arranged to reflect a movable beam of light through said open end of said casing, and mounting means adjustably supporting said bracket in said casing to adjust the projection axes of both of said beams of light in unison only.

4. A combination headlight-warning light apparatus, comprising, a unitary bracket having a headlight unit mounted in firm assembly therewith to project a stationary beam of light on a first projection axis, a light source on said bracket adjacent said headlight unit, said bracket having a pedestal adjacent said light source, and a motor on said pedestal having an eccentrically offset parabolic reflector connected in driven assembly therewith to project the light rays from said light source as a moving beam around a second projection axis generally parallel to said first projection axis, said unitary bracket having adjustable connecting means adapted to assemble the apparatus in a casing and to adjust both of said projection axes in unison only with respect to the casing.

5. Illumination apparatus, comprising, in com-

bination, a housing, a door in one end of said housing, a clear lens in said door, a mounting plate, a plurality of spaced apart connections between said housing and said mounting plate to adjustably suspend said plate in said housing adjacent said clear lens, an integral headlight unit having its own casing, reflector and lens elements mounted in firm assembly on said plate and arranged to project a fixed headlight beam through said clear lens on a first projection axis, a colored lens, and a light source carried by said plate in spaced relation to said headlight unit, and gyrating reflector means positioned in spaced alignment relative to said colored lens and said light source and being carried by said mounting plate for projecting a gyrating beam of light through said colored lens and said clear lens on a second projection axis generally parallel to said first projection axis, said mounting plate being adjustable to align the axes of said beams of light in unison only.

6. Illumination apparatus comprising, in combination, a case, a mounting plate in said case, a sealed beam lamp unit mounted on a lower portion of said mounting plate, a support arm extending rearwardly and being integral with said mounting plate, motor driven reflector means on said support arm, a stationary second lamp unit on said mounting plate spaced from said sealed beam lamp unit and in alignment with the optic axis of said reflector means, whereby the optic axes of projected beams of light emanating from said lamp units are generally parallel, and adjustable connecting means between said mounting plate and said case to adjust said optic axes with respect to said case in unison only.

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