

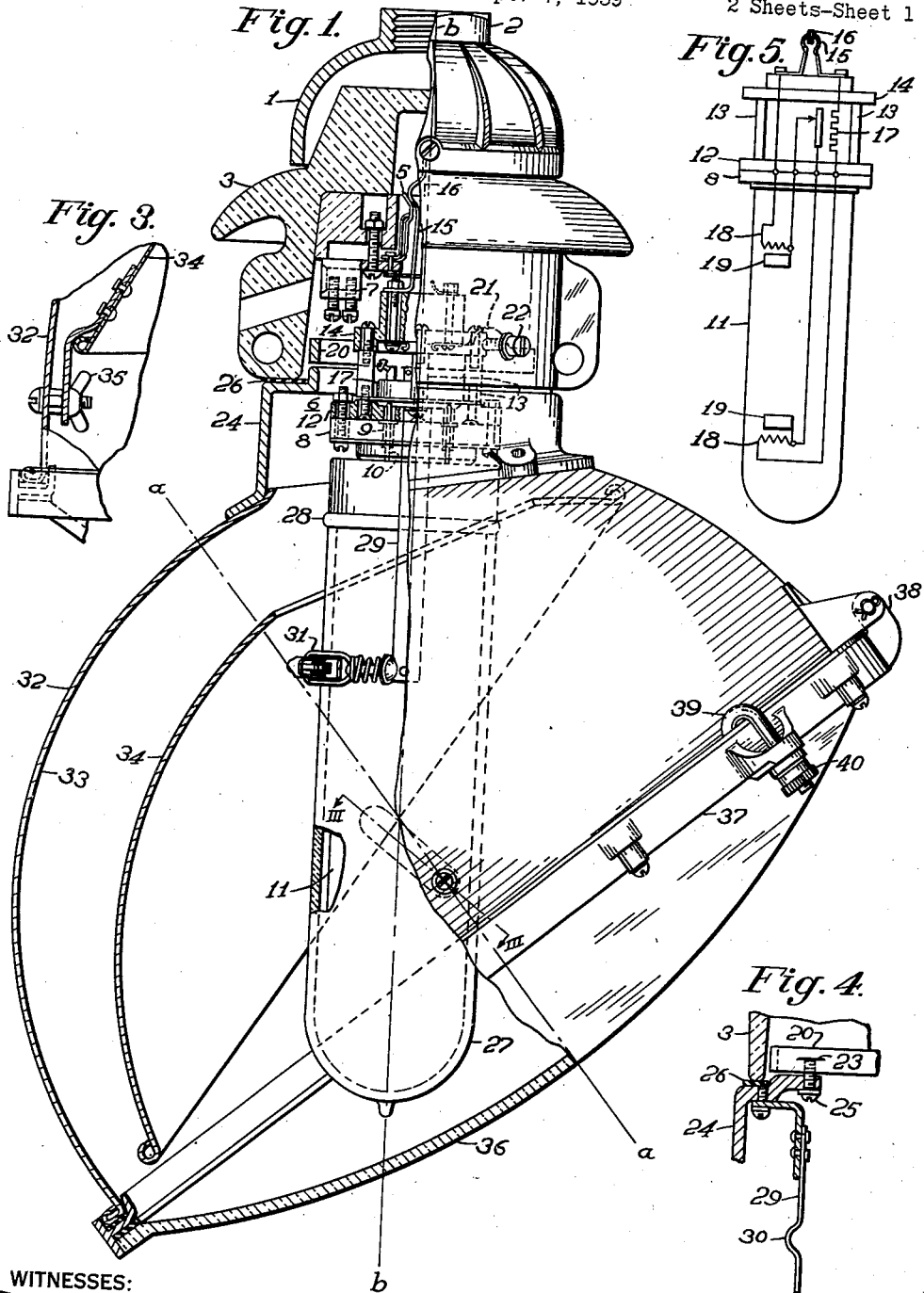
July 7, 1942.

I. A. YOST  
LIGHTING UNIT

2,289,160

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2 Sheets-Sheet 1



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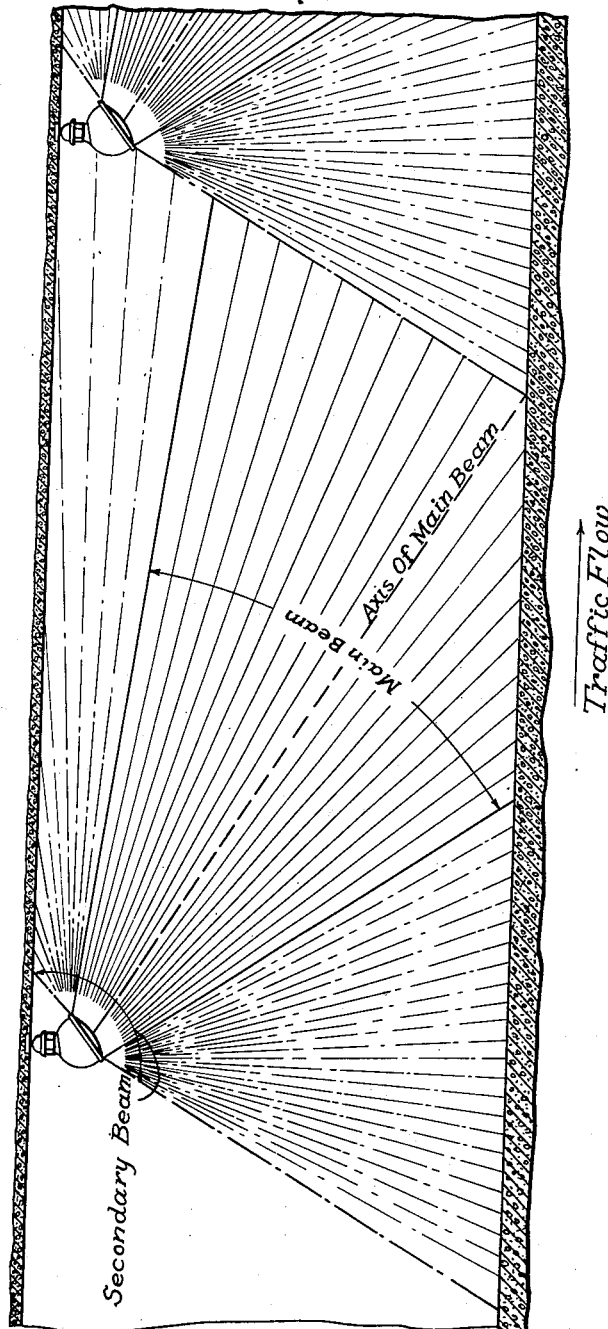
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Fig. 2.



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## UNITED STATES PATENT OFFICE

2,289,160

## LIGHTING UNIT

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3 Claims. (Cl. 240—25)

My invention relates, generally, to lighting units and more particularly, to luminaires of the pendant type, utilizing vapor-type lamps, such, for example, as the sodium vapor lamp.

The object of my invention, generally stated, is to provide a luminaire which shall be of simple and compact construction, economical to manufacture, install and maintain and which shall function to effectively illuminate the interior of a tunnel and the vehicles passing therethrough, roadways for one-way traffic, moving trains at railway crossings and the like.

A more specific object of my invention is to provide an enclosed luminaire of the angle type which may be mounted pendant from a suitable support in the form of a bracket or junction box and which is so constructed that it may be relamped and accessories replaced through a single opening.

A further object of my invention is to provide a luminaire of the above character which shall function to direct or concentrate a portion of the light produced thereby into a comparatively narrow main beam, the direction of which is adjustable vertically, for the purpose of lighting distant areas, and which also functions to direct a portion of the light produced thereby into a wide secondary beam for lighting the immediate foreground, side areas and areas behind the luminaire.

Another object of my invention is to provide a luminaire of the above character wherein the lamp socket, time-delay relay or thermostat utilized with vapor lamps, contact prongs for holding a film cutout and any other necessary accessories are assembled into a unitary structure which, together with the lamp, is removable as a unit for replacement of the lamp, relay or film cutout and other maintenance work.

A still further object of my invention is to provide a luminaire of the angle type wherein an inner auxiliary or secondary reflector is mounted for vertical adjustment with respect to the outer angle reflector whereby the main light beam produced by the luminaire may be directed at the desired angle.

Another object of my invention is to provide a luminaire of the pendant type in which an elongated light source may be mounted in a vertical position and the light produced thereby directed in the desired direction without tilting the luminaire and light source.

Still another object of my invention is to provide an enclosed luminaire of the pendant type comprised of an outer angle reflector, an auxiliary

or secondary reflector mounted therein for vertical adjustment and an elongated light source whereby the auxiliary reflector functions to direct a substantial portion of the light into a comparatively narrow main beam and the outer reflector functions to direct a portion of the light into a comparatively wide secondary beam.

These and other objects of my invention will become more apparent from the following detailed description when considered in conjunction with the drawings, in which:

Figure 1 is a side view partly in elevation and partly in section, of a lighting unit embodying the principle of my invention;

Fig. 2 is a diagrammatic representation of the light distribution from a luminaire embodying my invention when utilized in a tunnel for one-way traffic;

Fig. 3 is an enlarged view, partially in section, taken on line III—III of Fig. 1, illustrating details of mounting the auxiliary reflector within the angle reflector;

Fig. 4 is a fragmentary view in section, taken along the vertical axis *b—b* of the lighting unit showing details of the arrangement for supporting the reflector body adapter and vacuum flask for the lamp; and

Fig. 5 is a schematic wiring diagram showing the connections between the lamp and socket assembly.

Referring now to Fig. 1, which illustrates a preferred embodiment of my invention, a hood 1 is provided with a central threaded opening 2 for mounting the luminaire in a vertical plane *b—b* from a junction box or other suitable support (not shown), and is adapted to support a receptacle 3 which may be made of any insulating material, such as porcelain. This receptacle provides the necessary insulation between the conductors of the lighting circuit and ground, and also serves as a mounting for a pair of resilient contact clips 5, which receive and support a socket assembly 6, and binding posts 7 to which the line connections are made.

In other known types of lighting units utilizing vapor lamps, various operating elements such as the lamp and lamp socket, the film cutout for closing the circuit through the unit when a lamp burns out or is otherwise put out of service, and the time delay relay for starting the vapor lamp are usually mounted separately within the unit and are accessible only through several openings in the body of the unit. Such an arrangement of elements obviously causes much time to be taken in servicing the unit since it is seldom

possible from a cursory inspection to discover which of the various operating elements in the unit needs replacement.

In the interest of personal safety, and an increased efficiency in servicing these lighting units, I have provided a unitary socket assembly 6 comprising a time delay relay, lamp socket and film cutout, which, together with the lamp is removable as a unit through a single opening.

The unitary socket assembly 6 comprises a lamp socket 8 which is provided with a plurality of contact clips 9 for receiving the contact pins 10 on the base of a vapor lamp 11. The lamp socket 8 is mounted on an insulator 12, or, if desirable, the socket 8 and insulator 12 may be designed as a unit. Above the insulator 12 and spaced therefrom by a plurality of spacers 13, another insulator 14 is positioned, and carries a pair of resilient prongs 15 of the bayonet type for holding a film cutout 16 and for connecting the lamp 11 to the line contact clips 5. Between the two insulators 12 and 14, a thermostatic or time delay relay 17 is mounted in any suitable manner.

Electrical connections between the contact clips 9 of socket 8, time delay relay 17 and bayonet prongs 15 may be made by any suitable type of connectors in accordance with the schematic wiring diagram shown in Fig. 5. The contact element of the thermostatic relay 17 is shown in Fig. 5 in a closed position for starting the lamp 11. When the lamp has been heated to its proper operating temperature, the contacts of relay 17 open to interrupt the circuit of the cathodes 18 and establish the arc current between the anodes 19 of the vapor lamp 11 which ionizes the gas within the lamp to produce light.

A ring 20 for mounting a reflector body adapter 24 may also be provided having two or more upwardly extending lugs 21, and is assembled to the receptacle 3 by means of screws 22 which thread into the lugs 21 of the ring 20 through corresponding openings in receptacle 3. As shown in Fig. 4, the ring 20 is also provided with a plurality of inwardly extending lugs 23 to which the reflector body adapter 24 may be attached by means of screws 25. A gasket 26 may be placed between the top shouldered portion of the adapter 24 and the bottom face of the receptacle 3 in order to make the unit watertight and dust-proof as well as to keep out insects.

To keep the vapor lamp 11 at a proper operating temperature, a flask 27 open at the top thereof and having a bead 28 at its top portion is slipped over the lamp 11 and may be fastened in position thereon by means of a pair of oppositely disposed resilient straps 29, which are notched at 30 for corresponding engagement with the bead 28 of the flask 27, in cooperation with a semi-circular spring latch member 31 which holds the straps 29 snugly against the side walls of the flask. When it is desired to replace the lamp 11, the latch 31 is unfastened, allowing the straps 29 to spread and the flask to be released. The lamp 11 and socket assembly 6 may then be removed as a unit from the receptacle 3 and a new lamp and socket assembly inserted therein.

An outer reflector 32, which is substantially of bowl-like shape, is positioned with its axis at  $a-a$ , and may be fastened to the reflector adapter 24 by any suitable means, such as by spot welding or with rivets.

An opening, concentric with axis  $b-b$  is provided in the top of the reflector 32 to permit lamp and socket installation, and its inner surface 33 is preferably coated with a light diffusing finish.

In order to obtain a comparatively narrow main beam, the angle of which is adjustable, for lighting up distant areas, I provide within the reflector 32, a highly polished or mirror-like inner or secondary reflector 34 which may be pivotally mounted on the side walls of the reflector 32 by means of a pair of oppositely disposed bolt and wing nut assemblies 35, the details of which are shown in Fig. 3. Like the reflector 32, the inner reflector 34 is also provided with an opening concentric with axis  $b-b$  to permit lamp and socket installation and also to permit adjustment of inner reflector 34 about the pivot assembly 35.

To make the lighting unit weatherproof and exclude insects, I prefer to provide a convex glass cover 36 which may be mounted in a frame 37, this cover assembly being preferably pivotally connected to the top portion of reflector 32 by means of a hinge 38. A plurality of hook bolts 39 and knurled thumb nuts 40 may be spaced around the frame 37, and serve to hold the cover glass assembly tightly against the edge of the reflector 32.

In order to obtain the desired light distribution in accordance with the principles of my invention, an example of which is shown in Fig. 2 wherein a plurality of such units are employed in the illumination of a tunnel for one-way traffic, the vapor lamp 11, which emits light throughout substantially its entire length, is so mounted that its lower end extends within the area enclosed by the concave portion of the glass cover 36. This results in direct light from the lamp 11 over a wide secondary angle or beam for lighting the immediate foreground, side, and ceiling areas and also a limited area to the rear of the unit.

The top portion of reflector 32 between the front or leading edge of the secondary reflector 34 and the front edge of reflector 32, which, as hereinbefore explained, is provided with a light diffusing finish, directs additional light into the wide secondary beam.

A substantial portion of the light output from the lamp 11 is collected by the secondary reflector 34 and projected forwardly and downwardly in a comparatively narrow primary or main beam, and when used for tunnel lighting, serves to build up the illumination along the roadway towards the next unit, and to provide a high degree of vertical illumination on the backs of vehicles passing through the tunnel. As hereinbefore explained, reflector 34 is pivotally mounted and can be adjusted to various vertical angles to allow the direction of the primary beam to be suitably changed, such as, for example, to accommodate variations in mounting heights and spacings between the lighting units when a plurality of such units are used.

Also, when lighting units embodying my invention are employed in the illumination of roads for one-way traffic, it will be apparent that most of the light output of the lamp will be shielded from the eyes of the operators of approaching vehicles, by the angle type outer reflector 32, the distance illuminated to the rear of the unit being determined by the intersection with the ground line of a plane passed through the lowest point of the luminaire which is opposite the hinge member 38, and the bottom of light source 11.

In conclusion, it will be understood that the particular embodiment described and shown in the accompanying drawings is illustrative only, and that various changes and modifications may be made therein without departing from the spirit

and scope of my invention as set forth in the appended claims.

I claim as my invention:

1. In a pendant-type lighting unit, the combination comprising an inverted bowl-shaped main reflector, and an elongated tubular lamp of the vapor type vertically supported within said reflector, the axis of said reflector being disposed at an angle to the vertical axis of said lamp, a portion of said lamp being extended to a point between the plane defined by the outer edges of said reflector and a plane passing through the lowest point of said reflector normal to the vertical axis of said lighting unit, and a relatively large secondary reflector mounted within the main reflector and having an opening to receive the lamp, said opening being longer than the diameter of the lamp, and means on opposite sides of the secondary reflector for pivotally attaching the secondary reflector to the opposite sides of the main reflector for tilting movement about a horizontal axis, whereby the secondary reflector may be adjustably positioned in a vertical plane, said secondary reflector functioning to produce a relatively concentrated main beam of light in addition to a broad secondary beam projected directly by the lamp.

2. In a lighting unit, in combination, a hood, a receptacle supported by the hood, an inverted bowl-shaped main reflector provided with a reduced neck portion and supported by said receptacle with its axis disposed at an angle from the vertical axis of said lighting unit, an elongated tubular lamp of the vapor type mounted vertically within said main reflector, the lower end of said lamp extending downwardly to a point

below the plane defined by the outer edges of said main reflector, said extended portion functioning to illuminate an area rearwardly of said unit, and a secondary reflector having an opening through which the lamp extends mounted within said main reflector, said secondary reflector being adjustably mounted on pivotal supports attached to opposite sides of the main reflector and functioning to receive and redirect a substantial portion of the light output downwardly and forwardly of said lighting unit in a vertically adjustable main beam.

3. In a lighting unit for the illumination of one-way vehicular roadways, in combination, a bowl-like reflector, the axis of said reflector being disposed at an angle to the vertical axis of said lighting unit, a concave glass cover for said reflector, a tubular vapor type light source mounted on the vertical axis of said unit within said reflector, a portion of said light source extending to a point within said concave cover, and a secondary reflector having an opening therein through which the light source extends adjustably supported within said bowl-like reflector for tilting movement about an axis at right angles to the axis of the light source, whereby a substantial portion of the light output from said source is received and redirected by said secondary reflector in a vertically adjustable narrow beam of high intensity along said roadway forwardly of said lighting unit, a broad secondary beam being produced directly from said light source for lighting side areas, immediate foreground and a limited area rearwardly of said lighting unit.

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