

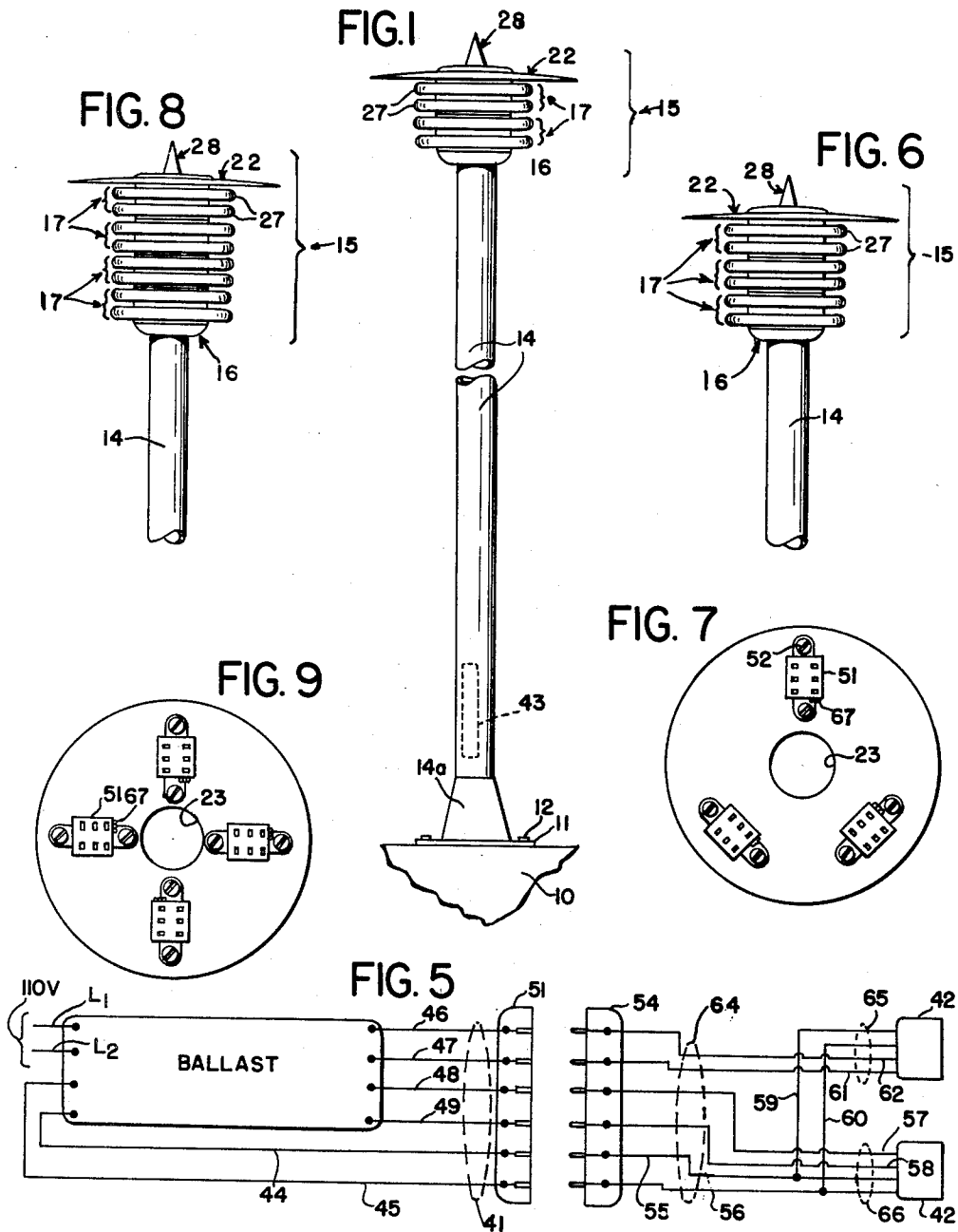
Aug. 25, 1964

K. F. GUGGEMOS
LIGHTING DEVICE

3,145,934

Filed Jan. 22, 1962

4 Sheets-Sheet 1



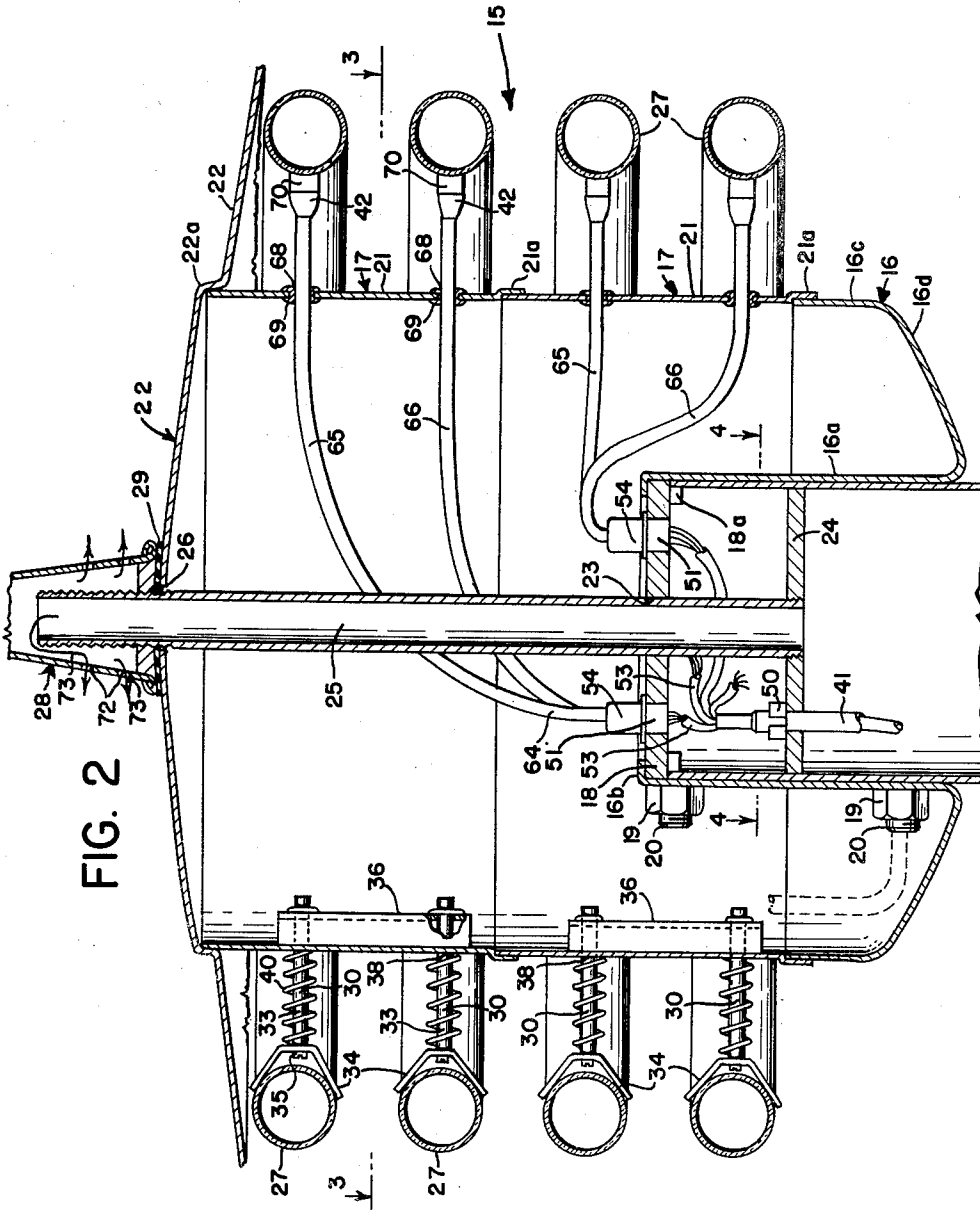
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4 Sheets-Sheet 2



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FIG. 3

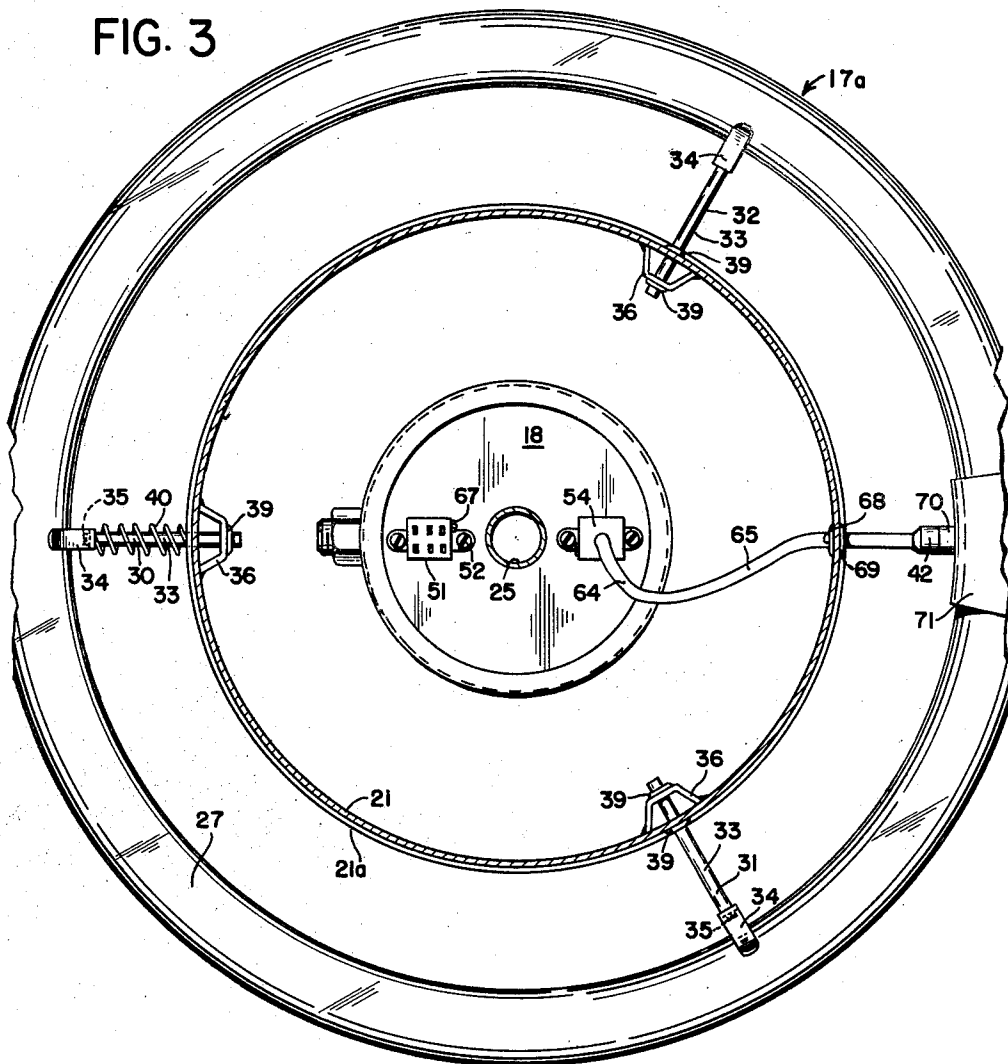
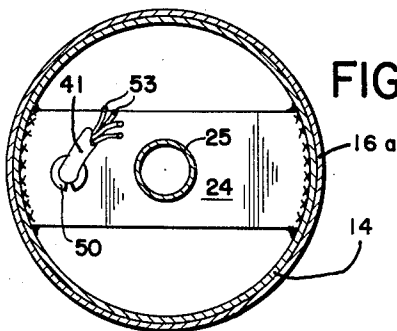


FIG. 4



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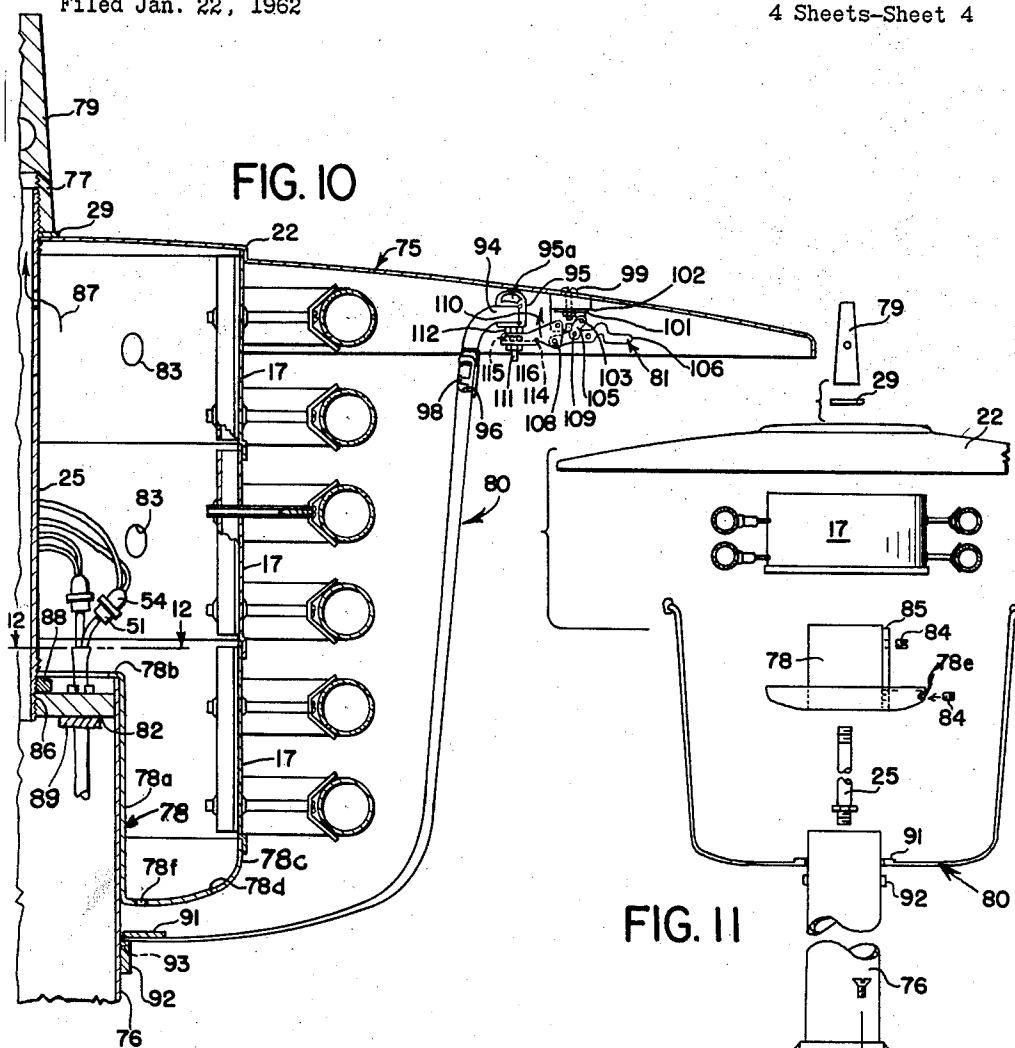


FIG. 11

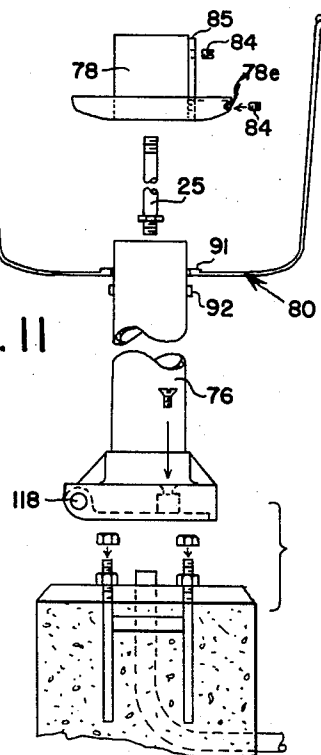
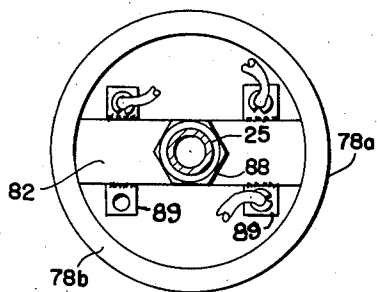


FIG. 12



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2 Claims. (Cl. 240—25)

This invention relates to lighting devices, particularly to outdoor type lighting devices. A central feature of this invention concerns lighting fixtures which hold and position a light element or elements in an outdoor type lighting device in conjunction with a support standard. It is an object of this invention to provide an improved fixture. It is a further object to provide a fixture that may easily be adapted for holding different numbers of lighting elements. It is an object to provide a fixture composed of standard subassemblies or units which may easily be added to or removed from the fixture to change the light element holding capacity. To this end, it is an object of the invention to utilize electrical connections which facilitate the addition or removal of units. A still further object of the invention is to provide a fixture of simplified and yet durable construction.

Other and further objects are those inherent in the invention herein illustrated, described and claimed, and will be apparent as the description proceeds.

To the accomplishment of the foregoing and related ends, this invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principles of the invention may be employed.

The invention is illustrated with reference to the drawings wherein:

FIGURE 1 is a side elevational view of a lighting device, including a fixture and standard of the present invention;

FIGURE 2 is a side elevational view in vertical section of a fixture according to the present invention;

FIGURE 3 is a horizontal sectional view of the top portion of the support standard taken along the line 3—3 of FIGURE 2;

FIGURE 4 is a horizontal sectional view of the top portion of the support standard taken along the line 4—4 of FIGURE 2;

FIGURE 5 is a wiring diagram illustrating the system by which electric current is supplied to the lighting elements from a power source;

FIGURE 6 is a side elevational view like FIGURE 1 of a portion of the lighting device, showing a modified construction possible using the principles of the invention;

FIGURE 7 is a partial horizontal sectional view like FIGURE 3 showing some of the electrical connections for the modified fixture of FIGURE 6;

FIGURE 8 is a side elevational view like FIGURE 1 of a portion of the lighting device, showing another modified construction possible using the principles of the invention;

FIGURE 9 is a partial horizontal sectional view like FIGURE 3 showing some of the electrical connections for the modified fixture of FIGURE 8;

FIGURE 10 is a sectional view of one-half of a modified fixture made according to this invention;

FIGURE 11 is an exploded view of the device of FIGURE 10;

FIGURE 12 is a sectional view taken along the line and in the direction of the arrows 12—12 of FIGURE 10.

Throughout the drawings, corresponding numerals refer to the same parts.

Referring to FIGURE 1, a typical lighting device according to this invention is shown secured to a foundation 10 by means of a base plate 11 and bolts and nuts 12. To

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the base plate a support standard 14, preferably of cylindrical cross-section, is fixedly attached by any suitable means, the standard having, according to some constructions, a lower pyramidal portion 14a. A lighting fixture, generally designated 15, is attached to the top of the standard 14. The fixture 15 is composed of a base generally designated 16, two or more light ring units generally designated 17, a cover generally designated 22 and a finial generally designated 28. In FIGURES 1, 6 and 8, the light fixtures 15 are identically constructed except that in FIGURE 1 there are two units 17 (4 lamps); in FIGURE 6 there are three units 17 (6 lamps) and in FIGURE 8 there are four units (8 lamps). As many units 17 are used as desired, depending on the amount of lighting desired. The basic parts of the device, including the support standard and the fixture, may be made from any conventional construction materials. Usually metal, preferably aluminum, is used.

As shown in FIGURES 1 and 2, the fixture 15 is formed from several units 16, 17, 22 and 28. A base unit 16 forms the lower part of the fixture and is constructed so as to provide a means for attaching the fixture to the standard 14. When the standard 14 is cylindrical in cross-section, as in the preferred embodiment and as illustrated, the base unit is formed with a cylindrical central portion 16a and when some other cross-section is used in the standard 14, the portion 16a is shaped to fit it. At the top of the cylindrical portion 16a a flange 16b is turned over and rests against the top of the plate 18 which in turn rests on the top of the standard 14. The plate 18 may be fixedly attached to and form a part of the top of the standard 14, but it can be made loose and provided with lugs 18a to hold it from shifting. When unit 16 is in place, flange 16b holds plate 18 in place. To the external side of the cylindrical center portion 16a, two nuts 19, one above the other, are fixedly attached, preferably by welding and the metal of 16a is apertured in line with the hole through the nuts. Stud 20 are threaded through the nuts and locked against pole 14. Stud 20 may be turned by means of an Allen-head wrench, illustrated in dotted lines in FIGURE 2. Thus, the base unit 16 can be tightened in a fixed position with respect to the standard 14, and in so doing holds plate 18 in place, unless it is welded to pole 14.

Coaxial with the central portion 16a, the base unit has a second cylindrical portion 16c that is joined to the central portion by an integral dish-shaped portion 16d. The fixture 15 is formed by the addition of coaxial cylindrical units 17 which are stacked one on top of the other, beginning at base unit 16. At the lower portion of each cylindrical unit 17 the side walls are offset out to form a lapping flange 21a. This flange seats against either the top edge of a similar unit 17 or the top edge of the cylindrical portion 16c of the base unit. The units 17 serve to mount the lamps 27, two to each unit 17, and the shell 21 of unit 17 is preferably made from aluminum. The exterior of the units 17—21 is for that reason made highly reflective. Whatever materials are used, the units are preferably made reflective by polishing or adding a coating or layer of some reflective substance. Against the top edge of the top unit there may be placed a dish shaped cover 22 with a raised portion 22a of the same diameter as the cylindrical shells 21 of units 17.

The whole assembly is held in assembled relationship by a central post (pipe) 25 and finial 28 which is screwed down on the top of the pipe. For this purpose a bar 24 is fixed inside the standard 14, usually by welding. This bar is threaded so that the pipe post 25 can be fastened to it by screwing it in, as illustrated. The post 25 extends up through an opening 23 in the plate 18, which steadies the post, and is threaded at the top. The cover 22 is apertured at 26 and is slipped down on the post and

gasket 29 is then put on. The whole assembly is held together by finial 28 which is threaded so it can be screwed down on the upper end of the post to apply end pressure for holding the whole assembly together.

Each cylindrical unit 17 carries mountings for holding two circular light elements, in this case circular fluorescent light tubes 27. According to the present construction, each unit will hold two circular tubes but one or more than two can be used, if desired. As shown in FIGURES 2 and 3, the tubes are held in spaced parallel planes transverse to the axis of units 17, the spacing being such that when several units 17 are stacked one upon the other, the tubes 27 will be equally spaced one from the other in an ascending relation. Each tube 27 is held by three radially projecting members 30, 31 and 32, spaced 120° apart, see FIGURE 3. Two of these supports are fixed and one can be sprung inward to allow the circular lamp 27 to be mounted and removed. The radial support members comprise a rod 33 on the end of which is mounted a holder 34 having fingers spread in a V which receive the tube. The holders 34 are rotatably mounted on rods 33 by means of screws 35 threaded into the end of the rod so that the holders can turn so as to adjust themselves to the tubes 27. Parenthetically, it is noted that tubes 27, even when manufactured by best available techniques are not precisely circular nor of precisely uniform tube diameter. The mountings must therefore accommodate such variations. The V-shaped end form is desirable as opposed to one that is circular since the V-shape permits a better seating against tubes which are off-dimension.

Two of the radial members, 31 and 32, are fixedly mounted on the cylindrical shell 21 of unit 17 while the third, 30, is slidable radially. Three trough-shaped pieces 36 are attached to the interior wall of the cylindrical unit, preferably by welding, with their longitudinal axes parallel to the axis of the cylindrical shell 21 and spaced at 120° intervals. Coaxial holes 38 in the base of the trough and the side of the shell 21, one above the other, receive the rod 33 of each radial member. For the two rigidly held members, two clamping burrs 39 are fixed to the rod. The burrs are small annuluses with inwardly extending fingers that bite into the rod. These burrs, which are standard articles of manufacture, face in opposite directions, one being fixed to the rod immediately adjacent the base of the trough 36 and the other immediately adjacent the exterior surface of the cylindrical shell 21 of unit 17, so as to prevent movement of the rod in either direction. For the slidable member 30, only one burr is used, this being on the interior end of the rod 33 adjacent the base of the trough 36. Thus, the rod 33 is permitted radial inward sliding movement, except that it is limited in outward movement when the burr meets the base of the trough. A spring 40 around the rod 33 and under compression between the V-shaped holder and the exterior surface of shell 21 holds the slidable rod 30 in an outward position. When a lighting tube 27 is placed on the fixture it is seated against slidable support 30, and the support is pushed radially inwardly against the force of the spring 40 until the tube can be fitted into the V-shaped holders of the members 31 and 32. Then the support 30 is released and spring 40 pushes it outwardly until the tube 27 engages supports 31 and 32 with uniform pressure. In this way tubes 27 of inexact dimension can be accommodated and held tightly but firmly to withstand high wind pressure.

This invention relates particularly to outdoor type lighting devices. For such devices electrical power is generally supplied through conduits in the ground. FIGURE 5 is a schematic representation of the circuitry used to supply electricity to the lighting elements. Preferably the lighting devices of this invention use fluorescent lighting elements. In such a case an electrical adjunct known as a "ballast" is required. The ballast 43 preferably is contained in the lower portion of the interior of the support standard 14 and is fastened permanently to the in-

side of the standard in any appropriate manner. The electrical supply enters the device, usually from the ground through the supply lines L1 and L2 which lead to the ballast 43. From the ballast a plurality of lines, appropriate to the number of fluorescent lamps, run upwardly as a cable 41 (see FIGURE 2). FIGURE 5 shows the wiring for each two-lamp unit 17. In FIGURE 5 a socket 42 is shown for each lamp. Four lines are required for each lamp, but two of the lines for each lamp of a two lamp unit are common. Thus a six line supply cable 41 will suffice and is used in the preferred embodiment. Six wires 44-49 are assembled as cable 41 and lead from the ballast to one-half 51 of the connector 51-54. As shown in FIGURE 2, the cable 41 goes through an opening in the bar 24 where it is anchored by a split squeeze collar 50. Above the plate and collar the cable wires are separated and connected to the individual elements of half-connector 51. The half-connector 51, preferably the female half, is held by friction in an opening in plate 41, or as shown in FIGURES 3, 7 and 9, may be held to the plate by screws 52. This depends on the style of connector used. As many cables 41 and half-connectors 51 are used as there are two-lamp units 17, through a separate socket and sub cable could be used for, each lamp, if desired. The cooperating (male) half-connector 54 is received in each half connector 51. Half-connector 54 carries six lines as a cable 64 which divides into two cables 65, 66, one for each lamp. The common lines 55, 56 divide so that four lines lead to each lamp socket 42. These are four lines 55, 56, 57 and 58 for the cable 66 for one lamp, and 59, 60, 61, 62 as the cable 65 for the other lamp. The cables 65, 66 pass through openings 68 in the walls of the cylindrical member 21 of unit 17. Grommets 69, as illustrated, or any other protection such as plastic sleeves, shield the cables against wear from the edges of the holes. The sockets 42 are received by an appropriate connection 70, on the fluorescent lamp tube 27 at the tube terminal 71. Usually this terminal piece is formed of plastic.

Three ribs 67 are formed on the side of the half connectors 51. These serve to assure that the two half connectors 51 and 54 are properly aligned when they are plugged together. It will be noted that the plate 18 is circular and covers the top of the standard 14 except for the opening 23 through which the tubular post extends and the openings to receive the sockets 51. Usually it is convenient to punch plate 18 with the maximum number of holes it will take, and fit half-connectors 51 in as many holes as there are units 17. The other holes are extras. In addition, vent openings may be provided in plate 18. According to the preferred embodiment, one socket per unit is needed. Thus, in FIGURES 3, 7 and 9 there is illustrated plates and sockets for four, six and eight lamp fixtures, respectively. FIGURES 1, 6 and 8 illustrate the fixtures with the lamps in place.

The operation of the device results in the creation of some heat, especially about the ballast 43. To alleviate this condition, air moves up in the interior of the standard 14 due to chimney effect. The standard 14 itself is hollow; the tubular post 25 is also hollow and communicates with the interior of the standard 14 through the threaded opening in the plate 24. Air rises through the post 14 into pipe 25 and then passes into the finial 28 which is hollow. From the finial the air escapes through holes 72 as shown by the arrows 73. The assembly thus provides ventilation, but water blown into the finial does not leak into the post because the upper end of pipe 25 is well above the holes 72.

FIGURES 10-12 show modifications that can be made in the basic design of the lighting device. Principally, these modifications relate to means for attaching the lighting fixture to the support standard, and to a light transparent enclosure placed around the fluorescent tubes. In FIGURES 10-12, a lighting fixture generally designated 75 is shown attached to a support standard 76. The light-

ing fixture 75 is similar to the lighting fixture 15 except that a modified base unit 78 and finial 79 and an enclosure generally designated 80 with a latching mechanism generally designated 81 are used. However, the light ring units 17 are the same, as is the central post 25, and the cover 22.

The base unit 78 of the lighting fixture 75 has a central portion 78a with an interior recess shaped to receive the support standard 76, in this case a cylindrical shape. The support standard 76, in this construction, does not have a top plate corresponding to plate 18. Therefore, the flange 78b that defines the end of the interior recess of the central portion of the base unit rests on top of the standard 76. As shown in FIGURE 11, the base unit is fixed to the support standard by means of studs 84 threaded into openings in the side of the base unit and locked against the standard 76. The openings may lie in a strip of metal welded to the side of the base unit such as 85 in FIGURE 11, or in smaller protrusions from the side of the unit, or may take the form of nuts, such as the nuts 19 in FIGURE 2, welded to the side of the base unit. In other respects, the base unit 78 is essentially like the unit 16 of FIGURE 2, having a cylindrical portion 78c coaxial with the central portion and joined to the central portion by an integral dish-shaped portion 78d. If desired, the dish-shaped portion may be apertured as shown by the dotted line 78e in FIGURE 11 so as to provide access to the locking stud from outside the base unit. In addition, an opening 78f may be provided to permit water accumulated during operation to drain away.

Instead of using a plate like plate 18 in FIGURE 2 at the top of the standard, a bar 82 similar to bar 24 is welded inside the standard slightly below the top. A threaded opening 86 in the bar receives the central tie-pipe 25; a lock nut 88 may be provided to tighten against the bar 82. Electric cables may pass through holes in the bar or they may pass through the guides 89 shown in FIGURE 12 that are attached to the bar by welding, etc. All the units may be fed through one cable as shown in FIGURE 2, or separate cables may be used for each unit as shown in FIGURES 10 and 12. Each unit cable leads to a female half-connector 51 and male half-connector 54, from which two sub-cables lead to the light units. The flange 78b in the base unit defines an opening through which the cables as well as tie-pipe 25 may pass.

The tie-pipe 25 is tubular and rises through the cover 22 where a finial 79 is threaded on the end and holds the unit in an assembled relationship. A gasket 29 is placed between the finial and cover. The interior of the finial communicates with the exterior through opening 77 slanted down to prevent the intake of water. Heat generated in the standard, through operation especially of the electrical ballast, may thus rise in the standard, pass through the tie-pipe 25 into the finial 79 and out the opening or openings 77. Further, ventilation may be provided inside the fixture. An opening or openings 87 in the wall of the pipe 25 permits heat to be drawn out of the fixture. To further aid the passage of heated air, openings 83 in the side walls of the units 17 may be provided. Thus, heat around the electrical apparatus inside the standard as well as heat created inside the fixture may be dissipated continuously to provide a superior and safer operation.

According to the alternative construction, a light transparent bowl-shaped enclosure 80, preferably formed from high-impact strength, clear acrylic plastic, surrounds the fluorescent tubes. Such an enclosure aids in achieving maximum light output and efficient performance in all extremes of weather since it prevents excessive heat loss from the lamps during cold weather. A central opening 90 in the bowl of the enclosure permits it to be placed over the standard as shown in FIGURE 11. A washer of plastic 91 is attached around the opening to reinforce the enclosure, and a rubber gasket 92 is frictionally held to the pole 76 to seal the opening. To insure that water

inside the fixture drains away, the gasket may be notched at 93 to provide a weep opening. The bowl of the enclosure turns out at the top to form a flange 94, over which an extruded plastic or rubber gasket 95 is fitted. A circumferential air pocket 95a in the gasket assists in maintaining a flexible seal. The enclosure may be vented to dissipate heat through an opening 96 near the top of the enclosure that is normally closed by a plug 98.

To firmly seal the enclosure 80 against the cover 22, one or more latching devices 81 may be placed on the cover, spaced around the circumference of the flange 94 of the enclosure. The latch is attached to the cover by a screw and nut 99 passed through one leg of an L-shaped bracket 101 and spacer 102. Pivoted on the bracket 101 are a latching lever 104 and at 103 an over-center locking linkage 105. An operating lever 106 which is shown in an intermediate position, is pivotally attached to the latching lever at 108 and locking linkage at 109. When the operating lever 106 is pivoted to its highest position, it moves the point 109 to an over-center position above a line drawn between points 103 and 108, thus locking the linkage in that position. At the same time, the latching lever 104 is pivoted in the direction of arrow 110 to press the gasket 95 tightly against the under surface of the cover 22. The force is transmitted to the gasket by means of a screw 111 having a head 112 that is pressed against the bottom of the flange 94 and attached gasket 95. The screw passes through an arm 114 of the latching lever 104 at a right angle to the rest of the lever and is held there by nuts 115 and 116. The screw may be adjusted up and down to achieve the appropriate pressure.

It will be understood that in FIGURE 11 one, two, three or more of the units 17 may be used in the assembly, and pipe 25 and bowl 80 are made of sizes appropriate to accommodate the number selected. The wattage and lighting power of the unit can thus be conveniently varied.

FIGURE 11 also shows a different arrangement (from that shown in FIGURE 1), for attaching the support standard to the base foundation. In this arrangement, which is fully set out in application, Ser. No. 27,013, filed May 5, 1960, the support standard is hinged at 118 so that it may be rotated to the ground or other surface on which it rests.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that I do not limit myself to the specific embodiments disclosed herein.

What I claim is:

1. A modular light fixture subcombination comprising a circular cylindrical tube having a greater diameter than length and terminating in upper and lower edges located in planes normal to the axis of the tube, said tube being of uniform outside diameter except that throughout a narrow margin around the tube at the lower edge thereof the tube diameter is increased sufficiently so that the inside surface of the tube at said margin will be capable of a slip fit onto the end of another surface having the same uniform outside diameter as the tube for assembling a plurality of said tubes end-to-end, a plurality of lamp supports mounted on the tube so as to project radially outwardly therefrom in arcuately spaced relation and in a plane substantially normal to the tube axis, the outer ends of each of said supports being shaped to engage and support a torus-shaped lamp.

2. A lighting device comprising a stack of separable units including, in order from bottom-to-top, a base, at least one modular light fixture unit and a cover, fastening means extending through the stack and fastened to the base and to the cover for holding them together in stacked relationship, said base being in the shape of a pan having an upper cylindrical marginal edge of a prescribed outside diameter, said pan having an open axial sleeve extending upwardly from the bottom thereof for receiving the upper

end of a support post, each modular light fixture unit comprising a circular cylindrical tube having a greater diameter than length and terminating in upper and lower edges located in planes normal to the axis of the tube, said tube having an outside diameter corresponding to the prescribed outside diameter of the base, said tube outside diameter being uniform except that throughout a narrow margin around the tube at the lower edge thereof the tube diameter is increased sufficiently so that the inside surface of the tube as said margin will be capable of a slip fit onto the end of another surface having said prescribed outside diameter for assembling a plurality of said tubes end-to-end and assembling a tube on said base, a plurality of lamp supports mounted on the tube so as to project radially outwardly therefrom in arcuately spaced relation and in a plane substantially normal to the tube axis, the outer ends of each of said supports being shaped to engage and support a torus-shaped lamp, and a cover of greater diameter than the modular light fix-

ture tube, said cover having a circular upwardly extending cylindrical indentation of a diameter slightly larger than said prescribed diameter, the upper edge of the uppermost modular light fixture unit being slip-fitted into said recess, the lower most modular light fixture unit being slip-fitted onto the upper cylindrical marginal edge of the base.

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