Nov. 12, 1940. J. D. KENNELLY 2,221,483

SIGNAL LAMP

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Fig. 1.

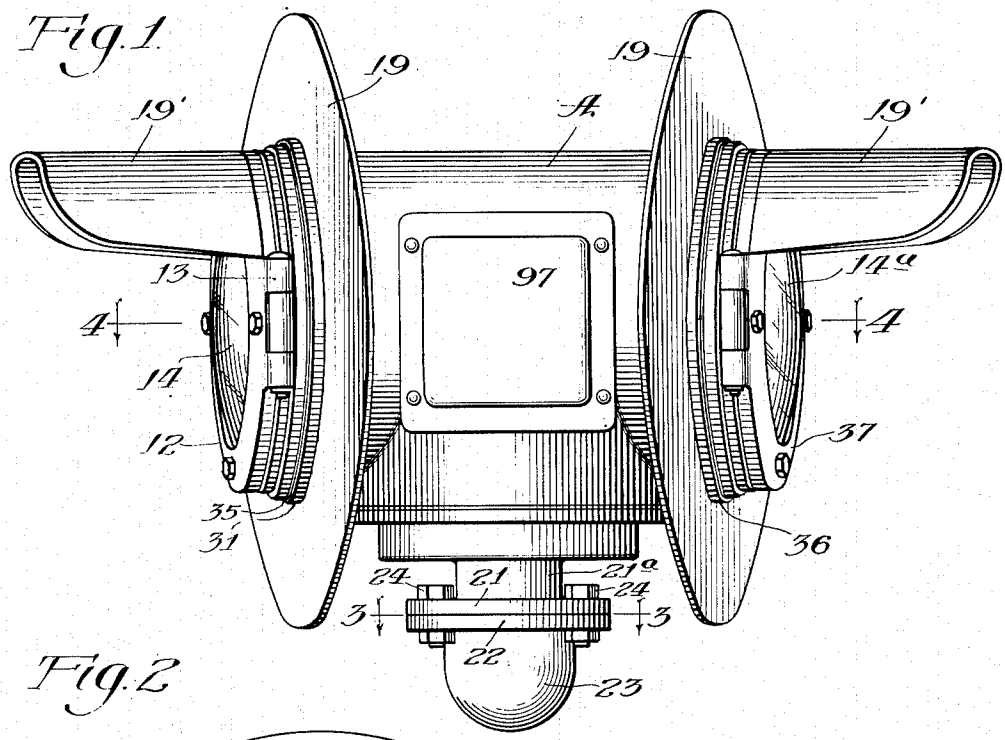


Fig. 2.

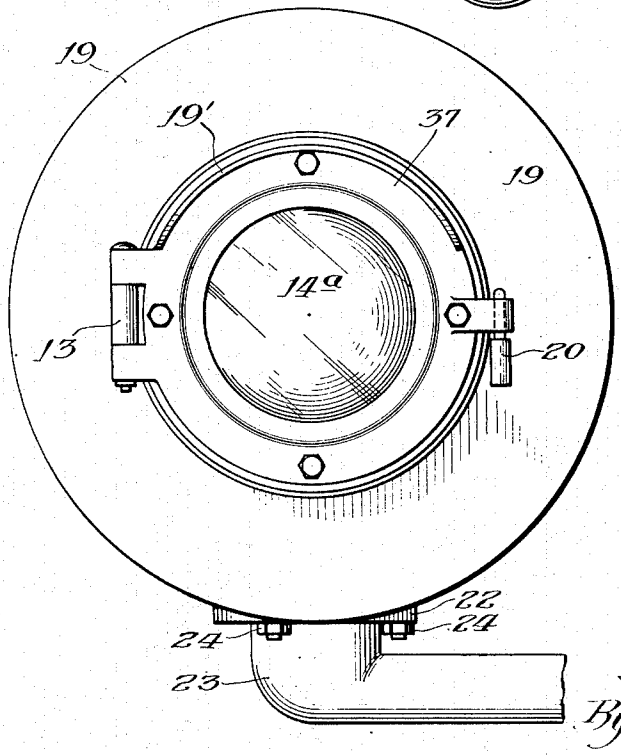
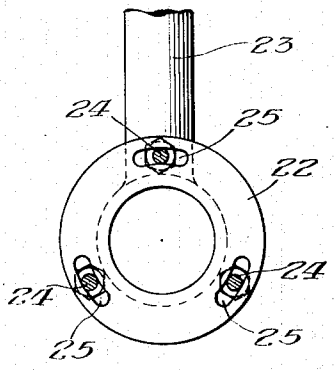


Fig. 3.



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SIGNAL LAMP

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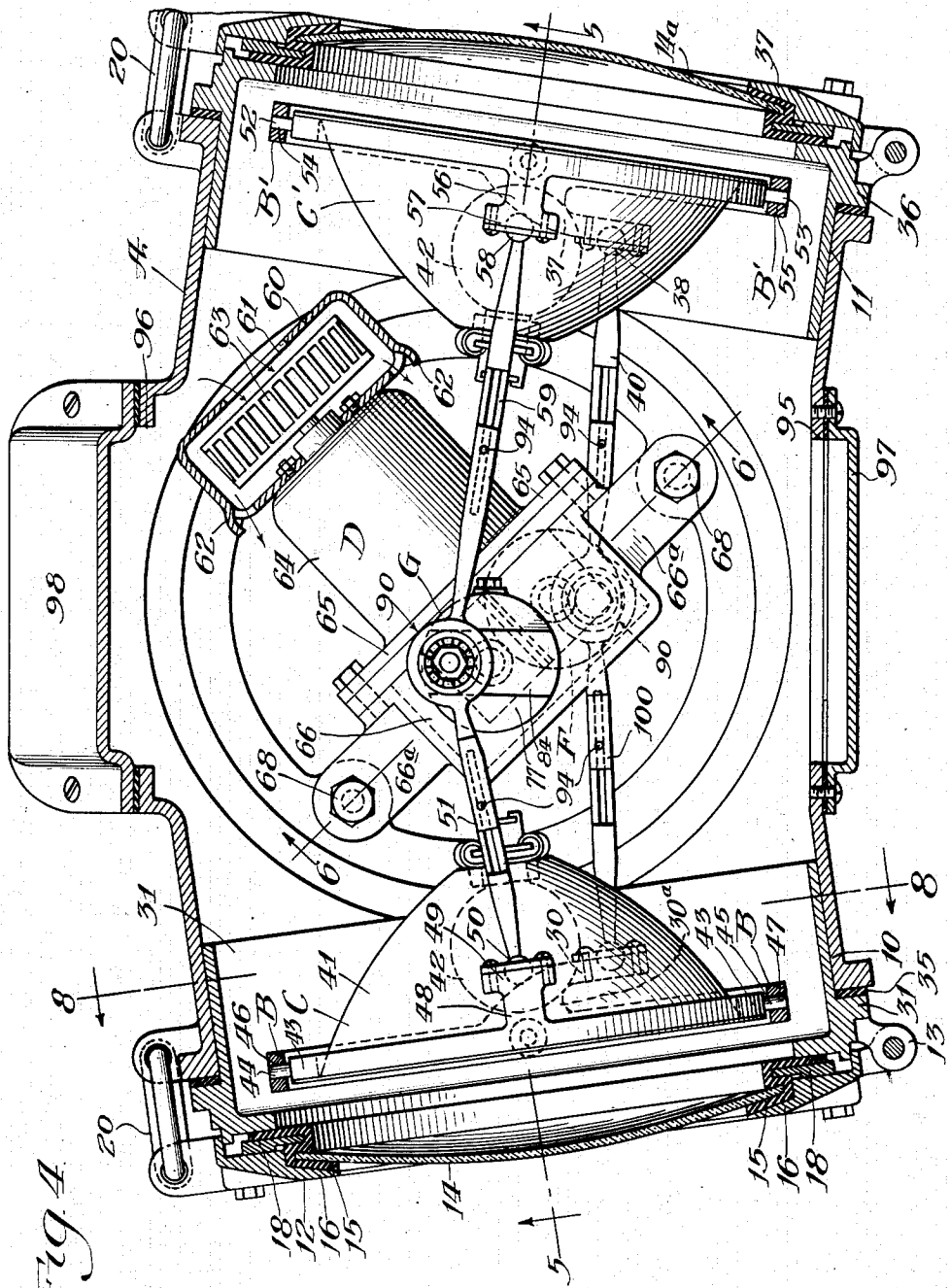


Fig 4

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SIGNAL LAMP

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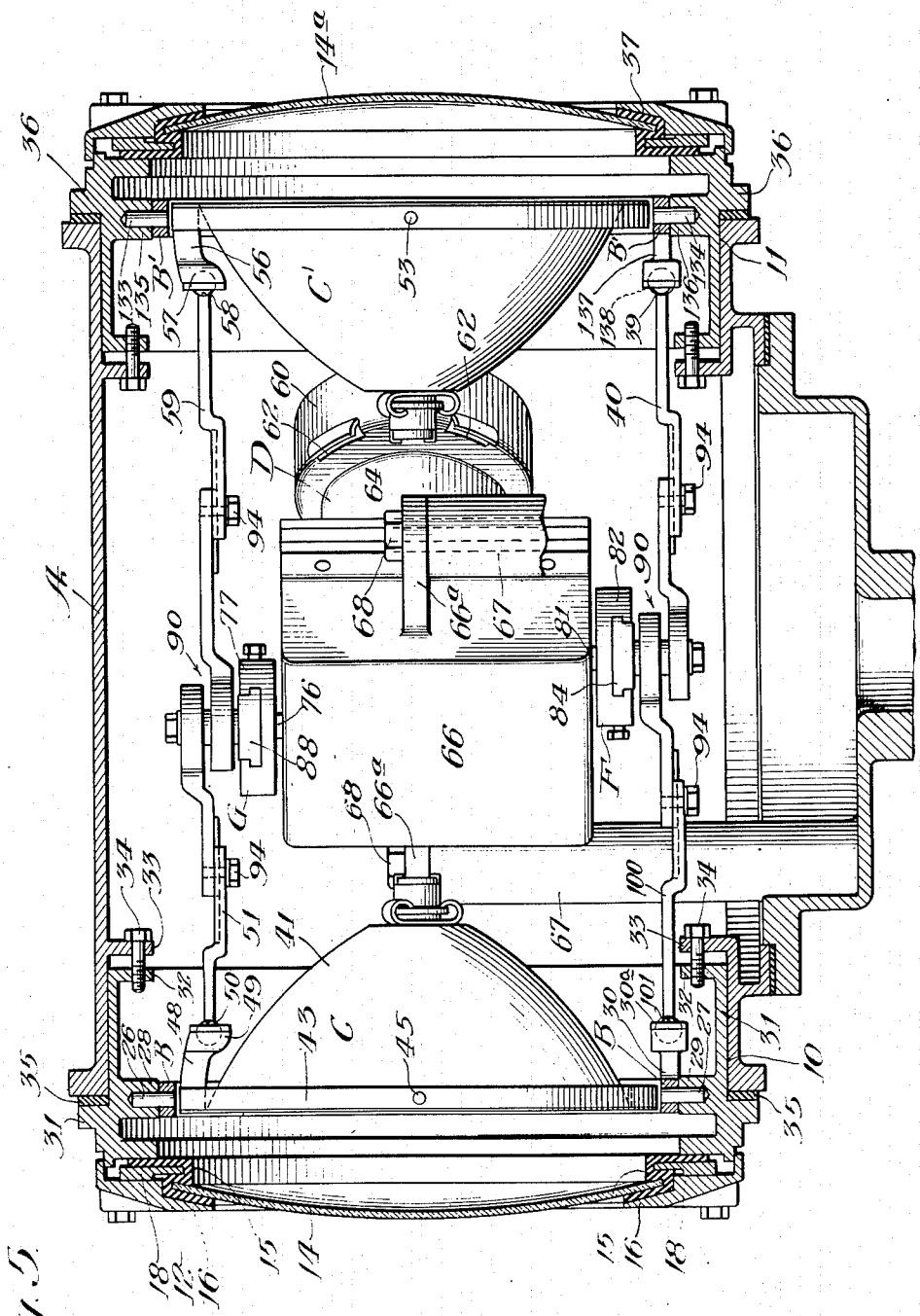


Fig. 5

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SIGNAL LAMP

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Fig. 6.

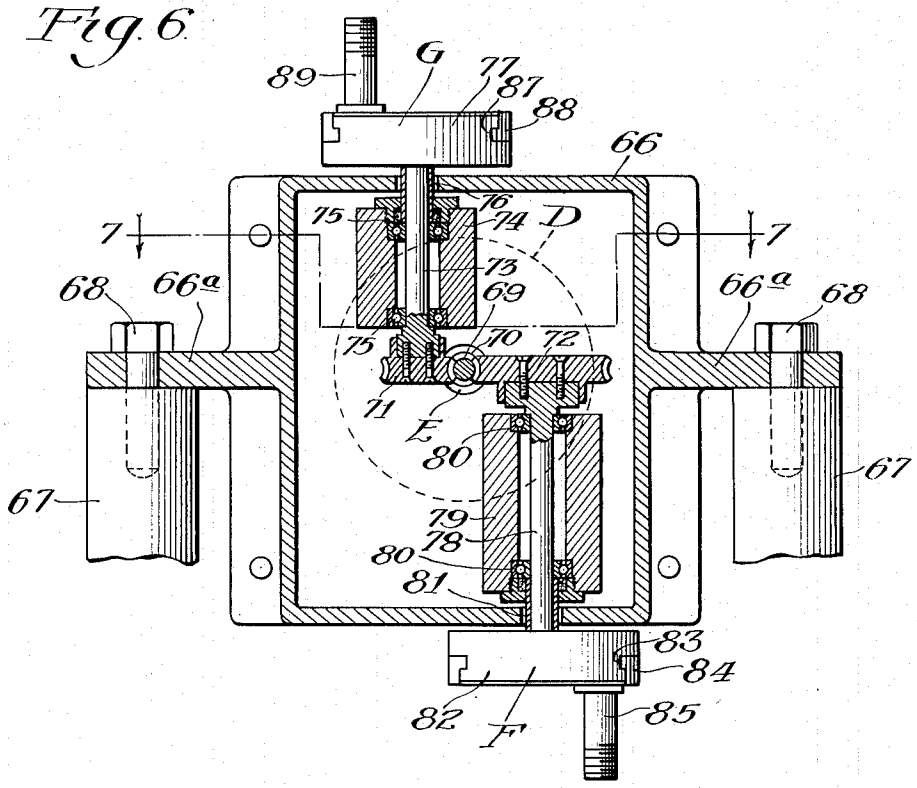
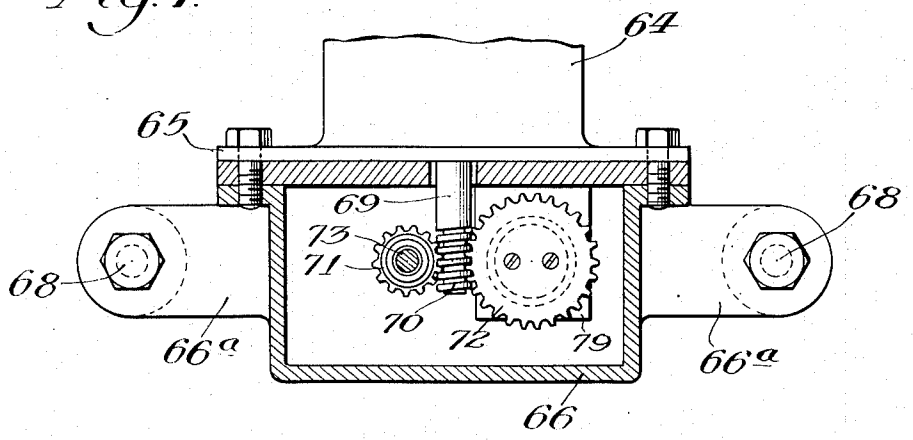


Fig. 7.



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SIGNAL LAMP

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Fig. 8.

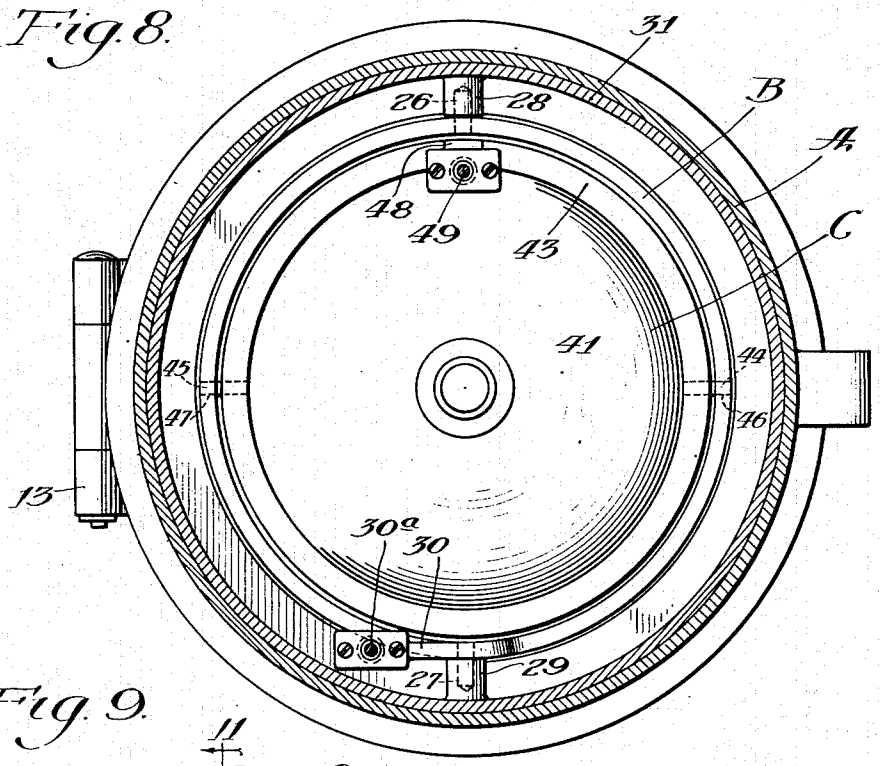


Fig. 9.

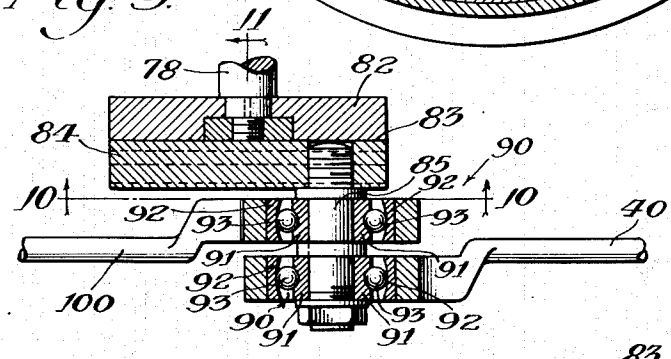


Fig. 10.

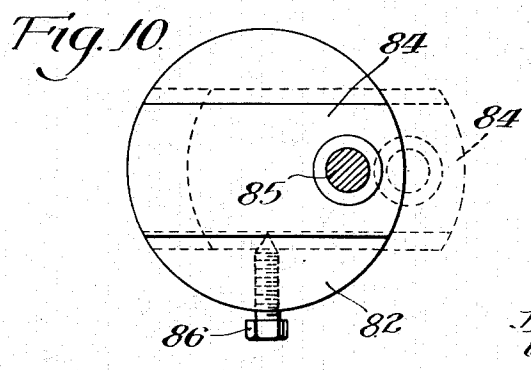
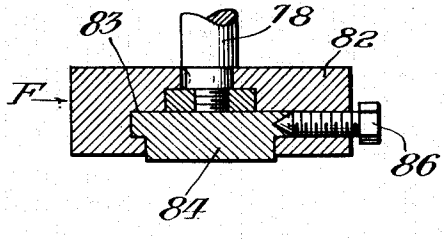


Fig. 11.



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Patented Nov. 12, 1940 2,221,483

UNITED STATES PATENT OFFICE

2,221,483

SIGNAL LAMP

Jeremiah D. Kennelly, Oak Park, Ill.

Application May 1, 1937, Serial No. 140,241

3 Claims. (Cl. 177—329)

This invention relates to a signal lamp, and more particularly to a signal lamp of the oscillating type which is suitable for use at railway and highway crossings to give warning of approaching and passing trains and for use on train cars, emergency vehicles, etc.

An object of the invention is to provide improved means for oscillating the beams of light so that a more conspicuous warning signal is given to the motorist approaching a railway crossing, such improved signal device being also useful upon the rear of a train, bus, car, emergency vehicle, etc.

Another object is to provide a lamp structure adapted to project beams of light down a highway in both directions from a railway crossing, the beams being oscillated in both vertical and horizontal planes. A further object is to provide light-projecting mechanism which is adapted to oscillate beams of light in more than one direction, and which is encased in a stationary frame structure adapted to be fixedly mounted in the angular space between the railway and the highway.

Still another object is to provide a signal lamp which is effective to give more vivid warning of a train which is passing at the crossing, and which illuminates the side of the passing train by a beam of light moving horizontally and vertically.

A preferred embodiment of the invention is shown in the accompanying drawings, in which—

Fig. 1 is a side view in elevation of the lamp fully assembled and mounted for use; Fig. 2, an end view in elevation of the lamp as shown in Fig. 1; Fig. 3, a detail plan view of the supporting bracket, the view being taken as indicated at line 3—3 of Fig. 1; Fig. 4, a plan sectional view taken as indicated at line 4—4 of Fig. 1; Fig. 5, an elevational sectional view taken as indicated at line 5—5 of Fig. 4; Fig. 6, an elevational sectional view of the drive gearing, the section being taken as indicated at line 6—6 of Fig. 4; Fig. 7, a detail sectional view taken as indicated at line 7—7 of Fig. 6; Fig. 8, a sectional view taken as indicated at line 8—8 of Fig. 4; Fig. 9, a detail view showing the crank arrangement here employed; Fig. 10, a detail view taken as indicated at line 10—10 of Fig. 9; and Fig. 11, a detail sectional view taken as indicated at line 11 of Fig. 9.

Mounted within the frame or casing A are the carrying rings B and B' which are pivoted at top and bottom, and mounted within rings B and B' are the light-projecting devices C and C', respectively, which are pivoted at each side. A motor D drives gearing E which actuates crank means F adapted to oscillate the carrying members B and B' about their vertical axes, and also actuates crank means G adapted to oscillate the devices C and C' about their horizontal axes.

The frame or casing A may be of any suitable construction, and may be cast of suitable material in the desired form. It provides two openings 10 and 11 facing different directions. Preferably the casing is so formed that light emerging squarely from these openings is projected at a wide diverging angle. The lamp is intended to be placed at the side of the highway, and the angle is necessary to allow the light beams to be projected across the highway.

At its bottom, casing A is provided with a short hollow standard 21[a] and flange 21, and is mounted in fixed position adjacent the railway crossing by bolting flange 21 to a flange 22 of the hollow bracket 23 which may extend from any fixed object. As shown by Fig. 3, flanges 21 and 22 may be secured by bolts 24 extending through them. The holes 25 in flange 22 may be arcuate to allow angular adjustment of the casing upon the bracket. Other means of supporting the frame may be employed as may be desired.

Fitted within opening 10 is a sleeve member 31 secured by means of lugs 32 and 33 and bolts 34, which means serves to draw the sleeve against washer 35 for forming a tight joint. A door 12 is attached to sleeve 31 on one side by the hinge 13 and is arranged to swing about hinge 13 to allow access to the casing through the sleeve member 31. The door 12 is provided with the glass lens 14 which is securely fastened within the door, the edge of the lens being enclosed in a lens gasket 15, which may be made of rubber or other resilient material. The frame of door 12 is composed of an outer rim 16 and ring 18. In the assembly of the door, lens 14 may be inserted into the inner circular socket of the lens gasket and ring 18 inserted within the outer socket. The outer rim 16 and ring 18 are then drawn together by small screws to securely bind the lens and the lens gasket. This structure provides a very firm joint which is water-tight and which at the same time imposes no strain on the lens.

Attached on the side of door 12 opposite hinge 13 is a latch or lock 20 for holding the door closed; a lock such as shown in Fig. 2, by which the door is locked to the main body of the casing, is preferable in order to prevent unauthorized persons from gaining entrance to the lamp. If

desired, the shields 19 and 19' may be attached adjacent each of the lenses.

A sleeve member 36, similar to member 31, is fitted within opening 11, and is secured in the same manner. The door 37, closing the outer end of sleeve 36, is preferably identical to door 12. The lens 14a may be of a different color from lens 14, if so desired.

Casing A houses within it the light-projecting devices and also the means by which these devices are oscillated. On the sides of the casing are manholes 95 and 96 having covers 97 and 98, respectively, which are secured by suitable bolts and gaskets. These manholes are provided to allow access to the casing for repair or adjustment of the oscillating mechanism.

The carrying member B comprises an annular ring which is equipped with pivot pins 26 and 27 at its top and bottom respectively. As shown more clearly in Figs. 5 and 8, this ring is mounted in casing A adjacent opening 10, and has its pins 26 and 27 received within the hollow bosses 28 and 29, respectively, which protrude inwardly from the top and bottom of sleeve 31. Member B is equipped also with a laterally projecting arm 30 which provides at its end portion a socket 30a adapted to receive the ball 101 of the connecting arm 100. It is readily seen that upon oscillating movement of connecting arm 100, the member B will be caused to oscillate angularly about an axis through pins 26 and 27.

Adjacent the opening 11, the carrying member B' is similarly mounted as is member B. Member B' has pins 133 and 134 which are received within bosses 135 and 136, and is equipped with laterally extending arm 137 providing socket 138 for receiving the ball 39 of connecting arm 40.

The light-projecting device C comprises a reflector 41 equipped with a suitable electric bulb 42 and electrically connected with a source of E. M. F. for projecting a beam of light. A reinforcing rim 43 encircles the edge of reflector 41 and is equipped at its sides with pivot pins 44 and 45, the ends of which are received in suitable holes 46 and 47 in the sides of member B. At its top, device C is provided with an extension 48 provided with a socket 49 which is adapted to receive the ball 50 of connecting arm 51. It is readily seen that upon oscillating movement of connecting arm 51, light-projecting device C will be caused to oscillate angularly about an axis through pins 44 and 45.

The light-projecting device C' is similarly mounted as is device C. It has pivot pins 52 and 53 which are received within holes 54 and 55 in member B'. It is provided with an extension 56 provided with a socket 57 which is adapted to receive the ball 58 of connecting arm 59.

It will be observed that members B and B' are each adapted to move about a vertical axis, and that light-projecting devices C and C' are each adapted to move about a horizontal axis.

The power means D for driving the oscillating mechanism comprises an electric motor of any suitable type. As here shown the motor is equipped with a ventilating casing 60 having inlet openings 61 and outlet openings 62 and inside of which is a cooling fan 63. The motor casing 64 has a flange 65 by which the motor is secured to the gear casing 66. As shown more clearly in Fig. 6, the gear casing 66 has laterally extending flanges 66a which rest on bosses 67 of the casing A. Bolts 68 extending through flanges 66a and into bosses 67 secure the gear casing 66 and the motor D to the frame structure.

The drive shaft 69 of motor D extends into gear casing 66 and is provided with a worm screw 70 engaging both of worm gears 71 and 72. Worm gear 71 is secured to a shaft 73 which is journaled in mounting 74 by bearings 75. The upper end of shaft 73 extends through opening 76 in the gear casing and is fixedly secured to the crank wheel 77. Worm gear 72, which may be larger and have a greater number of teeth than does gear 71, is fixedly secured to one end of shaft 78 which is journaled in mounting 79 by bearings 80. The lower end of shaft 78 extends through opening 81 in the gear casing and is fixedly secured to the crank wheel 82.

The construction of crank wheels 77 and 82 is clearly indicated in Figs. 9 to 11 of the drawings. As illustrated, the wheel 82 has a diametrical groove 83, and in this groove is a slidable piece 84 which is adapted to be moved longitudinally of the groove, and which is equipped with a crank pin 85 adjacent one end. A set screw 86 in wheel 82 is adapted to engage piece 84 and secure it in any desired position in groove 83.

Crank wheel 77 is constructed similarly as crank wheel 82. In wheel 77 is the slot 87 receiving slidable piece 88 equipped with a crank pin 89.

The upper crank pin 89 has the ends of connecting arms 51 and 59 pivotally secured to it through the joints 90 which are adapted to allow the arms to move also to positions inclined with the pin. The lower crank pin 85 has the ends of connecting arms 100 and 40 pivotally secured to it through joints of the type just described.

Joints 90 comprise the inner bushings 91 and the outer bushings 92 which are spaced by balls 93 between the bushings. It will be seen that as the light-projecting device C tilts upon its horizontal axis, the outer end of arm 51 must move downwardly, causing the arm to assume a position inclined with the axis of pin 85. Joints 90 are adapted to allow this type of motion without binding.

Each of connecting arms 51, 59, 100 and 40 are constructed of two pieces which are slidable with respect to each other and are secured together by such as bolts 94. Thus, the length of each of arms 51, 59, 100 and 40 is made adjustable for the purpose of regulating the limits of the angular oscillating movement of the light-projecting devices about their axes.

Operation

After being suitably mounted at the side of the highway and adjacent a railway crossing and electrically connected so as to be energized upon the approach of a train, the improved lamp gives warning to motorists in the following manner:

The bulbs of the light-projecting devices become energized and emit beams of light. Light may be projected by device C' down the highway in advance of the crossing, and light may be projected by device C toward and across the railway to give warning to the motorists approaching the crossing from the farther side.

At the same time, motor D becomes energized and through its shaft and worm screw 70 turns both of gears 71 and 72. Rotary motion of gear 72 is transmitted through shaft 78 to crank wheel 82, which through pin 85 serves to give a reciprocating motion to connecting arms 100 and 40. The reciprocating motion of arms 100 and 40, as before explained serves to oscillate the members B and B' about their vertical axes. Such

oscillation of members B and B' causes the oscillation of the light-projecting devices C and C' about these same vertical axes also, for these devices are carried by the carrying members B and B'.

Rotary motion of worm gear 71 is transmitted through shaft 73 to crank wheel 77, which through pin 89 serves to give a reciprocating motion to connecting arms 51 and 59. The reciprocating motion of arms 51 and 59, as before explained, serves to oscillate the devices C and C' about horizontal axes. Thus, operation of motor D serves to impart both vertical and horizontal oscillating movements simultaneously to each of the light-projecting devices C and C'.

The number of teeth on worm gear 71 may bear any desired relation to the number of teeth on worm gear 72, and different effects of light movement may be produced. For example, there may be the same number of teeth on gear 71 as on gear 72, in which case the beam of light projected might appear on a wall to traverse a substantially circular path; or, there may be twice as many teeth on gear 72 as on gear 71, in which case the path of the light might appear substantially as a figure 8; or other different effects may be produced by changing the gearing ratio just referred to.

One beam of light will sweep across the highway in advance of the railway, and this beam will also move up and down; and another beam of light will sweep across the highway at and beyond the crossing, and this beam of light also will move up and down. It is seen that before the train reaches the crossing, the motorists approaching the crossing from each side are warned by a light moving in all directions and covering the whole highway in its scope. When the train is passing at the crossing, one beam of light is sweeping the highway in advance of the crossing and the other one is illuminating an area on the side of the train. The moving lighted area serves as an additional warning to the motorist approaching in advance of the crossing.

It may be noted also, that as light-projecting device B' is being tilted so as to direct a beam of light nearer the surface of the highway, light-projecting device B is being tilted upwardly so as to direct its beam of light farther skyward. This opposite tilting movement of the two light-projecting devices is also noted in connection with the oscillating movement about the vertical axes. From this it is seen that the illuminating beam is directly in front of the motorist at an instant when the light beam directed toward him is not in his eyes to blind his sight. With this arrangement, at one instant a bright piercing light flashes into the motorist's eyes, and at the next instant this disappears and the passing train appears illuminated by a moving beam of light.

The signal device is particularly effective on the rear of a railroad train, bus, emergency car, or other vehicle.

The amplitude of oscillating movement in either vertical or horizontal direction may be changed by altering the position of the crank pins. For example, if it is desired to cause the light beams to move at greater horizontal amplitude, it is necessary only to loosen set screw 86 and move sliding piece 84 to push pin 85 farther from the center of the crank wheel 82. The amplitude of movement in a vertical plane may be increased similarly by moving sliding piece 88 in crank wheel 77 to push its pin farther from the center of this wheel.

Though in the foregoing description I have set out a very specific structure, it will be understood that many changes may be made in the construction without departing from the spirit of my invention.

I claim:

1. In a signal device of the character set forth for use with a highway and railway crossing, a frame, a plurality of light-projecting devices supported therein, said devices being so supported as to direct beams of light in two directions, one of said beams extending across the railway crossing for illuminating railway cars thereon and the other of said beams extending along the highway away from said crossing, and oscillating means for causing said light beams to move back and forth across said highway and said railway crossing, said means being also effective to cause said beams to oscillate in a vertical plane.

2. In a signal device of the character set forth for use with a highway and railway crossing, a frame, a light-projecting device supported in said frame and movable about an axis fixed in said frame, said device being movable also about an axis angularly related with said axis and adapted to project light down the highway in advance of the crossing, a second light-projecting device supported in said frame and movable about an axis parallel with said first-mentioned axis, said second device being movable also about an axis parallel with said angularly related axis and adapted to project light toward the crossing to illuminate railway cars thereon, and oscillating means for moving each of said devices about each of its axes, said means being effective for moving both of said devices in the same angular direction about at least one pair of parallel axes.

3. In a signal device of the character set forth for use with a highway and railway crossing, a frame, a plurality of light-projecting devices so arranged in said frame as to direct beams of light in two directions, one of said beams extending across the railway crossing for illuminating railway cars thereon and the other of said beams extending along the highway away from said crossing, means in said frame for mounting said light-projecting devices for rocking movement in a vertical plane and for oscillating movement in a substantially horizontal plane, means for rocking said light-projecting device to simultaneously cause one of said devices to rock upwardly and the other to rock downwardly, whereby when the first mentioned of said devices is rocked upwardly to illuminate the railway cars the other device is rocked downwardly to illuminate the highway adjacent the crossing and when the first mentioned device is rocked downwardly the second is rocked upwardly so that the beam extends along the highway in a path substantially parallel to the surface of the highway, and means for oscillating said light-projecting devices to move said beams of light in unison across said highway and said railway crossing.

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