

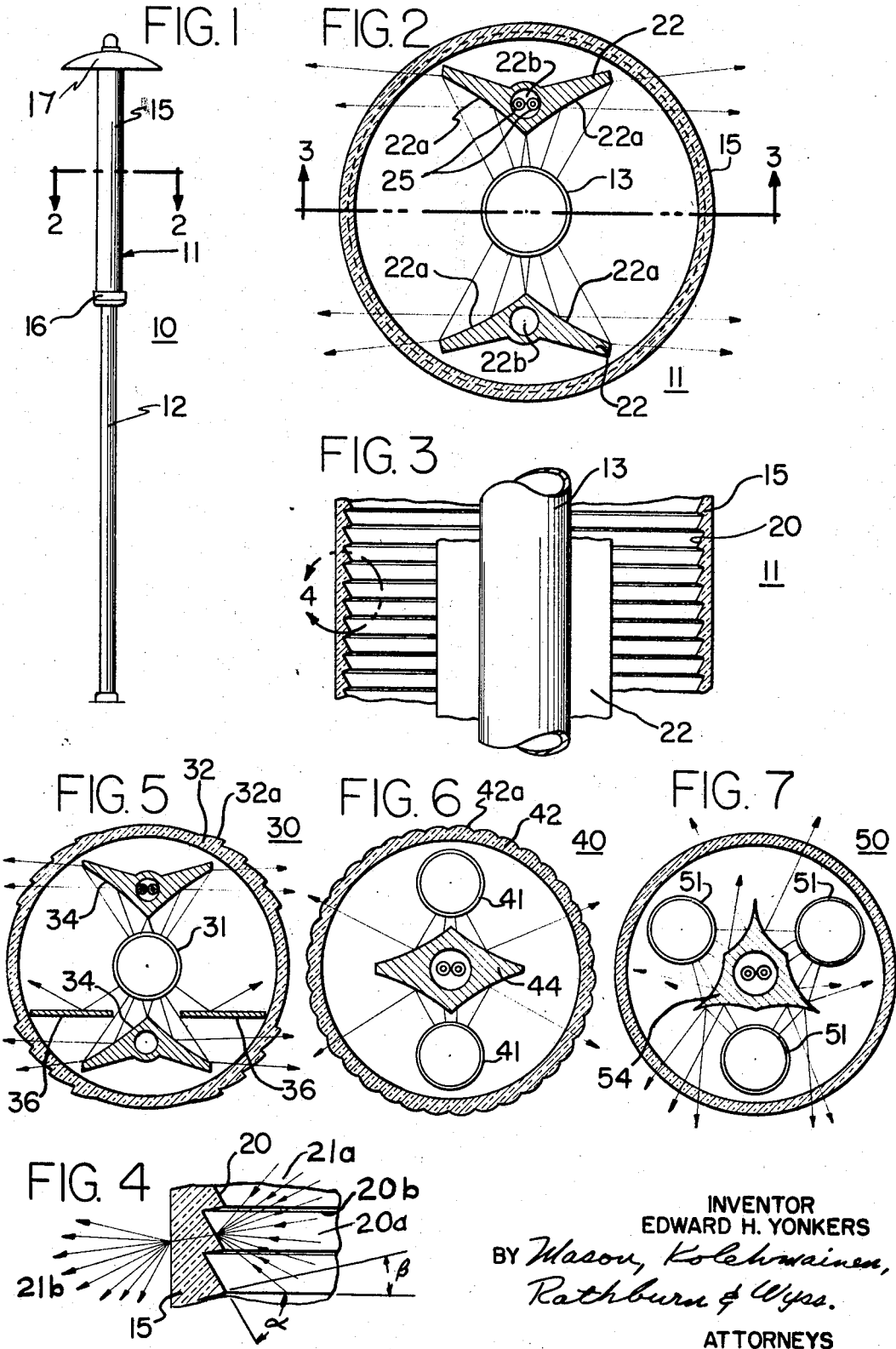
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LUMINAIRE

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LUMINAIRE

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The present invention relates to luminaires, and more specifically, to an outdoor lighting luminaire suitable for street lighting and other outdoor lighting applications.

Heretofore tubular electric lights, such as the low pressure fluorescent type or elongated incandescent type, are in common use in outdoor lighting applications. Such tubular lamps are frequently hung in a generally horizontal direction cantilevered from the end of a support or otherwise supported from a luminaire post inclined to the vertical. Such extending luminaires present structural difficulties in the design of the supporting structure or post. Additional difficulties are presented by such extending luminaires in the utilization of the light output from the top or back side of the lamp.

High pressure mercury vapor luminaires are also in common use in outdoor lighting applications. Such mercury vapor lamps have a very high surface brightness. The high surface brightness of the mercury vapor lamp is uncomfortable upon the eyes and is particularly undesirable in parks and plazas where people congregate. Moreover the relatively short length of the mercury vapor radiator causes harsh shadows without any light penetration.

Accordingly, it is an object of the present invention to provide a new and improved outdoor lighting luminaire.

Another object of the present invention is to provide an outdoor lighting luminaire including a tubular lamp wherein the lamp extends vertically from the top of a luminaire post.

Another object of the present invention is to provide an outdoor lighting luminaire which overcomes the above mentioned difficulties.

Still another object of the present invention is the provision of a new and improved outdoor lighting luminaire wherein the light emitted from the back side of the lamp may be readily utilized.

Still another object of the present invention is the provision of a new and improved outdoor lighting luminaire having a light output equal to that of a mercury vapor luminaire, but having a reduced surface brightness as compared to a conventional mercury vapor luminaire.

Yet a further object of the present invention is to provide an outdoor lighting luminaire which is inexpensive to manufacture and install, and which is structurally strong, and, consequently, sturdy under adverse wind and other weather conditions.

Yet a further object of the present invention is the provision of a new and improved outdoor lighting luminaire wherein the light distribution may be readily controlled.

Further objects and advantages of the present invention will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

In accordance with these and many other objects of the present invention, there is provided an outdoor lighting luminaire of the type employing a vertically positioned, tubular electric lamp extending from the top of a luminaire post. A vertically positioned, elongated cylindrical refractor, closed at its upper and lower ends, encloses the lamp. In a preferred embodiment of the invention, the tubular lamp is of the low pressure electric

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type commonly referred to as a fluorescent lamp. The outer refractor may be provided with suitable refractor elements on its inner or outer surfaces to provide control of lateral or vertical light distribution. Moreover, in a preferred embodiment of the invention, there is provided suitable vertically extending elongated reflector means within the refractor for further controlling the lateral light distribution from the lamp.

For a better understanding of the present invention, reference may be had to the accompanying drawing, wherein:

FIGURE 1 is an elevational view of a luminaire according to the present invention;

FIGURE 2 is a cross sectional view of the luminaire of FIGURE 1, drawn to a larger scale than in FIGURE 1;

FIGURE 3 is a fragmentary elevational cross sectional view of the luminaire of FIGURE 1, taken along line 3—3 of FIGURE 2;

FIGURE 4 is a detail view of the refractor of FIGURE 1, taken as detail 4 of FIGURE 3;

FIGURE 5 is a cross sectional view of a luminaire according to another embodiment of the present invention;

FIGURE 6 is a cross sectional view of a luminaire, according to another embodiment of the present invention, and illustrating a street luminaire utilizing a pair of tubular lamps, and

FIGURE 7 is a cross sectional view of yet another embodiment of the present invention illustrating a luminaire using three tubular electric lamps.

Referring now to the drawings, and particularly to the embodiment of FIGURES 1 through 4, there is illustrated a street lighting luminaire 10 according to the present invention and including a luminaire assembly 11 mounted on the top of a luminaire post 12. As best illustrated in FIGURES 2 and 3, the luminaire assembly 11 includes a light source or lamp 13, illustrated as a vertically positioned, tubular low pressure discharge lamp, of the type commonly known as a fluorescent lamp. The lamp 13 may, if desired, be of the type described in United States Patent 2,774,918 granted December 18, 1956 to Eugene Lemmers. The fluorescent lamp may also be of the type described and claimed in my copending application (Case J-108), filed even date herewith, and assigned to the same assignee as the present invention. The lamp 13 is concentrically positioned within an enclosing, vertical, elongated, cylindrical refractor 15. The refractor 15 is closed at its lower end by a lower cover 16 and at its upper end by an arcuate shade 17. The refractor 15 may be provided on its inner or outer surfaces with suitable refractor elements 20, FIGURES 2 and 4, which are effective to refract light rays striking thereupon to provide for vertical or lateral light distribution control of the light from the tubular lamp 13. In the illustrated embodiment, the refractor elements 20 are illustrated as horizontally extending prisms in the inner surface of the refractor 15 thereby to provide for vertical light control as best illustrated by the light ray arrows of FIGURE 4.

In the embodiment best illustrated in FIGURE 4, the refractor elements 20 have upwardly and outwardly inclined surfaces 20a, and lower surfaces 20b. The light distribution from the fluorescent lamp 13 is generally outwardly as indicated by the arrows 21a, and most of the light rays strike the inclined surface 20a of the prisms 20 so as to be refracted generally downwardly as indicated by the arrows 21b. Some small amount of light rays will be directed upwardly from the lamp 13, and will strike the lower surfaces 20b of the prisms 20. Advantageously, these lower surfaces, if desired, may be coated with silver or other reflecting material to reflect the rays generally outwardly and downwardly into a usable light pattern.

In one embodiment of the invention, the inclined surfaces 20a formed an angle α of 55° above the horizontal, and the lower surfaces 20b formed an angle B of 10° below the horizontal. In the illustrated embodiment the light is uniformly emitted along the six-foot axis of the radiant part with a downward angle of about 15° for the maximum.

To provide for lateral light control, and to support the lamp 13 and the arcuate shade 17, the luminaire assembly 11 may additionally include one or more reflectors, here shown as a pair of reflectors 22, extending vertically and elongated within the refractor 15 for controlling lateral light distribution from the lamp 13. As best illustrated in FIGURE 2, the reflectors 22 may have a geometric light reflecting surface 22a of elliptical, parabolic, hyperbolic or other arcuate or light distributing shape. As illustrated in FIGURE 2, the reflectors 22 are formed of metal extrusions provided with a hollow core 22b which serve to lighten the reflector 22 and additionally provide a passageway if required for electrical wires 25.

It is understood that the fluorescent lamp 13 is held between suitable end supports providing electrical terminals for the lamp 13, and, in commonly commercially available lamps, require electrical connections to both ends thereof. Moreover, it is understood that the refractor 15 may be moved in suitable manner for replacement of the lamp 13. More specifically, the cover 16 closing the lower end of the refractor 15 may permit the refractor to be slid down the post 12 thereby to provide access to the lamp 13. Suitable ballast transformer means for starting and controlling the lamp 13 may be installed within the post 12 or other suitable location.

Referring now to FIGURE 5, there is illustrated another embodiment of a luminaire assembly 30 suitable for mounting on top of a post in a vertical position. More specifically the luminaire assembly 30 includes a tubular lamp 31 enclosed within a cylindrical refractor 32. As illustrated in FIGURE 5, the refractor 32 is provided with suitable vertically extending refractor elements 32a which aid in lateral light distribution. Moreover, the luminaire assembly 30 includes a pair of opposed reflectors 34 positioned on opposite sides of the lamp 31 for further controlling lateral light distribution from the tubular lamp 31. Additionally, as illustrated in FIGURE 5, the luminaire assembly 30 includes a pair of vertically extending sheet metal reflectors 36 positioned within the refractor 32 for further controlling lateral distribution of the light from the lamp 31. The sheet metal reflectors 36, in conjunction with the adjacent one of the reflectors 34, are effective to direct all the light from one quadrant of the luminaire, for example, from the house side in a residential street lighting area.

Yet another embodiment of the present invention is illustrated in FIGURE 6. As therein shown, there is illustrated a luminaire assembly 40 wherein a pair of tubular lamps 41 is enclosed within an elongated refractor 42. The refractor 42 is provided with suitable refractor elements 42a extending vertically on its outer surface to provide for lateral light control. Positioned intermediate lamps 41 is a refractor 44 for further controlling the light distribution of the lamps 41.

FIGURE 7 illustrates another luminaire assembly 50, according to the present invention, wherein three tubular lamps 51 are enclosed within a suitable refractor 52. An

elongated, concentrically positioned, generally triangular, reflector 54 provides lateral light control of the light from the lamps 51.

Advantageously it has been found that in the embodiment of FIGURE 7 the surface brightness of the luminaire was reduced considerably over that of a corresponding mercury vapor luminaire. More specifically, three six-foot lamps at 6000 lumens each provide a total of 18,000 lumens. This light output is uniformly emitted along the six-foot axis of the refractor 42 with a downward angle of about 15° for the maximum. A corresponding 20,000 lumen mercury vapor luminaire would put out approximately the same total lumens but they would come out or through a surface area of around 50 square inches. The present luminaire according to the embodiment of FIGURE 7 would radiate this same number of lumens through a surface area of around 1,000 square inches or a reduction in surface brightness of almost twenty to one so that illumination of areas can be achieved without the uncomfortable effect upon the eyes of high surface brightness. This is particularly useful in parks and plazas where people congregate. Also the length of the light radiating source permits the light to work through trees with a significant reduction in shadowed areas. Additionally the light emitted from the back side of the fluorescent tube strikes the reflector surfaces and readily escapes around the tube without loss other than the deflection efficiency.

Although the present invention has been described by reference to several embodiments thereof, it will be apparent that numerous other modifications and embodiments will be devised by those skilled in the art which will fall within the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. An outdoor lighting luminaire comprising a vertically positioned, elongated cylindrical refractor provided with refractive elements on at least one of its surfaces said refractive elements comprising horizontally extending prisms, the inner surface of said refractor having an upper surface inclined about 55° above the horizontal and a lower surface inclined about 10° below the horizontal directing the light downwardly at about 15° from the horizontal, at least one vertically positioned, tubular fluorescent lamp positioned within said refractor, and vertically extending elongated reflector means within said refractor and provided with geometric light reflecting surface means for controlling lateral light distribution from said lamp.

2. An outdoor lighting luminaire as defined in claim 1 above wherein the lower surface of said prisms is coated with light reflecting coating.

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