Jan. 12, 1960 W. B. ELMER 2,921,181

STREET LIGHTING LUMINAIRE

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FIG. 1

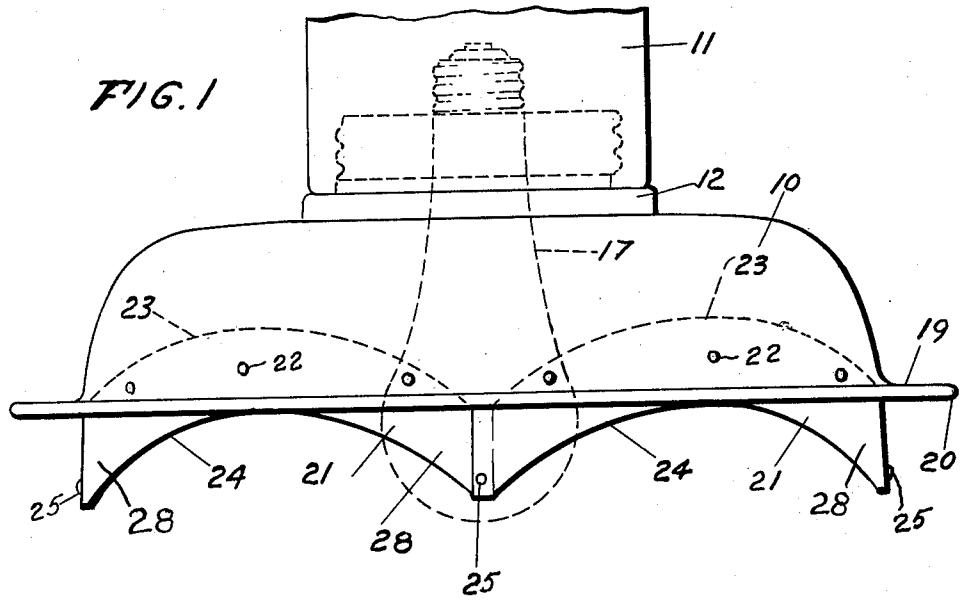


FIG. 3

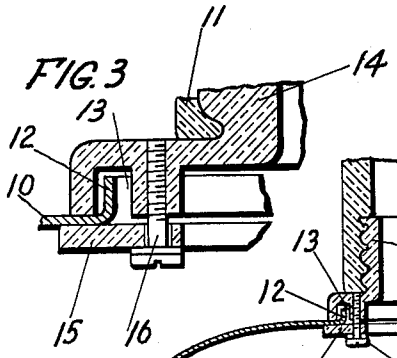


FIG. 2.

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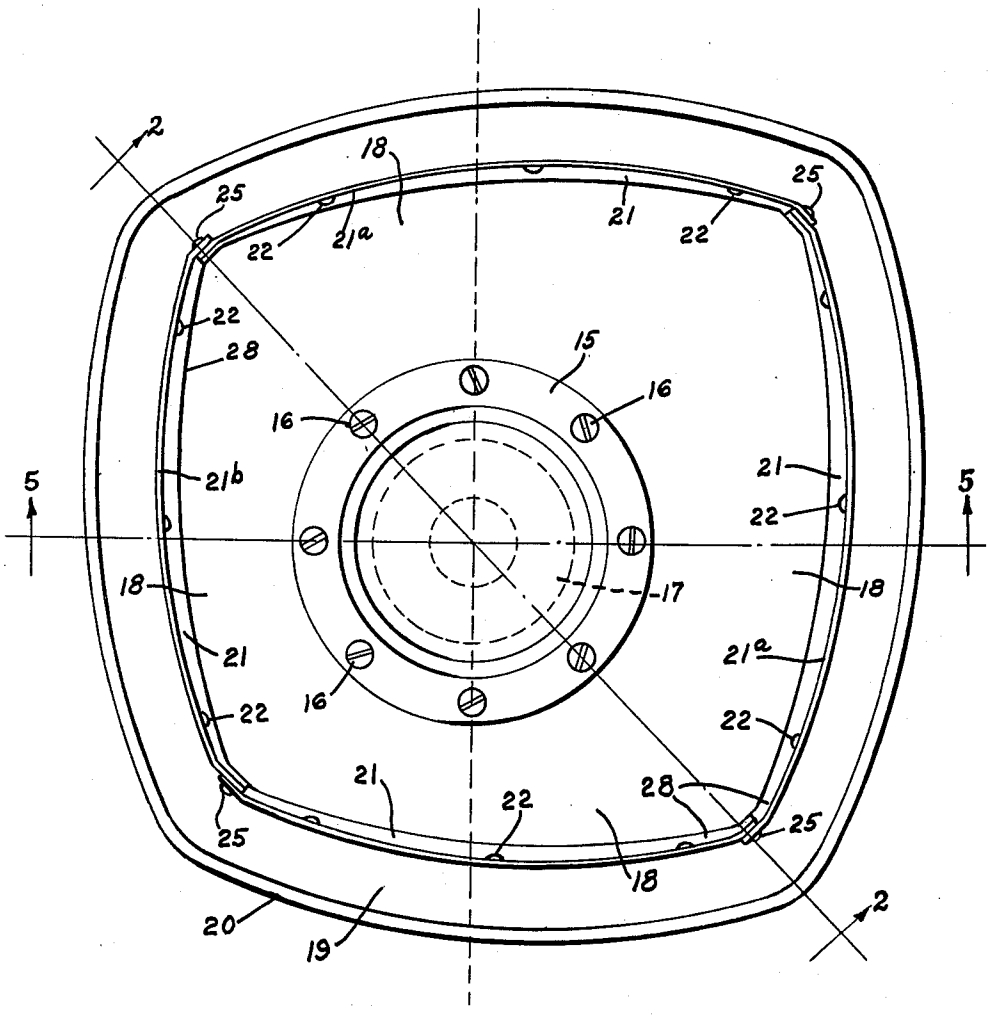
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FIG. 4.



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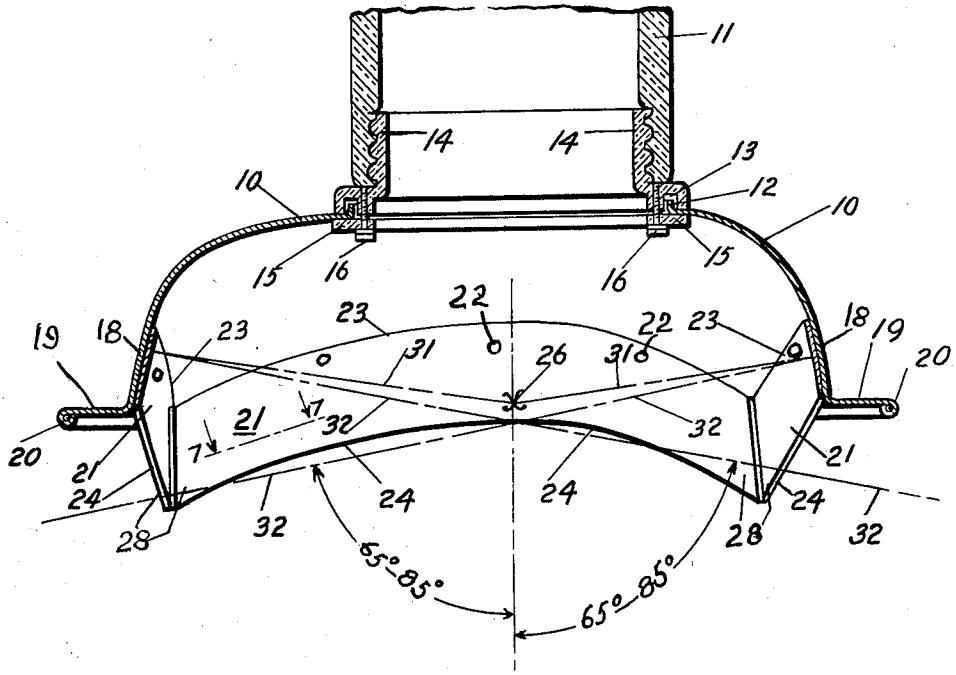
STREET LIGHTING LUMINAIRE

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FIG. 7



FIG. 5



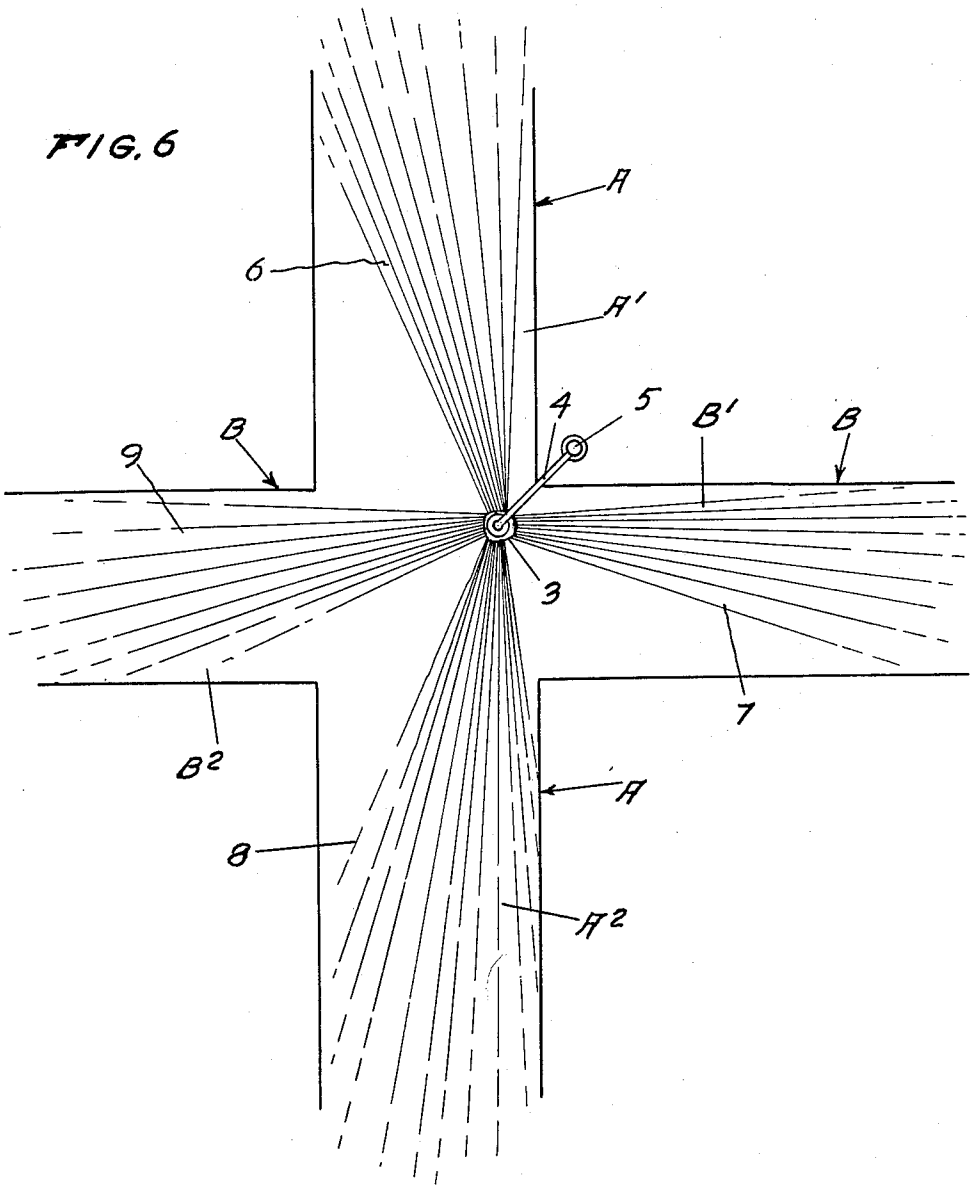
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STREET LIGHTING LUMINAIRE

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FIG. 6



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2,921,181

STREET LIGHTING LUMINAIRE

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Application October 24, 1957, Serial No. 692,112

5 Claims. (Cl. 240—25)

This invention relates to street lighting luminaires and especially to a luminaire designed for use at street intersections.

One object of the invention is to provide a luminaire of this type which is constructed to divide the light emanating from the light source into separate light beams, one for each of the street sections radiating from the intersection, each light beam being directed in the lengthwise direction of the corresponding street section.

Another object of the invention is to provide a luminaire of this type which not only directs beams of light onto and along the direction of each street section radiating from the intersection, but also serves to shield from direct illumination any buildings which are on the corners of the intersection.

Other objects of the invention are to improve street lighting luminaires for street intersections in the particulars hereinafter referred to.

In the drawings wherein I have shown one embodiment of my invention:

Fig. 1 is a side elevation of a street lighting luminaire designed for use in an intersection in which two streets cross each other at right angles;

Fig. 2 is a section on the line 2—2, Fig. 4;

Fig. 3 is a fragmentary detail showing the way in which the reflector of the luminaire can be connected to the reflector support;

Fig. 4 is an under side view of a four-way luminaire embodying the invention, that is, a luminaire designed to be used at an intersection in which two streets cross each other at right angles;

Fig. 5 is a section on the line 5—5, Fig. 4;

Fig. 6 is a diagrammatic view illustrating the manner in which the luminaire herein illustrated operates to illuminate the radiating street sections; and

Fig. 7 is a section through one of the reflecting strips on the line 7—7, Fig. 5.

Referring to Fig. 6 wherein my luminaire is illustrated as illuminating two streets A and B which intersect each other at right angles, 3 indicates a luminaire embodying the invention which is shown as mounted on an arm 4 extending from a supporting pole 5. The luminaire is constructed so that it directs a beam of light in the direction of each of the four streets sections A^1, A^2, B^1, and B^2. In other words, the luminaire directs a light beam indicated at 6 lengthwise of the street section A^1, another beam of light 7 along the direction of the street section B^1, a third beam of light 8 along the direction of the street section A^2, and a fourth beam of light 9 along the direction of the street section B^2.

The luminaire includes a reflector element 10 which is of special construction, as will be presently described, and which is shown as supported by a reflector support 11. The reflector is secured to the reflector support so that it can be turned about a vertical axis relative thereto for the purpose of properly orienting the luminaire to conform to the type of street intersection at which it is to be used. Any suitable way of securing the reflector

to the reflector support to accomplish this end may be employed. As herein shown the reflector body, which has the usual opening for the light source, is provided with an upturned flange 12 bounding the opening, and this flange is received in an annular groove 13 formed in a collar member 14 which has screw threaded engagement with the reflector support 11. The reflector body is held in position by means of a clamping ring 15 which underlies the edge of the opening in the reflector and which is clamped to the collar by means of clamping screws 16. This manner of connecting a reflector to its reflector support is commonly used and forms no part of the present invention.

The light source is indicated at 17 and may be mounted in any suitable socket member (not shown).

The reflector body 10 is constructed to present at its sides a plurality of relatively flat side sections 18, one such side section for each of the radiating street sections at the intersection where the luminaire is to be used. In the embodiment shown there are four such side sections so that when the luminaire is viewed from beneath or from above, it presents a four sided outline.

Each side section 18 is curved outwardly slightly from one end to the other and any two adjacent side sections form between them an angle representing the corner of the four-sided outline.

The lower edge of the reflector body is shown as bent outwardly to form a peripheral horizontal flange 19, the edge of which may be curled as shown at 20 to form an annular bead. This flange has for its purpose to reinforce the reflector body sufficiently so that it will maintain its angular shape.

Some or all of the side sections of the reflector body have on the interior of their lower edge portions a specular reflecting zone which extends from one end to the other of the side section, and in the illustrated embodiment of the invention shown each of the side sections is thus provided with a specular reflecting zone.

Such specular reflecting zones may be provided for in any suitable way and as herein illustrated each specular reflecting zone is formed by the inner reflecting surface of a specular reflecting strip 21 which is secured to the side section on the inside thereof. Each reflector strip 21 extends the full length of the corresponding relatively flat side section of the reflector body and the reflector strips for the adjacent flat sides meet each other at the corners of the reflector. These reflector strips thus form a continuous specular reflecting zone extending clear around the reflector body.

Each reflector strip is shown as being curved slightly in the direction of its length to conform to the slight curvature of the side section of the reflector to which it is attached, and each reflector strip may be secured to the reflector body by means of rivets 22 or by any other desirable means.

In the construction shown each reflector strip has a convexly curved upper edge 23 and a concavely curved lower edge 24, and it is of substantially the same width from one end to the other. Each reflector strip is preferably straight from one curved edge to the other. It may also be provided with very shallow flutes or corrugations 40 as illustrated in Fig. 7.

The reflector strips are so constructed that when installed the lower edge 24 of each strip at its central portion is substantially flush with the bottom edge of the reflector body, while at each end of each strip the top edge 23 thereof is substantially flush with the bottom edge of the reflector body, as shown in Figs. 1 and 2.

With this construction the end portions 28 of two adjacent reflector strips will be situated below the lower edge of the reflector body and will have an angular relation, while at the central portion of each reflector strip

the entire strip is located within the reflector body. The overlapping ends of adjacent reflector strips may be secured together by means of screws **25** in any other suitable way.

The width direction of each reflector strip has a slight inclination to the vertical, as best seen in Fig. 2, and this inclination is such that the direct light which strikes the inner reflecting face of any reflector strip is reflected downwardly at an angle of approximately 65°–85° from the vertical, as shown in Fig. 5.

The lengthwise curvature of each reflector strip is on the order of a parabolic curve and is such that direct light which is received thereby is reflected in the form of a beam, and when the luminaire is properly installed at an intersection, as shown in Fig. 6, each beam will be directed lengthwise of one of the street sections radiating from the intersection. The vertical shallow fluting of each reflector strip serves to spread slightly the light beam reflected thereby. The interior surface of the reflector body above the reflector strips is preferably provided with a light diffusing characteristic. If the reflector body is made of porcelain enameled steel the porcelain surface will provide the desired light diffusing characteristic. Reflector bodies for street luminaires are sometimes made of polished aluminum and in such case the light diffusing reflecting surface for the central portion of the inside face of the reflector may be obtained by sand blasting the aluminum.

The light source **17** will preferably be so supported that its center is approximately in the plane of the lower edge of the reflector body, as shown at **26** in Fig. 2. When the luminaire is properly installed at a street intersection, each reflector strip will be facing one of the radiating street sections and the depending end portions **28** of the reflector strips will be facing the corners of the intersection. These depending end portions project below the center **26** of the light source and thus shield any buildings on the corners from direct light from said light source. If the reflector body is made of polished aluminum, then the polished aluminum surface of the lower edge portion of each side section may constitute the specular reflecting zone, and by properly shaping the side sections the reflector body will thus have four specular reflecting zones by which the direct light from the light source is divided into four beams which can be used for illuminating four street sections radiating from the intersection.

If the specular reflecting zone of each side section is located entirely within the reflector body, then the reflector would not produce any means for shielding the corners of the intersection as is the case where specular reflecting strips of the shape shown in Figs. 1, 2 and 5 are used.

While I have shown herein a luminaire embodying my invention designed for a street intersection having four radiating street sections, yet the invention is adapted for use in connection with street intersections that have only three radiating street sections, or street intersections which have five or six radiating street sections. If a luminaire were to be used at an intersection that had only three radiating street sections, then the reflector body would be formed with only three relatively flat side sections and only three of the reflector strips which would have the same angular relation to each other as that of the three street sections. On the other hand, if there were five street sections radiating from the intersection, then the luminaire for such a situation would be provided with five relatively straight side sections and five reflector strips, each reflector strip being placed so that it would face one of the radiating street sections.

It will be noted that two of the side sections **18** of the reflector body are longer than the other two side sections. This is best shown in Fig. 4 wherein the two side sections having the reflecting strips **21***a* are longer than the other two side sections having the reflecting strips **21***b*. If the luminaire herein illustrated is designed to be mounted on a pole at the corner of the intersection, as illustrated in Fig. 6, the reflector body will be made with the reflector support **11** centered where the two diagonal lines **36** and **35** cross each other, as shown in Fig. 4.

If, however, the luminaire is intended to be supported on cross wires over the center of the street intersection, then the reflector body would be made with the reflector support **11** at a point above the position shown in Fig. 4. With the mounting illustrated in Fig. 4 the four light beams shown in Fig. 6 will all be of practically the same brilliance.

Where the luminaire is mounted on a corner pole, as illustrated in Fig. 6, the reflector body should be so oriented that the shorter reflector strips **21***b* will reflect the beams of light **8** and **9** while the longer reflector strips **21***a* will reflect the beams of light **6** and **7**.

In the case of a street intersection in which the streets do not cross each other at right angles and one street is of greater importance than the other, it would be possible to obtain fairly satisfactory illumination for the intersection by placing the four-sided luminaire herein shown so that two oppositely disposed reflector strips will illuminate the two radiating sections of the street of greater importance and eliminating the other two reflector strips. With this arrangement the bare lamp will illuminate a broad angle and actually serve a useful purpose in providing illumination for the two street sections of lesser importance.

I claim:

1. A street lighting luminaire for use at a street intersection from which at least three street sections radiate, said luminaire having a dome-shaped reflector body having a plurality of connected relatively flat side sections, one for each street section which radiates from the intersection, which side sections have the same angular relation to each other as that of said street sections, each side section being curved outwardly slightly in a horizontal plane from one end to the other, a light source within the reflector body, a specular reflecting strip on the inner face of each of said side sections at the lower portion thereof, each specular reflecting strip having a convexly curved top edge and a concavely curved bottom edge and being of a length to extend from one end to the other of the side section, means attaching each reflecting strip to its side section in a position with the central portion of the reflecting strip located within the reflector body and the end portions depending below said reflector body, the adjacent ends of adjacent reflecting strips meeting each other whereby the reflecting strips together form a continuous endless reflecting surface, each reflecting strip being positioned to reflect direct light from the light source in a beam directed at an angle of 65° to 85° from the vertical, and means supporting said luminaire at said street intersection in a position in which the beam of light reflected from each specular reflectng strip is directed onto and in the lengthwise direction of a street section radiating from the street intersection.

2. In a street lighting luminaire for use at a street intersection in which two streets cross each other, a dome-shaped reflector body having four relatively flat side sections each of which is curved outwardly slightly in a horizontal plane to present substantially a parabolic curve from one end to the other, a light source within the reflector body, a specular reflecting strip on the inside face of each of said side sections, each reflecting strip presenting a generally parabolic curve in the direction of its length and having a convexly curved upper edge and a concavely curved lower edge, means securing each reflecting strip to the inside face of a said side section of the reflector body with the lower edge of the central portion of the reflecting strip substantially

flush with the lower edge of the reflector body and with the end portions of said reflecting strip depending below the lower edge of the reflector body, each reflecting strip presenting a straight surface in a direction from its top edge to its bottom edge, which surface is positioned to reflect direct light from the light source in a beam directed at an angle of 65° to 85° from the vertical, and means supporting said luminaire in a position in which the beam of light reflected from each specular reflecting strip is directed onto and in the lengthwise direction of a street section radiating from the intersection.

3. A street lighting luminaire for use at street intersections as defined in claim 2 in which the lower edges of all of the side sections of the reflector body are in the same horizontal plane and means are provided for connecting together the adjacent depending ends of the adjacent reflecting strips.

4. A street lighting luminaire for use at a street intersection having three or more street sections radiating therefrom, said luminaire having a dome-shaped reflector body providing a plurality of separate but connected relatively flat side sections, one such side section for each of said radiating street sections, each two adjacent relatively flat side sections meeting at an angle which is substantially the same as the angle between the corresponding radiating street sections, a light source within the reflector body, the lower edge portion of each side section having a specular reflecting zone which extends the full length of such edge portion, each end of each specular reflecting zone meeting the adjacent end of the specular reflecting zone on an adjacent side section, the reflecting edge portion of each side section being positioned to reflect direct light from the light source in a condensed beam directed at an angle of 65–85 degrees from the vertical, and means supporting the luminaire at said street intersection in a position in which the condensed light beam reflected from each reflecting zone is directed onto and in the lengthwise direction of the corresponding street section.

5. A street lighting luminaire for use at a street intersection in which two streets cross each other thereby providing four radiating street sections, said luminaire having a dome-shaped reflector body presenting four relatively flat side sections, one such side section for each of the radiating street sections, each two adjacent side sections meeting at an angle to each other which is substantially the same as the angle between the corresponding two radiating street sections, a light source within the reflector body, a specular reflecting strip secured to the inner face of the lower portion of each side section and extending from one end to the other thereof, each specular reflecting strip being positioned to reflect direct light from the light source to produce a beam of light directed at an angle of 65–85 degrees from the vertical, each end of the reflecting strip carried by any side section meeting the ends of the reflecting strips carried by the adjacent side sections, each reflecting strip reflecting light from the light source in a beam directed onto and in the lengthwise direction of the corresponding radiating street section.

References Cited in the file of this patent

UNITED STATES PATENTS

743,687	Burnham	Nov. 10, 1903
1,153,443	Pole	Sept. 14, 1915
1,728,762	Horni	Sept. 17, 1929
2,366,356	Rolph	Jan. 2, 1945
2,647,202	Elmer	July 28, 1953
2,721,931	Franck	Oct. 25, 1955
2,727,980	Farber	Dec. 20, 1955

FOREIGN PATENTS

448,645	Great Britain	July 12, 1936