

Oct. 24, 1967

J. H. FAHEY, JR., ET AL  
OUTDOOR LIGHTING LUMINAIRE

3,349,239

Filed June 21, 1965

4 Sheets-Sheet 1

FIG. 1

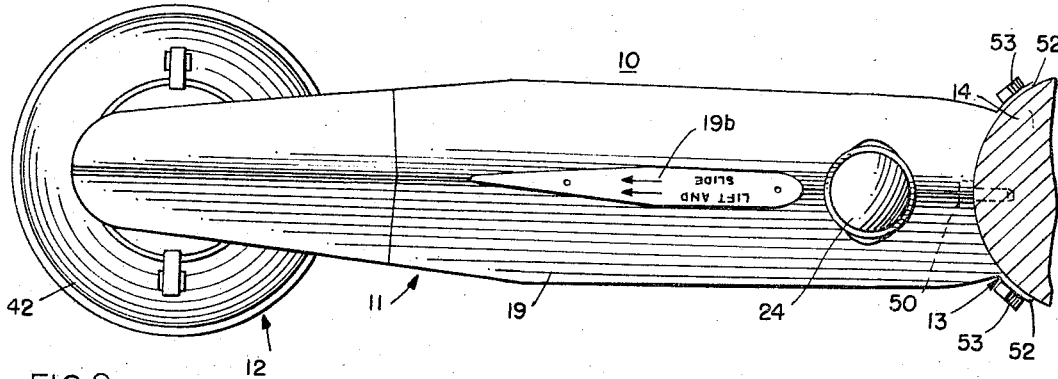


FIG. 2

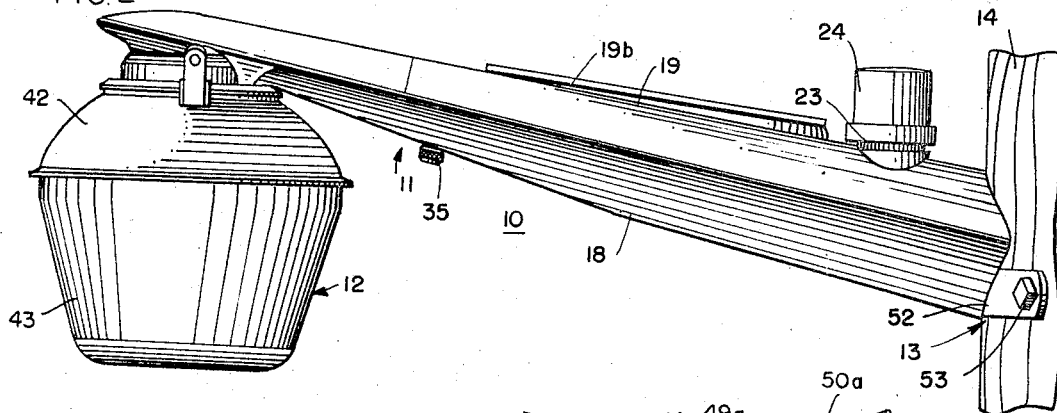


FIG. 3

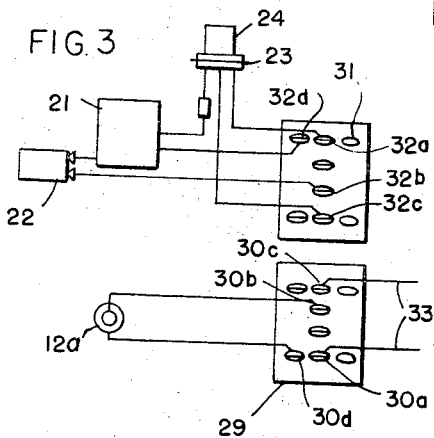
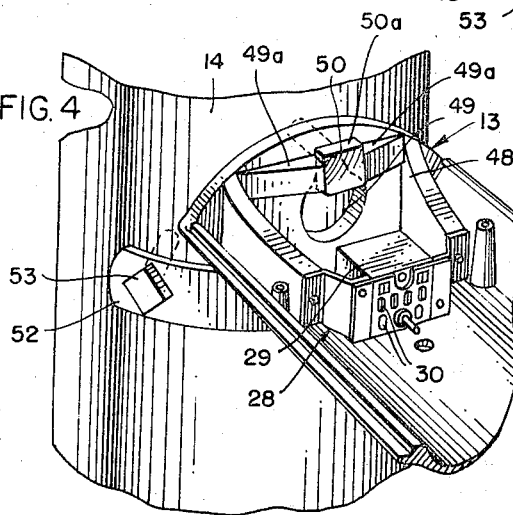


FIG. 4



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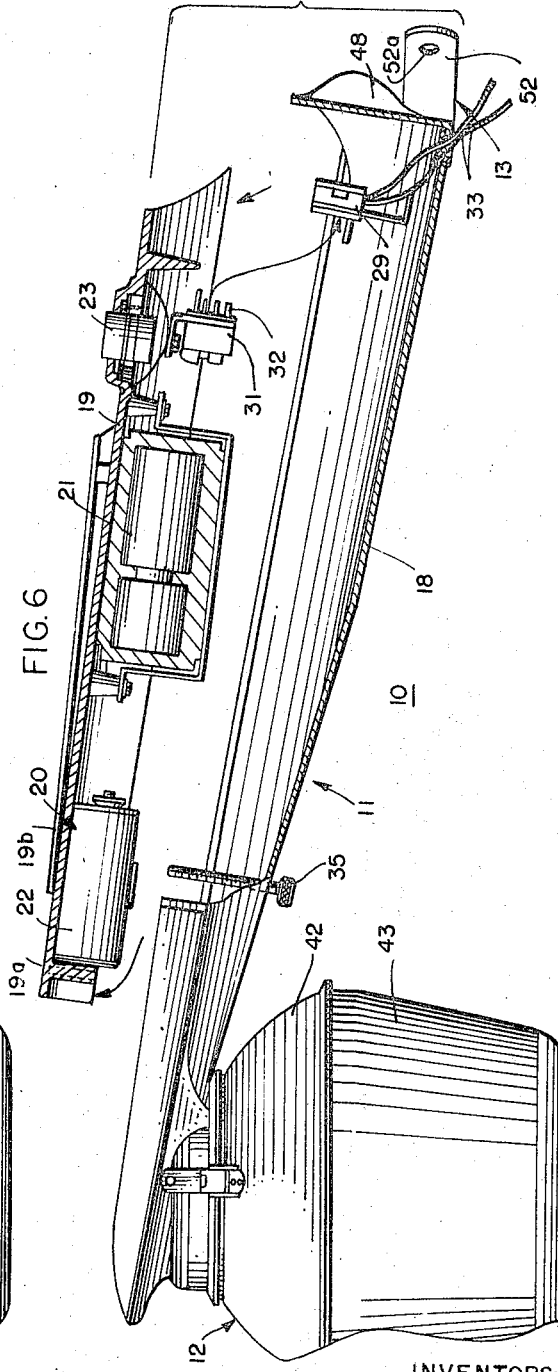
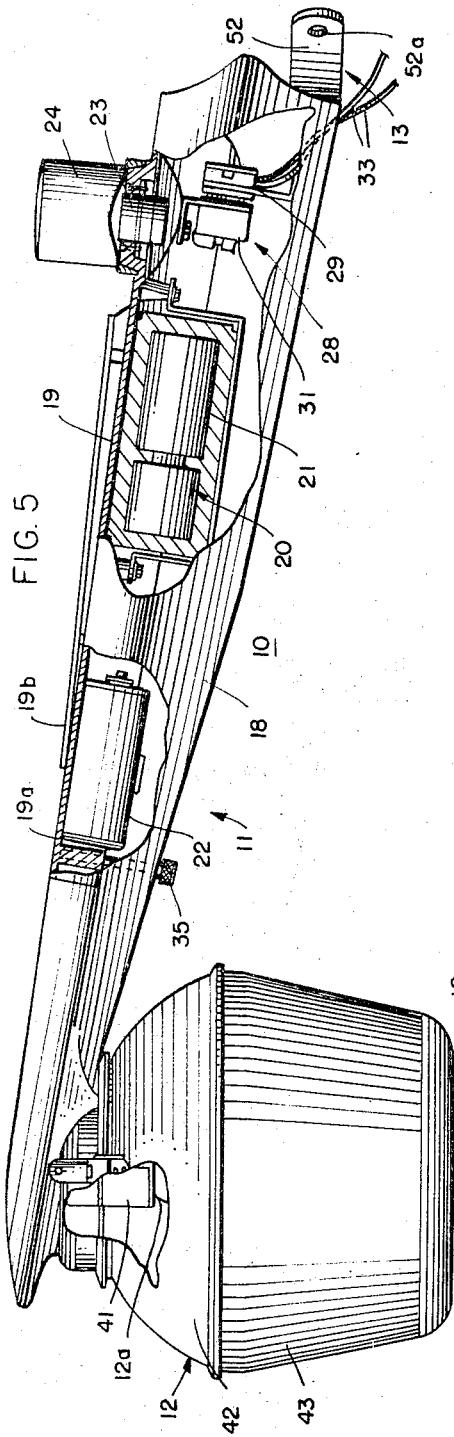
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FIG. 7

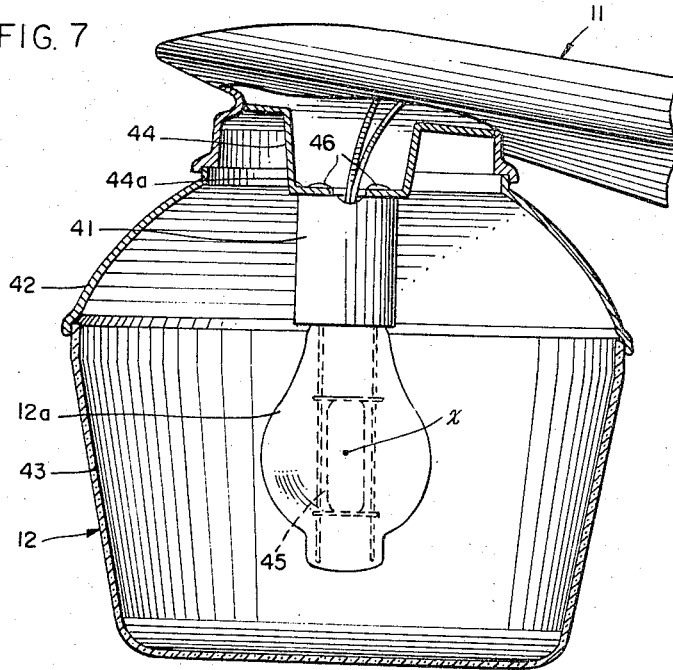
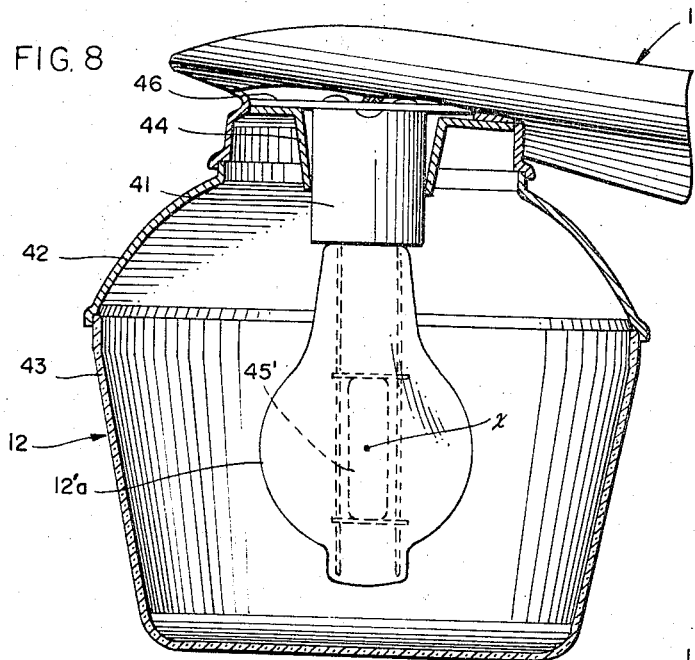


FIG. 8



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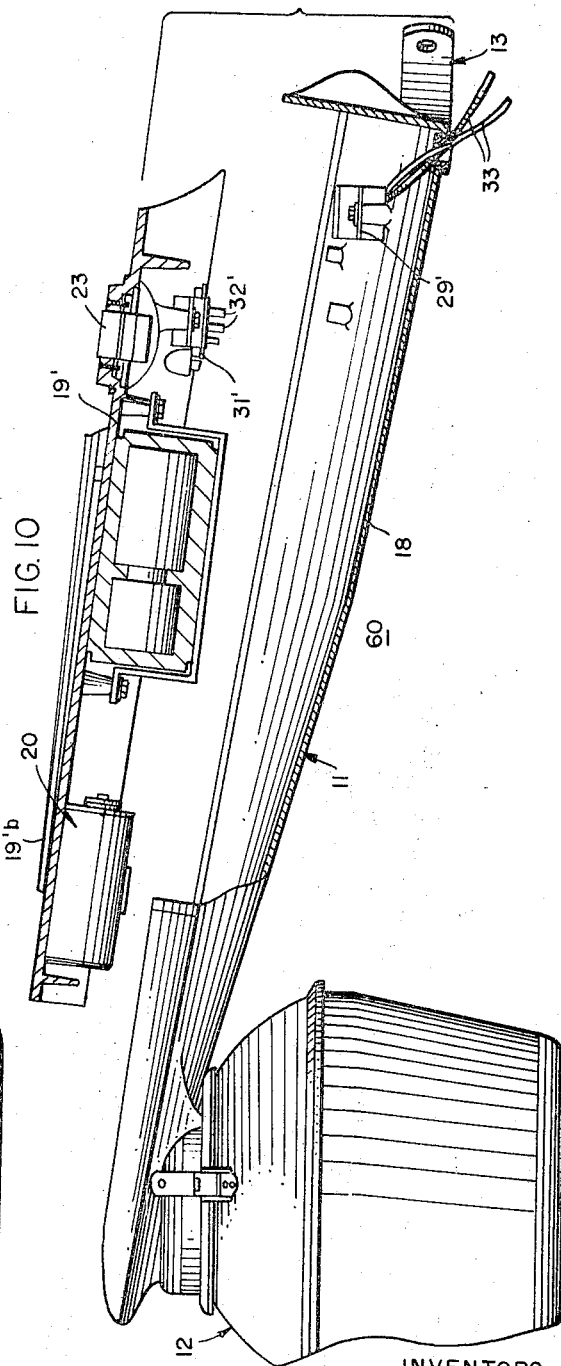
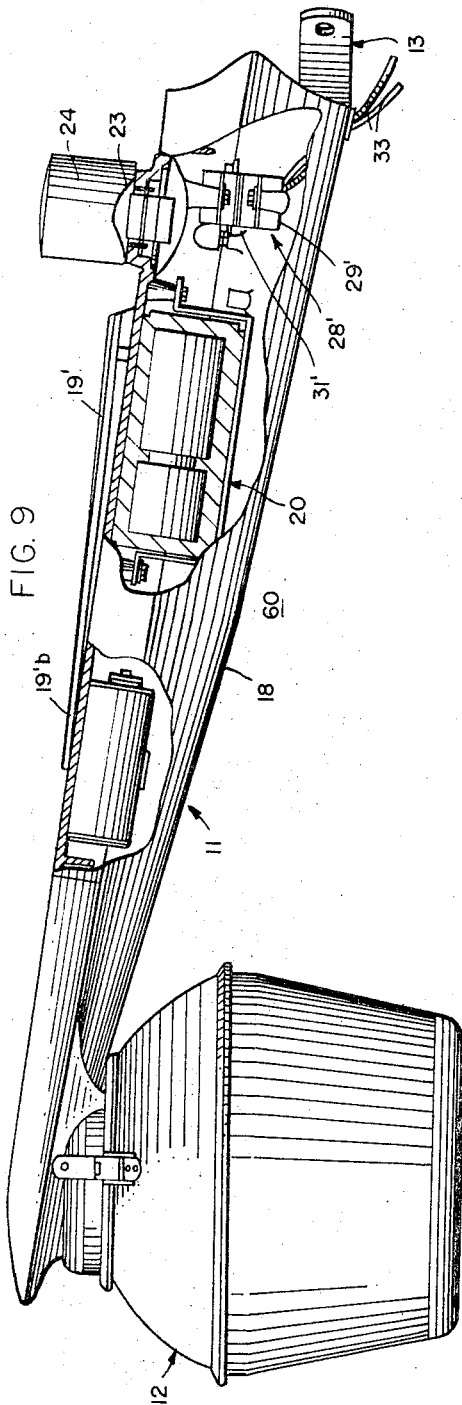
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**OUTDOOR LIGHTING LUMINAIRE**

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**ABSTRACT OF THE DISCLOSURE**

There is provided an improved outdoor lighting luminaire including an elongated hollow housing or support which encloses the ballast components. The luminaire support includes an upwardly opening support portion provided with a cover. The cover carries the ballast components. An automatic disconnect connects the components of the cover and the remainder of the support structure so that the mere removal of the cover automatically separates the power disconnect so that there are no exposed live conductors or terminals which present a safety hazard to the worker. In addition means are provided so that lamps of various lengths may be supported in the luminaire with the center of the lamp light being maintained at the focal or geometric center of the reflector-refractor assembly of the luminaire.

This invention relates to luminaires, and more particularly, to luminaires which employ a high intensity ballasted light source suitable for outdoor lighting of such areas as highways, parking lots, and the like.

One common form of luminaires uses a mercury vapor lamp which requires ballasting means for operating the lamp. Such ballasting means are frequently housed within the luminaire housing. The ballasting means necessary to operate a large size mercury vapor lamp is of substantial weight and the weight of the ballasting means requires that the housing be made strong enough to support the ballast components. Moreover it is not uncommon to provide further electric control means in the luminaire system so that a photoelectric control unit automatically controls the on-off of a single or multiple number of luminaires.

Heretofore difficulty has been experienced in the servicing, testing, repair, and replacement of the ballast components, photoelectric unit, and lamp. It is particularly desirable that the photoelectric unit and ballast components may be removed from the luminaire and taken back to the shop, after replacement, for testing and repair.

Moreover such luminaires commonly operate at voltages in the range of 120-480 volts. Since it is generally necessary to replace the luminaire components while the luminaire is supported above the ground from a utility pole or other structure, it is particularly desirable that the input lead terminals to the luminaire be readily disconnected from the luminaire circuit during the repair and replacement of the components, and moreover, that the luminaire presents no exposed terminals or wires which may create a safety hazard.

As is well known, mercury vapor lamps of various wattages are commercially available. Such different size lamps will have different physical dimensions. It is important in obtaining the proper light distribution from a luminaire that the center of light output of the lamp corresponds with the focal point of the reflector and refractor. Commercially it is desirable that a single light unit such as a reflector-refractor unit be interchangeably useable with a selected number of different lamp wattages. Accordingly it is necessary to make provision to selectively support mercury vapor lamps of various dimensions within the refractor-reflector assembly in

order to position the lamp light output at the focal center of the reflector-refractor combination.

It is therefore an object of the present invention to provide an improved mercury vapor luminaire which overcomes the above mentioned difficulties.

A further object of the present invention is to provide an improved mercury vapor luminaire.

A further object of the present invention is to provide an improved mercury vapor luminaire wherein the ballast components may be readily removable from the luminaire assembly for testing, repair, and replacement.

Yet a further object of the present invention is to provide a new and improved mercury vapor luminaire wherein there are no exposed terminals or wiring during repair or replacement of the luminaire components by a serviceman.

Yet another object of the present invention is to provide a new and improved mercury vapor luminaire wherein means are provided for selectively mounting various size lamps within the luminaire.

Further objects and advantages of the 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.

Briefly stated, in accordance with the present invention, there is provided an improved outdoor lighting luminaire including an elongated hollow housing or support which encloses the ballast components. The luminaire support includes an upwardly opening support portion provided with a cover. The light assembly includes a lamp, lamp socket, and optical assembly carried at one end of the support while the other end of the support is adapted to be connected to a suitable structure such as a utility pole. The ballast components, which normally include a ballasting transformer and a capacitor, are supported within the housing from the cover. Moreover, if desired, the cover can carry a socket for a photoelectric unit. The cover with its associated components is readily removable from the luminaire support by the provision of a power disconnect in the form of a plug and socket arrangement which interconnects the cover with the support. In one embodiment, the cover with its associated components may be readily separated for inspection, testing, repair, or replacement of the components by merely raising, sliding forward, and lifting off the cover and associated components, thereby automatically separating the power disconnect. Advantageously the components may be readily removed from the luminaire structure and, by providing a female socket on the support, there are no exposed live conductors or terminals which present a safety hazard to the worker.

In another embodiment, the cover and its associated components may be readily separated by merely lifting them off the luminaire body thereby automatically separating the power disconnect.

According to another feature of the present invention, lamps of various lengths may be supported in the luminaire with the center of the lamp light being maintained at the focal or geometric center of the reflector-refractor assembly. More specifically the luminaire is provided with an annularly depending skirt extending downwardly from the support and having inwardly extending opposed projections. A lamp socket may be supported from the projections on the skirt, or alternately, the projections may be removed and the lamp socket may be supported from a strap extending across the upper end of the skirt. In this manner a single luminaire is adapted to support lamps of various length and to maintain the lamps with their center of light output at the geometrical focal point of the reflector and refractor assembly.

For a better understanding of the present invention,

reference may be had to the accompanying drawings wherein:

FIG. 1 is a top plan view of a luminaire according to the present invention;

FIG. 2 is a side elevational view of a luminaire according to the present invention;

FIG. 3 is a schematic drawing illustrating the electrical system of the luminaire according to the present invention;

FIG. 4 is a partial perspective view, with the cover removed, illustrating a detail of a luminaire according to FIG. 1;

FIG. 5 is a broken away elevational view of the luminaire of FIG. 1;

FIG. 6 is a partially disassembled view of the luminaire of FIG. 1;

FIG. 7 is an elevational sectional view of the optical and lamp assembly according to the present invention;

FIG. 8 is an elevational sectional view of the assembly of FIG. 7, illustrated with a differently sized mercury vapor lamp; and

FIG. 9 is a broken away elevational view of a luminaire according to another embodiment of the present invention; and

FIG. 10 is a partially disassembled view of the luminaire of FIG. 9.

Referring now to the drawings and particularly to the embodiment of FIGS. 1 to 8, there is illustrated an outdoor lighting luminaire 10 according to the present invention. The luminaire 10 includes an elongated support forming a hollow housing 11 and inclined slightly upwardly from the horizontal. An optical assembly 12 enclosing a lamp 12a, FIG. 7, at its focal point is carried at the outer end of the support 11, while the other end of the support 11 is provided with suitable bracket means 13 for securing the support 11 to a structure such as a utility pole 14.

Referring now to the support 11, the support 11 has a generally channel shaped support portion 18, open at the top, and closed by a cover 19. The cover 19 is provided with a handle 19b to facilitate removal and replacement thereof. The cover 19 carries the ballast means 20 for controlling the light source 12. More specifically the ballast means 20 normally includes a ballasting transformer 21 and a capacitor 22. Additionally the cover 19 may, if desired, be provided with a socket 23 for receiving a photoelectric control unit 24.

To permit separation of the cover 19 from the support 11, and removal of the associated components, there is provided a suitable disconnect assembly 28 including a female disconnect block 29 having a plurality of horizontally opening plug receiving sockets 30, FIG. 4, and carried within the housing by the housing portion 18. In the illustrated embodiment the female disconnect block 29 is positioned adjacent the end of the support 11 which is provided with the pole bracket means 13. Moreover the cover 19 is provided with a complementary male disconnect block 31 having a plurality of horizontally extending plugs 32, FIG. 6, removably received in respective ones of the plug receiving sockets 30, and supported within the housing from the cover 19. Suitable conductors electrically interconnect the male disconnect block 31 with the ballasting transformer 21 and capacitor 22, and with the photoelectric unit 24 as best illustrated in FIG. 3. Additional electrical conductors interconnect the female disconnect block 29 with the light source 12. The female disconnect block 29 is adapted to be connected by suitable conductors 33 to the line wires. When the disconnect assembly 28 is united, plugs 32a, 32b, 32c, and 32d, FIG. 3, connect in sockets 30a, 30b, 30c, and 30d, respectively, to connect the luminaire to the line.

A suitable lock, here shown in the form of a thumb screw 35, extends through the lower wall of the housing portion 18 into a threaded opening to secure the cover to the housing portion 18.

As is well known in the luminaire field, the lamp 12a

may be of the high pressure mercury vapor type supported in a suitable socket 41, FIG. 7, operatively positioned in the optical assembly 12.

Advantageously, according to another feature of the present invention, the luminaire 10 is adapted to accept lamps of selected dimensions, as illustrated in FIGS. 7 and 8, and maintain the light source of the lamp at the focal pointed geometric axis of the optical system 12 to provide light distribution of a predetermined pattern. More specifically the optical assembly 12 includes a reflector 42 and an associated refractor 43 which have a geometric shape to provide a predetermined light distribution pattern when a light source is maintained at the focal point or geometric center, indicated by the point x in FIGS. 7 and 8. The support 11 is provided with an annularly depending skirt 44 depending downwardly from the support 11 and having opposed inwardly extending projections 44a, FIG. 7 which are separable from the skirt to provide for their selective removal therefrom. When the luminaire 10 is designed for use with a comparatively shorter lamp, as represented by lamp 12a, FIG. 7, the socket 41 will be supported from the projections 44a, as by securing thereto with the screws 46. Thus the actual light source 45 within the envelope of the lamp 12a will be maintained at approximately the focal point x of the optical assembly 12. When, however, the luminaire 10 is to be used with a longer lamp 12'a, FIG. 8, the projections 44a will be removed and the socket 41 will be mounted on a strap 46 extending across the upper end of the projecting skirt 44. Thus a light source 45' within the envelope of the lamp 12'a will be maintained at the approximate focal point x of the optical system 12. Thus the same luminaire structure may be used for either the smaller lamp 12a, or for the longer lamp 12'a, depending upon the selective mounting of the lamp socket 41.

The bracket structure 13 includes an arcuately shaped end wall 48 closing the housing portion 18 and adapted to closely fit around the pole 14. The end wall 48 is provided with a keyhole slot 49, FIG. 4, so that the luminaire 10 may be hung over the head of a bolt 50. A pair of inwardly extending wedge shaped lugs 49a, FIG. 4, engage the head of the bolt 50 and prevent the bolt 50 from turning. Additionally, spaced below the keyhole slot 49, there is a pair of arcuately shaped outwardly extending ears or projections 52 adapted to fit against the pole 14. The projections 52 are each provided with bolt holes 52a to receive suitable bolts 53. The bolts 50 and 53 may, of course, be of any suitable type and, if desired, may be lag screws. Advantageously, bolt 50 is a through bolt so that it may be tightened from the back side of the pole where a workman has ample clearance around the luminaire 10, while the side bolts 53 providing lateral stability are lag screws.

From the above detailed description, the operation of the improved luminaire is believed clear. However, briefly, it will be understood that it is possible for a serviceman to service or replace the photoelectric unit 24 with the luminaire assembled in position on the pole. Moreover, additionally, a serviceman may service or replace the ballast components by first loosening the thumb screw 35, and thereafter slightly raising the outward edge 19a of the cover 19 by raising up on the outward edge of the handle 19b. Thereafter the cover 19 may be slid outwardly toward the optical assembly 12 to separate the power disconnect 28. The cover 19 along with the ballast components 20 may then be lifted up and removed from the remainder of the luminaire 10 for servicing, repair, or replacement either on the ground or back in the shop. It will be noted that by the mere removal of the cover 19 the power to the components, as well as to the lamp 12a, is disconnected from the line, thereby providing a safe structure and permitting servicing of the components on the cover 19.

It will be seen that the power disconnect insures complete safety during the maintenance operations. All the

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components are disconnected from the power source by simple removal of the top cover. Removal of the top is simple—a thumb screw is loosened and the cover is slid forward and lifted up. There is no need to ever touch electrical components within the luminaire while the power is connected. If necessary the complete cover with the ballast and photoelectric control can be replaced with a spare and taken into the shop for maintenance or testing.

Moreover according to the present invention the improved luminaire is easily installed with a through bolt and two lag screws. It is simply necessary to install the through bolt on the pole, put the head of the bolt through the keyhole slot in the end wall of the luminaire and to tighten the through bolt. As the bolt is tightened, the holding lugs prevent the bolt head from turning. After the bolt is tight, the two lag screws at the two sides are driven through the holes provided in the mounting strap to insure lateral stability.

FIGS. 9 and 10 illustrate a luminaire 60 according to another embodiment of the present invention wherein the cover and ballast means may be removed by the mere removal of the fastening screws and the lifting up thereof. Such lifting of the cover and ballast assembly automatically separates the power disconnect. Similar components of FIGS. 9 and 10 and FIGS. 1 through 8 are identified by the same reference numerals.

Referring now to FIGS. 9 and 10, the outdoor lighting luminaire 60 includes the elongated support defined by the hollow housing 11 and the optical assembly 12 carried at the outer end of the support 11. The other end of the support 11 is provided with suitable bracket means 13 for securing the support 11 to a utility pole.

Referring now to the support 11, the support 11 has a generally channel shaped support portion 18, open at the top and closed by a cover 19'. The cover 19' is provided with a handle 19'b to facilitate removal and replacement thereof. The cover 19' carries the ballast means 20 for controlling the light source. Additionally the cover 19' may, if desired, be provided with the socket 23 for receiving the photoelectric control unit 24.

To provide for separation of the cover 19' from the support 11, and removal of the associated components, there is provided a suitable disconnect assembly 28' including a female disconnect block 29' having a plurality of vertically opening plug receiving sockets, and carried within the housing by the housing portion 18. In the illustrated embodiment the female disconnect block 29' is positioned adjacent the end of the support 11 which is provided with the pole bracket means 13. Moreover the cover 19' is provided with a complementary male disconnect block 31' having a plurality of vertically extending plugs 32', FIG. 10, removably received in respective ones of the plug receiving sockets, and supported within the housing from the cover 19'. As heretofore described suitable conductors electrically interconnect the male disconnect block 31' with the ballast means 20 and with the photoelectric unit 24 in like manner as illustrated in the preceding embodiment. Additional electrical conductors interconnect the female disconnect block 29' with the light source. The female disconnect block 29' is adapted to be connected by suitable conductors 33 to the line wires. When the disconnect assembly 28' is united, the plugs 32' connect in respective ones of the sockets in the female disconnect block 29'.

Suitable fastenings or screw can extend through the cover 19' into the housing portion 18 to secure the cover to the housing portion 18.

Although the present invention has been described by reference to various embodiments thereof, it will be apparent that numerous other modifications and embodiments may be devised by those skilled in the art and it is intended by the appended claims to cover all modifications and embodiments which will fall within the true spirit and scope of the present invention.

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

1. An outdoor lighting luminaire comprising an elongated support forming a hollow housing, said housing including a generally channel shaped housing portion and a generally inverted channel shaped cover; means at one end of said support for securing said support to a suitable pole structure with said support inclined slightly upwardly from the horizontal; light source means carried by said support at its other end and including a lamp socket adapted to receive a high pressure mercury vapor lamp, and reflector means and refractor means both operatively positioned relative said lamp socket; a female disconnect block having a plurality of horizontally opening plug receiving sockets and carried within said housing by said housing portion adjacent said one end of said support and adapted to be connected to line wires; conductor means electrically interconnecting said lamp socket and said block; a male disconnect block having a plurality of horizontally extending plugs removably received in respective ones of said plug receiving sockets and supported within said housing by said cover; ballast means supported within said housing by said cover; photocontrol receiving means carried by said cover; conductor means electrically interconnecting said male disconnect block, said ballast means, and said photocontrol receiving means; and lock means securing said cover to said support.

2. An outdoor lighting luminaire comprising an elongated support forming a hollow housing, said housing including an upwardly opening housing portion and a cover for said housing portion; means at one end of said support for securing said support to a suitable pole structure; light source means carried by said support at its other end and including a lamp socket adapted to receive an electric lamp, and reflector means and refractor means both operatively positioned relative said lamp socket; a female disconnect block having a plurality of plug receiving sockets and carried within said housing by said housing portion and adapted to be connected to line wires; conductor means electrically interconnecting said lamp socket and said block; a male disconnect block having a plurality of plug removably received in respective ones of said plug receiving sockets and supported within said housing by said cover; ballast means supported within said housing by said cover; photocontrol receiving means carried by said cover; conductor means electrically interconnecting said male disconnect block, said ballast means, and said photocontrol receiving means and lock means securing said cover to said support.

3. An outdoor lighting luminaire comprising an elongated support including an upwardly opening housing portion and a cover; light source means carried at one end of said support and including an optical assembly defined by a reflector and a refractor, and a lamp socket, said reflector and refractor having a common focal point and having a geometrical shape for directing light from said focal point in a predetermined pattern; and an annularly depending skirt extending downwardly from said support means and having inwardly extending opposed projections readily frangible from said skirt, said skirt being adapted to support said lamp socket from said projections or to have said projections removed and to support said lamp socket from a strap extending across the upper end of said skirt to provide for receiving lamps of selective lengths and maintaining the center of lamp light at the focal point of the optical assembly; a first disconnect block carried within said support by said housing portion; conductor means electrically interconnecting said lamp socket and said block; a second disconnect block removably connected with first disconnect block and supported within said support by said cover; ballast means supported within said housing by said cover; and conductor means electrically interconnecting said second disconnect block and said ballast means.

4. A lighting luminaire adapted to selectively receive

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various size lamps and comprising support means; an optical assembly carried by said support means and including a reflector and a refractor having a common focal point and having a geometrical shape for directing light from said focal point in a predetermined pattern; and an annularly depending skirt extending downwardly from said support means and having inwardly extending opposed projections readily frangible from said skirt, said skirt supporting a lamp socket from said projections, or having said projections removed and supporting a lamp socket from a strap extending across the upper end of said skirt to provide for receiving lamps of selective length and maintaining the center of lamplight at the focal point of the optical assembly.

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