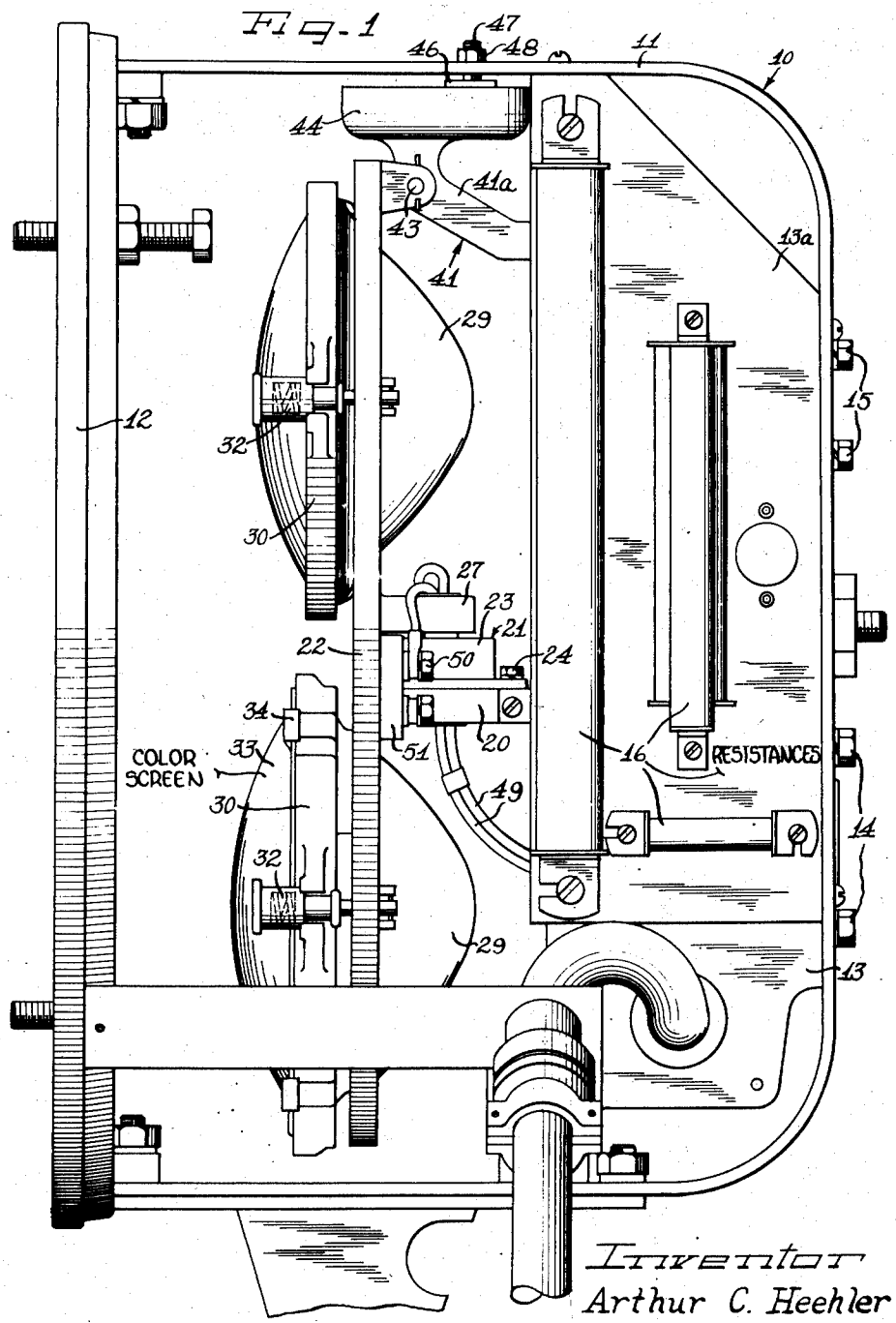
Oct. 6, 1953 A. C. HEEHLER 2,654,875

COMBINATION WARNING LIGHT AND STATIONARY HEADLIGHT

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Fig. 1



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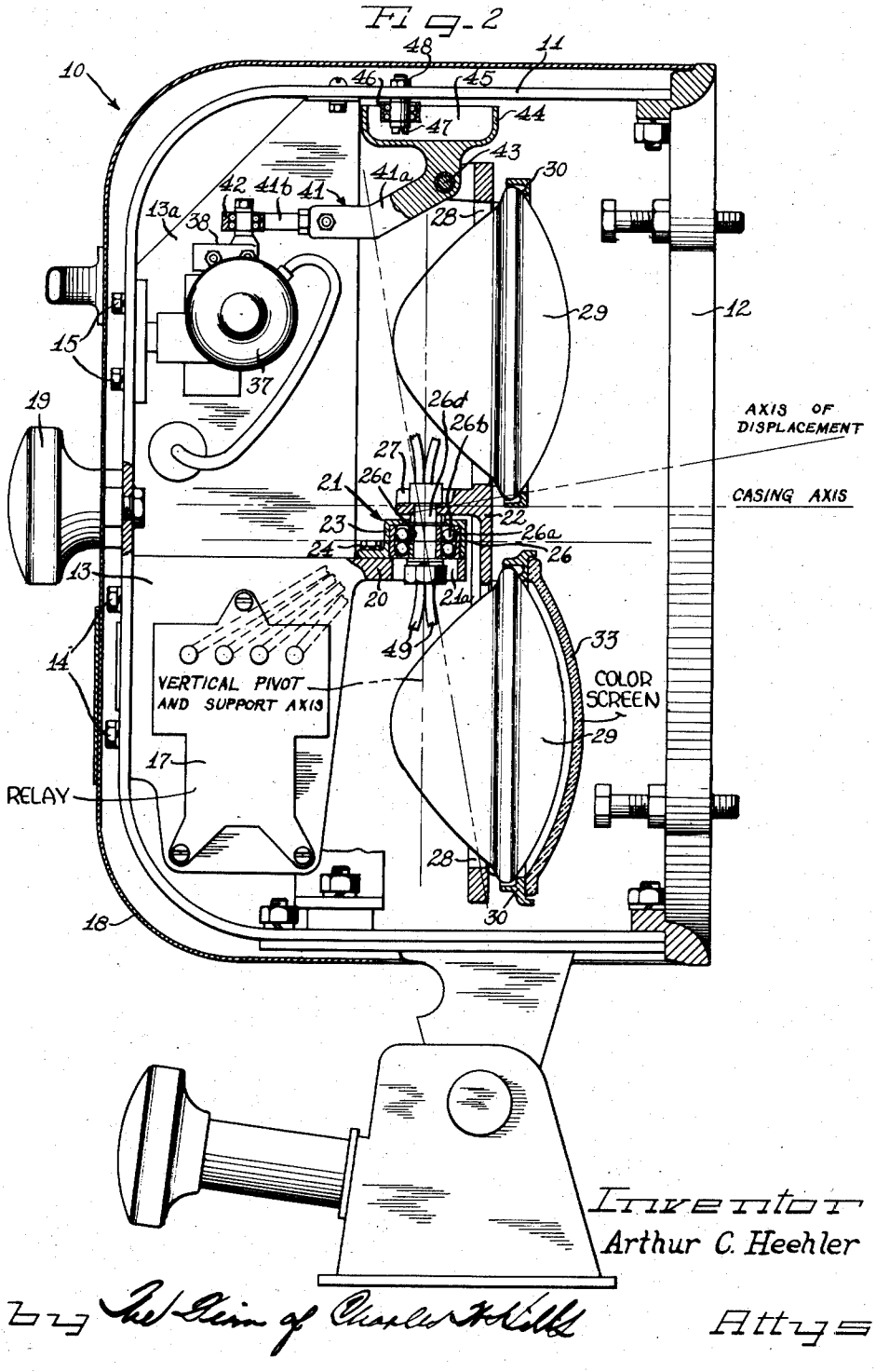
by [illegible] Attys

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COMBINATION WARNING LIGHT AND STATIONARY HEADLIGHT

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Fig. 2



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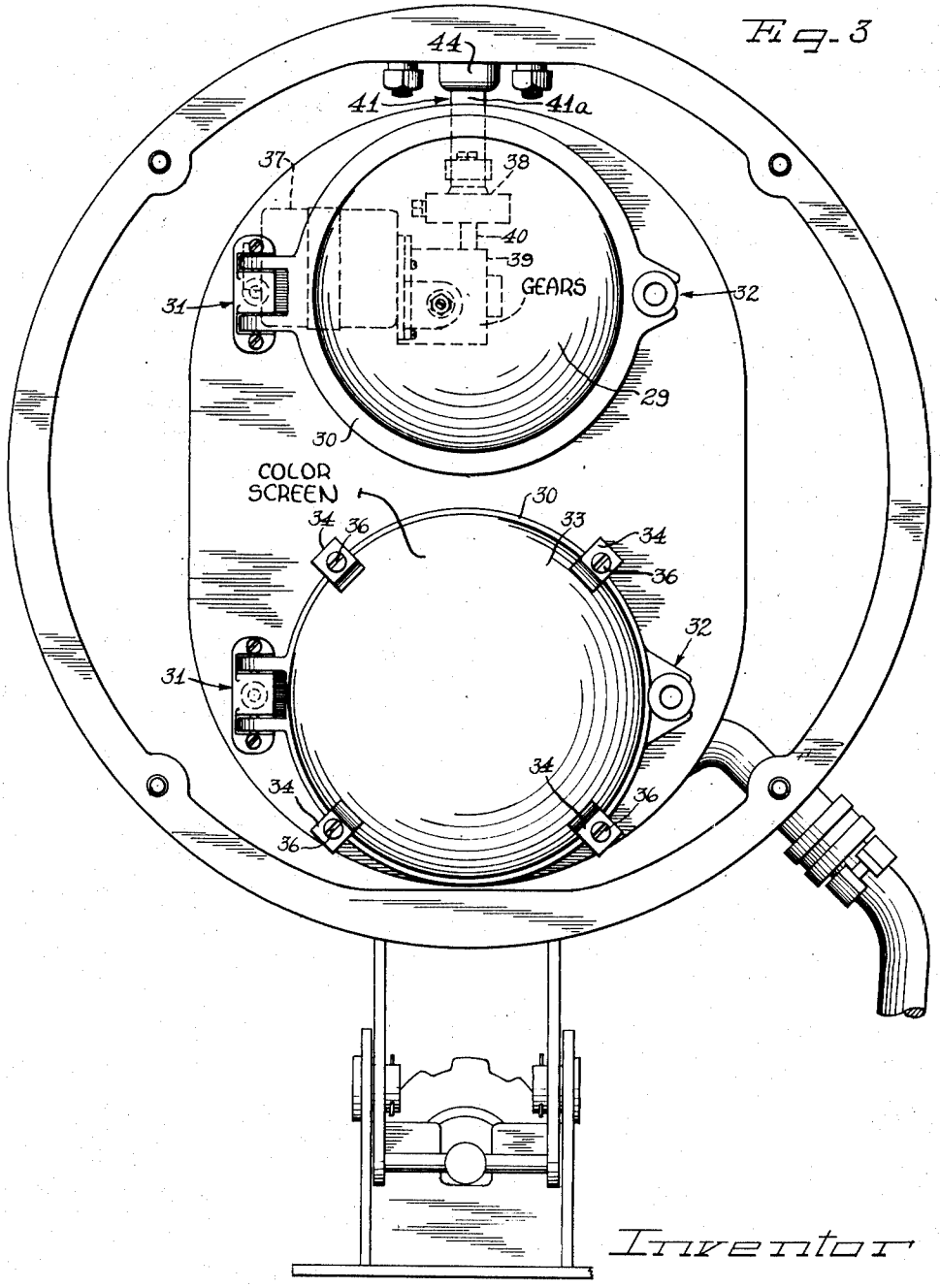
by Theo. Klein & Charles H. Hibbs Attys

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Fig. 3



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COMBINATION WARNING LIGHT AND STATIONARY HEADLIGHT

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Fig. 4

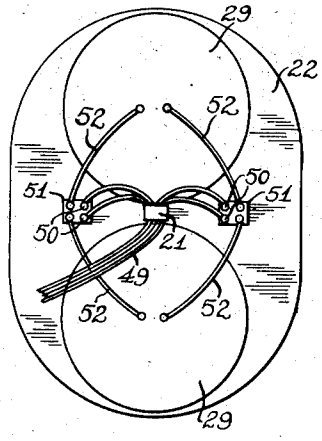


Fig. 5

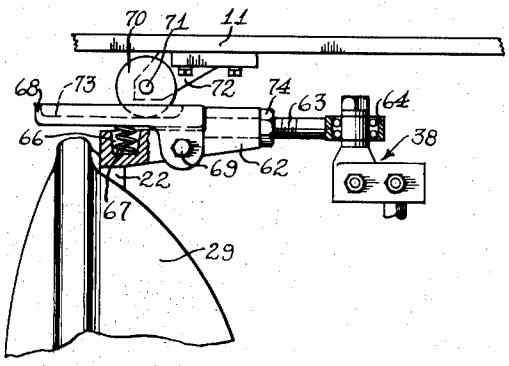


Fig. 6

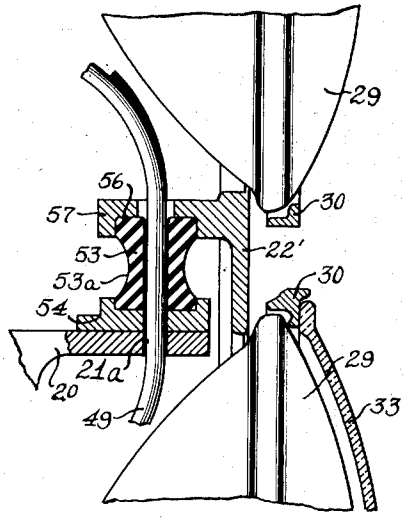
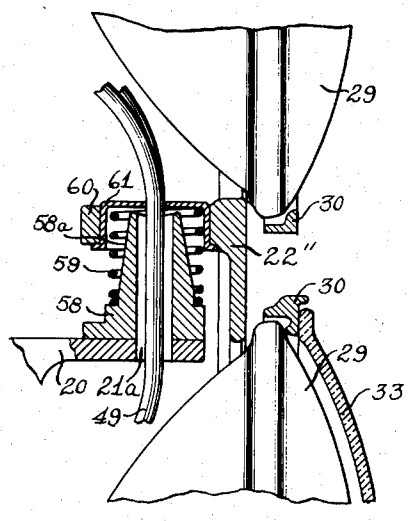


Fig. 7



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Patented Oct. 6, 1953

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UNITED STATES PATENT OFFICE

2,654,875

COMBINATION WARNING LIGHT AND STATIONARY HEADLIGHT

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Application August 22, 1950, Serial No. 180,775

21 Claims. (Cl. 340—49)

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This invention relates generally to headlight apparatus and more particularly to an illumination apparatus capable of being used for warning and signalling purposes or alternatively as a stationary headlight. More particularly, the present invention includes a novel oscillating mechanism whereby sealed-beam type lamp units may be mounted on a pivotally supported plate having an eccentric driving connection with a motor means so that a movable beam of light may be projected through a changing pattern whenever it is desired to employ the headlight apparatus as a warning light.

According to the general features of the present invention, a lamp support carrying a sealed-beam type lamp is pivotally supported on a self-aligning bearing or other bearing means permitting universal movement of the lamp support about a vertical support axis extending through the bearing. The lamp support is connected to an electric motor or other prime mover having an eccentric driving connection by means of an adjustable lever arm which serves to transmit an eccentric driving motion from the motor to the lamp support to oscillate the lamp support about the bearing means so that a movable pattern of light will be projected by the sealed-beam lamp. If desired, a plurality of sealed beam lamps may be mounted on the lamp support without impairing the efficiency of the operation of the oscillating apparatus because the lamp support is directly vertically supported by the bearing means.

Moreover, if a plurality of sealed-beam lamp units are carried by the lamp support, one or more of the sealed-beam lamps may be appropriately screened by a suitable filter or color screen so that a selectively colored movable beam of light may be produced by the lamp apparatus.

The connecting rod between the eccentric driving connection of the motor and the lamp support is also provided, according to this invention, with adjustment means so the light pattern produced by the oscillating apparatus may be selectively varied.

The mounting arrangement of the present invention embodies a further additional feature in that a wire conductor passage is provided directly through the bearing means to receive wire conductors attached at one end to each sealed-beam lamp unit. Since pivotal movement of the lamp support occurs about the bearing means, flexing of the conductor wires is minimized.

It is an object of the present invention, therefore, to provide a combination warning light and

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emergency headlight including an improved and simplified oscillating structure.

Another object of the present invention is to provide an oscillating structure for a warning headlight by means of which a plurality of sealed-beam type lamps may be oscillated and a comparatively small electric motor driving means may be employed.

Another object of the present invention is to provide a combination warning light and stationary headlight structure comprising a reduced number of simplified elements which may be manufactured more economically than has been heretofore possible.

Another object of this invention is to provide an oscillating structure for a warning headlight in which the flexure of the conductor wires will be minimized.

Many other features, advantages, and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description which follows and the accompanying sheets of drawing in which preferred embodiments of a combination warning light and stationary headlight according to the present invention as shown.

On the drawings:

Fig. 1 is a side elevational view of a combination warning light and stationary headlight according to the present invention with the external casing removed to show the general layout of the headlight apparatus.

Fig. 2 is a cross-sectional view with parts in elevation of a combination warning light and stationary headlight according to the present invention.

Fig. 3 is a front elevation view of the headlight structure shown in Fig. 1.

Fig. 4 is a schematic illustration depicting a rear view of the lamp support to bring out the details of the wiring arrangement whereby flexure of the conductor wires is minimized according to the present invention.

Fig. 5 is a fragmentary elevation view partly broken and with parts shown in cross section showing an alternative form of a connecting rod between the lamp support and the eccentric driving connection of a motor means provided in a combination warning light and stationary headlight according to the present invention.

Fig. 6 is a fragmentary cross sectional view with parts shown in elevation of an alternative form of bearing means mounting the lamp support for oscillatory movement.

Fig. 7 is a fragmentary cross sectional view with parts shown in elevation of yet another alternative form of bearing means for mounting a lamp support for oscillatory movement.

As shown on the drawings:

Referring first to Fig. 1, the combination warning light and stationary headlight of the present invention is indicated generally by the reference numeral 10 and includes a frame 11 conveniently formed from a U-shaped piece of metal and a front ring 12 connected to the ends of the legs thereof by any suitable fastening means.

A mounting casting 13 is securely fastened to the frame 11 by a plurality of fasteners 14. An additional chassis 13*a* is also provided and serves as a mounting base for various resistors indicated generally by the reference numeral 16 employed in connection with the operation of the lamp apparatus. A relay assembly indicated generally by the reference numeral 17 is also provided and is carried on the mounting casting 13. Since the details of structure of the control system are not believed necessary to the understanding of the principles of the present invention, further description of same is believed to be unnecessary.

As will be noted on Fig. 2, an open ended casing 18 is employed to encase the entire lamp assembly and is locked to the frame 11 by a back-cover hand wheel 19.

The mounting casting 13 is provided with a boss 20 having an aperture 21*a* therethrough which extends forwardly toward the open end of the casing 18 and serves to support a bearing means 21 which, in turn, is arranged to provide a vertical support axis and mounts a lamp support plate 22 for oscillatory movement about a generally vertical pivot axis extending through the bearing means 21 and coinciding with the support axis.

In the embodiment of Figs. 1, 2 and 3, the bearing means 21 includes a bearing holder 23 connected to the boss 20 by fasteners 24, the bearing holder 23 housing a conventional self aligning pivot bearing 26 including a curved outer race ring 26*a*, a plurality of shiftable elements 26*b*, a curved inner race ring 26*c* and a hollow center post in the form of a pivot bearing screw 26*d*.

The lamp support plate 22 is directly mounted on the bearing means 21 so as to be oscillatably movable about a generally vertical pivot axis, however, in the embodiment shown in Figs. 1, 2 and 3, the lamp support plate 22 is provided with a rearwardly extending boss 27 suitably apertured to receive the pivot bearing screw 26*d*.

The lamp support plate 22 is provided with one or more apertures 28 each adapted to receive the bowl shaped portion of a conventional sealed-beam type headlight lamp 29 therein. The lamp 29 may be retained in the lamp support plate by a retaining ring 30 suitably hinged at one side as at 31 and latched on the other side as at 32, both the hinge 31 and the latch 32 being spring loaded in accordance with a structural arrangement more particularly described and claimed in the copending application of Frank X. Keegan, Serial No. 161,050 filed May 19, 1950.

Since the apparatus of the present invention defines a particularly useful application when employed as a combination warning light and stationary headlight on a movable vehicle such as a locomotive, or the like, it is desirable to appropriately screen or filter at least one of the sealed beam lamps 29 with a color screen 33 which, in this particular embodiment, comprises

a disk of translucent material such as colored glass or plastic and may be positioned in registry with one of the sealed beam lamps 29 by means of a plurality of lens clips 34 retained on the lamp support plate 22 by screws 36.

In order to operate the headlight apparatus of the present invention as a warning light an oscillating mechanism including a train of mechanism to convert a rotary motion into an oscillatory movement is provided.

The frame 11 is used to support an electric motor or other suitable prime mover indicated at 37 suitable fasteners 15 being provided for that purpose. An eccentric driving connection indicated 38 is provided for the motor 37. In this particular embodiment, the motor 37 is connected to a reduction gear box 39 and a rotatable power take-off shaft 40 is provided with an eccentric crank arm forming the eccentric driving connection 38.

A connecting rod 41 is provided between the eccentric driving connection 38 of the motor 37 and a portion of the lamp support plate 22 spaced away from the bearing means 21.

As shown in Figs. 1, 2 and 3, the connecting rod is preferably provided with a shank 41*a* having a stem 41*b* adjustably assembled therewith, the stem 41*b* having a rod end self aligning bearing 42 on the end thereof adapted to receive the crank arm of the eccentric driving connection 38. The shank 41*a* of the connecting rod 41 is pivotally connected to the lamp support plate 22 as, for example, by the pivot pin 43.

In order to stabilize the movement of the connecting rod 41 about a predetermined pivot point and to properly translate the eccentric motion to the lamp support plate 22, the shank 41*a* is preferably provided with a boss 44 having an elongated recess 45 formed therein and arranged to receive a self aligning guide bearing 46 carried on a pivot screw 47 secured in the frame 11 by a nut 48. The guide bearing 46 will engage the side walls of the elongated recess 45 formed in the boss 44.

Whether the bearing means 21 mounts the lamp support plate 22 directly at the bottom of the lamp support plate or at an intermediate point afforded by the provision of a special boss formed on the lamp support plate as, for example, the boss 27, it will be apparent that the connection of the lamp support plate to the eccentric driving connection 38 through the connecting rod at a pivot point corresponding to the pin 43 spaced from the bearing means 21 will result in the oscillation of the lamp support plate 22 about the bearing means 21 so that the beam of light projected by the sealed-beam lamps 29 will be gyrated through an oscillatory path to produce a moving pattern of light.

Ordinarily the component elements of the apparatus are arranged so that the normal beam of light projected by the lamps 29 will lie on a substantially horizontal axis corresponding generally to the casing axis. Oscillation of the lamp support plate 22 will displace the beam of light around such axis through a generally elliptical path of traverse.

Adjustment of the stem 41*b* relative to the shank 41*a* of the connecting rod 41 may be effected to accommodate manufacturing variations. The relationship of the various pivot centers may thus be established in accordance with a predetermined leverage ratio so that a desirable elliptical beam pattern may be produced. The determination of the proper dis-

position of the various pivot points is taken up in greater detail in my copending application U. S. Serial No. 191,007, filed October 19, 1950.

It should be evident that the oscillating mechanism herein provided is particularly efficient despite the number of sealed beam lamps **29** that are mounted on the lamp support plate **22** because all of the weight of the lamp support plate as well as the lamps **29** is supported directly on the bearing means **21**. The force necessary to oscillate the lamp support plate **22** on the bearing means **21**, therefore, will be very small and a comparatively small electric motor may be employed as a prime mover. The absence of unusual stresses and strains afforded by supporting the beam projecting means on a vertical pivot and support axis results in economical operation and greatly reduced maintenance and upkeep cost.

In order to connect the sealed-beam lamps **29** to a suitable source of current supply, a plurality of electrical conductor wires **49** may be passed directly through the passageway established by the pivot bearing screw **26***d* of the bearing means **21** whereupon the ends of each of the conductors **49** may be fastened to suitable terminal posts **50** on one or more terminal blocks **51** fastened to the rear face of the lamp support plate **22**. Additional conductor wires **52** may then be led from the terminal blocks **51** to each of the respective sealed-beam lamps **29**.

The conductor wires **52**, of course, together with the terminal blocks **51**, oscillate with the lamp support plate **22** hence, there will be no flexure of the additional conductor wires **52**. Moreover, since the oscillation of the lamp support plate **22** will be about a generally vertical pivot axis extending through the bearing means **21**, actual flexure of the conductor wires **49** will be substantially eliminated. This feature is especially desirable in a combination warning light and stationary headlight since special flexure mechanisms need not be provided and ordinary conductor wires may be employed with safety and without incurring the need of high maintenance costs.

In Figs. 6 and 7, alternative embodiments of bearing means **21** are shown, the bearing means of Fig. 6 comprising a flexible elastic ring **53** made out of a resilient material such as a rubber or a rubber substitute, the ring **53** being generally cylindrical in overall configuration. The ring **53** is bottomed in a bearing support **54** connected to the boss **20** of the mounting casting **13** and the other end of the ring **53** is received in a complementary recess **56** formed in a boss **57** extending rearwardly from a lamp support plate **22'**. The ring **53** is preferably provided with a reduced diameter portion **53***a* to promote ready flexure thereof, thereby to enhance the oscillation of the lamp support plate **22'** about a vertical pivot axis extending through the hollow conductor passage found in the center of the ring **53**.

In Fig. 7, the boss **20** is shown as mounting a hollow center post **58** having an upstanding generally conical portion **58***a* around which is situated a coil spring **59**. The lamp supporting plate **22''** is provided with a boss portion **60** suitably apertured to receive a cup-shape retainer **61** adapted to bottom the other end of the spring **59**. With the bearing means of Fig. 7, the lamp support plate **22''** is resiliently supported by the coil spring **59** and may be freely oscillated universally within the limits prescribed by the upstanding conical portion **58***a* of the hollow center post **58** and the retainer **61**.

In both of the alternative modifications, the conductor wires **49** may be passed through the center of the bearing means, in the structural Fig. 6 through the center of the ring **53** and in the structure of Fig. 7 through the hollow center post **58** and the retainer **61**.

In Fig. 5 is shown an alternative form of a connecting rod for connecting the lamp support plate **22** to the eccentric driving connection **38** of the motor **37**. In this form, the lamp support plate **22** is provided with a rearwardly extending boss **62** forming the shank portion of the connecting rod. A threaded stem **63** is received by the boss **62** and is provided with a bearing **64** on the end thereof pivotally connectable with the crank arm of the eccentric driving connection **38**.

The boss **62** is provided with a recess **66** bottoming a spring **67** arranged to urge a guide member **68** pivoted to boss **62** by a pivot pin **69** upwardly into engagement with a roller **70** rotatably carried by the frame **11**, a roller pin **71** supported in a bracket **72** being provided to journal the roller **70**. The guide member **68** is preferably provided with an elongated recess **73** to receive the roller **70** and provide a raceway therefor. A locknut **74** is provided on the stem **63** so that various adjustment positions of the stem **63** with reference to the boss **62** may be retained in firm assembly.

Although various minor structural modifications might be suggested by those versed in the art, it should be understood that I do not wish to be limited to the precise details described herein for the sake of clearly setting forth the principles of my invention. I wish to embody within the scope of the patent all such modifications as reasonably and properly come within the scope of my contribution to the art.

I claim as my invention:

1. A warning light comprising an open ended casing, a motor in said casing, a universal bearing means in said casing, a light source support mounted on said universal bearing means for oscillatory movement about a pivot axis extending through said bearing means, a light source in said support arranged to project a beam of light through the open end of the casing along the casing axis and means connecting said motor and said light source support and oscillating said support structure about said pivot axis, whereby said beam of light will oscillate in a similar manner about said casing axis.

2. The combination according to claim 1 wherein said last mentioned connection means include adjustable elements to change the effective length thereof, whereby the effective length may be selectively varied.

3. In a warning light structure of the type adapted to project a beam of light in a changing pattern, means establishing a vertical support axis including a universal bearing having a pivot axis coincident with said support axis, a light source means pivotally supported soley by said bearing for oscillatory movement thereon about said pivot axis, and a motor having an eccentric driving connection with said light source means to move said light source means through a predetermined motion pattern.

4. In a warning headlight, a lamp supporting frame, a lamp means in said frame, a bearing means supporting said frame for oscillatory movement about a vertical pivot axis, means

connected to said frame to oscillate said frame about said bearing means, whereby said lamp means will project a movable pattern of light, said bearing means having a center passageway extending therethrough and conductor wires extending through said center passageway, one end of said wires being adapted for connection to said lamp means and the other end being adapted for connection to a current source, whereby the flexure of said conductor wires during oscillation of said frame will be minimized.

5. A warning headlight according to claim 4 wherein said bearing means comprises a self-aligning bearing having curved inner and outer races, a hollow center post and anti-friction shiftable members between said races, said hollow center post being oscillatably supported in said inner race and being connected to said lamp supporting frame and establishing said center passageway.

6. A warning headlight according to claim 4 wherein said bearing means comprises a flexible elastic ring made of a material such as a resilient rubber or the like.

7. A warning headlight according to claim 4 wherein said bearing means comprises a hollow center post establishing said center passageway and a coil spring surrounding said center post, said coil spring oscillatably supporting said lamp supporting frame.

8. In a warning headlight, the improvement of a beam projecting light source arranged to project a beam of light, a bearing support arranged to establish a support axis and mounting said light source for universal tilting movement around a pivot axis extending through said bearing support and being coaxial with said support axis and motor means having an eccentric driving connection with said light source to effect said universal tilting movement of said light source, whereby said beam of light will be moved to produce a changing pattern of light.

9. In an oscillating mechanism for a warning light of the type having a beam projecting light source oscillated universally to produce a changing pattern of light, the improvement of a single bearing arranged to provide a vertical pivot axis and the sole support of said beam projecting light source for universal pivotal movement about said axis.

10. A mechanism as defined in claim 9 wherein said single bearing comprises a self-aligning bearing having a bearing holder, curved outer and inner races therein, and a plurality of shiftable elements between said races, said self-aligning bearing further including a pivot bearing screw to support said beam projecting light source, said pivot bearing screw being supported by said inner race for oscillation.

11. A mechanism as defined in claim 10 wherein said pivot bearing screw has a hollow bore extending therethrough, said hollow bore constituting a conductor carrying passageway for the beam projecting light source.

12. A mechanism as defined in claim 9 wherein said single bearing comprises a flexible elastic ring made of a resilient material and being generally cylindrical in over-all configuration, the hollow bore of said ring constituting a conductor carrying passageway for the beam projecting light source.

13. A mechanism as defined in claim 12 wherein said ring is provided with a centrally disposed reduced diameter portion to promote ready flexure thereof.

14. A mechanism as defined in claim 9 wherein said single bearing comprises a coil spring.

15. A mechanism as defined in claim 9 wherein said bearing includes a coil spring and a hollow center post having an upstanding generally conical portion extending into the coils of said spring, said center post forming a conductor wire passage for the beam projecting light source.

16. In an oscillating mechanism for a warning light, a train of mechanism for converting a rotary motion to an oscillatory motion comprising, a casing to enclose said beam projecting means and having a bearing arranged therein to oscillatably support said beam projecting means for universal movement about a generally vertical pivot axis, a motor in said casing, a power take off shaft rotated by said motor, an eccentric crank arm having a driven connection with said shaft, and a link means pivotally connecting said eccentric crank arm and said beam projecting means, said link means including a shiftable pivot connection intermediate its ends with said casing.

17. A mechanism as defined in claim 16 wherein said link means comprises a shank member pivotally connected to said beam projecting means, a stem adjustably assembled therewith, said stem having a bearing on the end thereof adapted to be pivotally connected to said crank arm and said shiftable pivot connection comprises a guide bearing carried by said casing and being cooperable with a bearing raceway formed in said shank and adapted to receive said guide bearing.

18. A mechanism as defined in claim 16 wherein said link means comprises a shank firmly connected to said beam projecting means, a stem adjustably assembled therewith, said stem having a bearing on the end thereof adapted to be pivotally connected to said crank arm and said shiftable pivot connection comprises a guide bearing carried by said casing and being cooperable with a recessed guide member pivotally carried by said shank, there being a spring between said shank and a portion of said guide member to resiliently urge said guide member into engagement with said guide bearing.

19. A unitary oscillatory mechanism for a warning light comprising a support bracket, a universal bearing on said bracket, a light source supported on said bearing for universal oscillatory movement, confining means limiting the freedom of movement of said light source to substantially two planes at right angles to each other, a motor on said bracket, and means for connecting said motor to said light source to give said light-projecting means components of motion in said two planes, respectively.

20. A warning light comprising a flat lamp support plate having at least two spaced apertures therein, a sealed beam lamp in each of said apertures, retainer means clamping said sealed beam lamps in firm assembly with said plate, a color screen mounted on said plate over one of said sealed beam lamps, a bracket having universal pivot means supporting said lamp support plate uprightly for universal movement, a motor on said bracket having a driving connection with said plate and oscillating said plate universally, a casing open at one end and receiving said bracket and said lamp support plate with the lamp support plate and the sealed beam lamps aligned to project beams of light out of the open end of the casing, and conductor means to selectively energize said sealed beam lamps concur-

rently with said motor, to project a selectively colored beam of light out of the open end of the casing and in a moving pattern.

21. A warning light comprising a flat lamp support plate having at least two spaced apertures therein, a sealed beam lamp in each of said apertures, retainer means clamping said sealed beam lamps in firm assembly with said plate, a bracket having universal pivot means supporting said lamp support plate uprightly for universal movement, a motor on said bracket having a driving connection with said plate and oscillating said plate universally, a casing open at one end and receiving said bracket and said lamp support plate with the lamp support plate and the sealed beam lamps aligned to project beams of light

out of the open end of the casing, and conductor means to selectively energize said sealed beam lamps concurrently with said motor, to project a beam of light out of the open end of the casing and in a moving pattern.

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