

FILE NAME: McGraw-Edison (ME)

DATE: 1960 Sept 8

DOC#: ME014

DOCUMENT DESCRIPTION: Patent - Outdoor lighting fixture [Approved - 1963
Dec 31]

Dec. 31, 1963

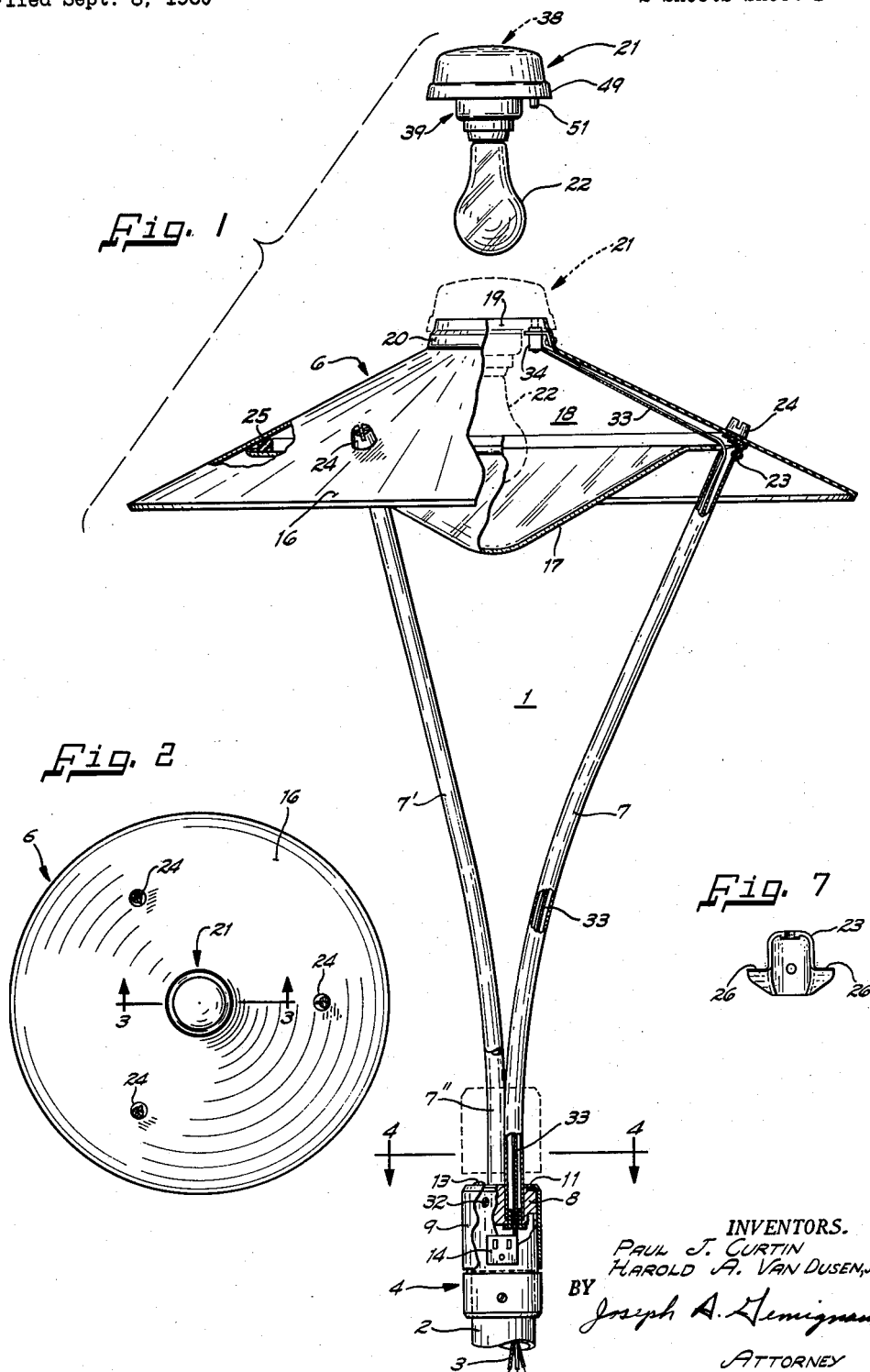
H. A. VAN DUSEN, JR., ETAL

3,116,023

OUTDOOR LIGHTING FIXTURE

Filed Sept. 8, 1960

2 Sheets-Sheet 1



Dec. 31, 1963

H. A. VAN DUSEN, JR., ETAL

3,116,023

OUTDOOR LIGHTING FIXTURE

Filed Sept. 8, 1960

2 Sheets-Sheet 2

Fig. 3

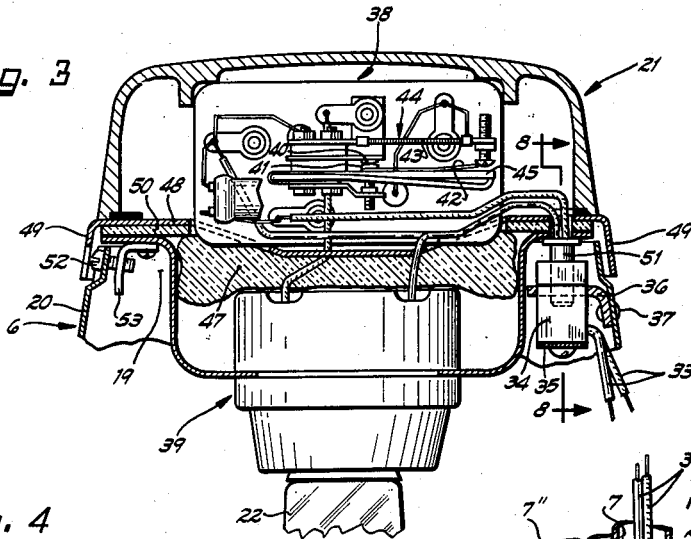


Fig. 4

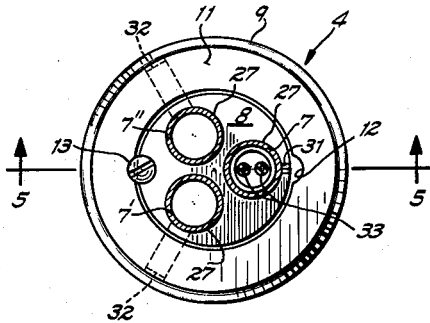


Fig. 5

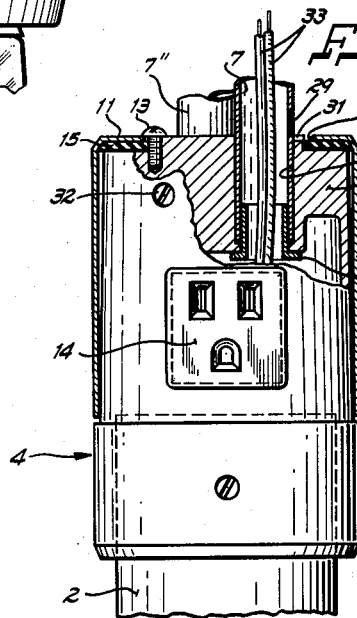


Fig. 6

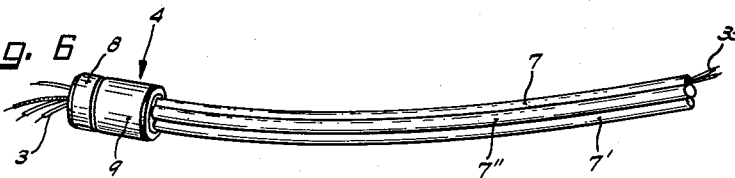
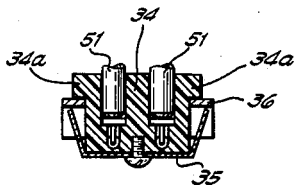


Fig. 8



INVENTORS.
PAUL J. CURTIN
HAROLD A. VAN DUSEN, JR.
BY Joseph A. Lemignani
ATTORNEY

1

3,116,023

OUTDOOR LIGHTING FIXTURE

Harold A. Van Dusen, Jr., and Paul J. Curtin, South Milwaukee, Wis., assignors to McGraw-Edison Company, Milwaukee, Wis., a corporation of Delaware
Filed Sept. 8, 1960, Ser. No. 54,606
10 Claims. (Cl. 240-3)

Our invention relates to light fixture assemblies, more particularly it relates to an outdoor light fixture assembly that is particularly well suited for residential uses.

We have recognized the existence of a particularly acute and unfilled need for a quality outdoor electric light fixture which would be sufficiently attractive and particularly well suited for residential use. This need we have met by providing a residential light fixture assembly of improved design but which can still be safely and easily installed and maintained by even the most unskilled individual.

To accomplish this we provide a light fixture in which all of the component elements are integrated to provide a unitary assembly which is readily assembled by the homeowner and can be connected to any suitable mounting surface without undue handling of or exposure to electrically live leads and connections. Further, an optical assembly is provided which controls the generated light so that it is properly directed for effective utilization thereof while keeping the amount of glare to a minimum. Also included in the light fixture assembly is means for automatically controlling the energization and de-energization thereof and a convenience electrical outlet which is tamper-proof and positively shielded from the elements.

Accordingly, we have as an object of this invention the provision of a quality outdoor light fixture which is readily adapted for residential and area outdoor lighting.

Another object of this invention is to provide an integrated self-controlled light fixture assembly which can be used with any suitable mounting.

Another object is the provision of an outdoor light fixture which can be readily assembled and maintained by even an unskilled individual without difficulty or danger of exposure to electrically live parts.

A further object is to provide readily detachable light source support means for a light fixture which when removed from the light fixture is completely electrically de-energized.

A still further object is the provision of a unitary light socket and light control means which is detachably connected in the uppermost portion of the light fixture and which, when removed from the light fixture, is completely de-energized.

An additional object is the provision of a light fixture assembly having a readily accessible, shielded and substantially tamper-proof convenience electrical outlet as an integral part of the light fixture assembly.

Still another object is the provision of a light fixture which when disassembled can be readily shipped or warehoused.

These and further objects and advantages of our invention will be more readily apparent from a reading of the following description in connection with the drawings in which:

FIG. 1 is a side elevation of a light fixture embodying our invention;

FIG. 2 is a top plan view of the light fixture of FIG. 1;

FIG. 3 is a partial cross sectional view taken along lines 3-3 of FIG. 2;

FIG. 4 is a view taken along lines 4-4 of FIG. 1;

FIG. 5 is a partial cross sectional view taken along lines 5-5 of FIG. 4;

FIG. 6 illustrates the slip fitter and support means for the light fixture as arranged for shipment or storage;

2

FIG. 7 illustrates the clips used on each support arm; and

FIG. 8 is taken along lines 8-8 of FIG. 3.

Although our invention is discussed in relation to a particular application thereof, namely a residential light fixture, it should be understood that it is equally well suited to other area lighting applications such as shopping center malls, parks, parking lots, etc. and that such uses are considered to be within the scope of our invention.

Referring to FIG. 1, a light fixture assembly 1 embodying our inventive concept is illustrated as being mounted atop a pole 2. Only the upper portion of the pole 2 has been illustrated for convenience but it is preferably 4½ to 5 feet in height with its lower end suitably anchored in the ground with electrical leads 3 extending upwardly therethrough.

In general terms, the light fixture assembly includes means for connecting the assembly to the top of pole 2, preferably in the form of slip fitter 4; an optical assembly 6; and means for supporting the optical assembly 6 in spaced relation with the slip fitter 4. The support means preferably takes the form of support arms which extend upwardly and outwardly from the slip fitter 4. Three support arms 7, 7' and 7'' are illustrated and are so configured and disposed relative to one another as to offer the least obstruction to light transmission from the optical assembly 6. The number of support arms may be varied as desired.

The means by which the slip fitter 4 engages the top of the pole 2 is substantially identical to that which is disclosed in a U.S. Patent 2,750,488 of Harold A. Van Dusen, Jr., and which is assigned to the assignee of the present application. This means is neither illustrated nor described herein, reliance being placed upon the above-identified patent for a complete disclosure thereof.

The slip fitter 4 includes a body portion 8 and a sleeve 9 which is slidable axially with respect to the body portion 8 so that it may assume either the full line or covering position as shown in FIG. 1 or the broken line position as also illustrated in FIG. 1. The sleeve 9 is preferably made of aluminum to resist corrosion and deterioration from exposure to the element. A convenience outlet 14 is included as an integral part of the slip fitter 4 with the leads 3 being suitably connected (not shown) to the convenience outlet 14. The convenience outlet 14 is an integral part of the light fixture assembly 1 so that any mounting can be used, in contrast to prior art structures wherein the convenience outlet is generally a part of the mounting structure. Further, the convenience outlet 14 being positioned adjacent the top of pole 2 is out of the reach of children and the sleeve 9 provides adequate protection of the outlet from the elements.

Locking means for securing the sleeve 9 in the covering position is provided to make the convenience outlet tamper proof and preferably takes the form of an annular flange 11 provided on the upper portion of the sleeve 9, a notch 12 and a projection 13, which can be an integrally cast projection or a headed screw threaded into the body portion 8 of the slip fitter as illustrated. As is perhaps best illustrated in FIGS. 4 and 5, the notch 12 has a configuration complementary to the configuration of the projection 13 and the projection 13 is so positioned relative to the flange 11 that the flange 11 can be disposed beneath the screw 13 to thereby lock sleeve 9 in position. To provide moisture and dirt protection the flange 11 is seated on a gasket 15 in the covering position. To release the sleeve 9 for axial movement relative to the body 8 the sleeve can be rotated so that the notch 12 registers with the projection 13 to free the sleeve 9 for axial movement relative to the body 8.

The optical assembly 6 includes a cone-shaped reflector hood 16 and a light diffuser 17 which cooperate, as

3

illustrated in FIG. 1, to form a light source chamber 18. The hood 16 is provided with an aperture 19 preferably located centrally with respect to the hood 16 and formed by an upturned lip 20. Support means 21 for a light source 22 is adapted to be detachably positioned in the aperture 19 to position the light source 22 within the chamber 18. The support means 21 and its means of connection in the light fixture 1 will be more completely described hereinafter.

As can be seen in FIG. 1, the light source 22 is supported in the chamber 18 so that the hood 16 extends below the light source 22. The hood 16 then provides a reflector for reflecting the upwardly directed light from the light source 22 onto the ground and the lower edge of the hood 16 provides a cutoff to reduce the amount of glare to an observer. The light diffusing member 17 further contributes to the reduction of glare and the proper distribution of light onto the ground.

The support arms 7, 7' and 7'' extend upwardly and outwardly from the slip fitter 4 to engage and support the hood 16 in spaced relation from the slip fitter 4. Fixed to the top of each of the support arms, as by means of a rivet, is a clip 23. Finger screws 24 extend through the hood 16 and engage each of the clips 23 to fixedly attach the hood 16 to the tops of the support arms. As can be seen in FIG. 7, each of the clips 23 is provided with a pair of opposed wing-like projections 26. The diffuser 17 rests upon these wing-like projections and is thereby supported in the optical assembly 6. A gasket 25 is provided at the juncture of hood and diffuser to provide a bug-proof seal.

The lower ends of the support arms engage the body 8 of slip fitter 4 with one of the support arms 7 being fixedly attached to the body 8 and the remaining two support arms 7' and 7'' being releasably attached to and rotatable in the slip fitter body 8. More particularly and with reference to FIG. 5, each of the support arms fit into suitable apertures 27 provided in the body 8. Two of the apertures 27 are dead ended holes (not shown) whereas the third aperture, as illustrated in FIG. 5, is a through hole. The means for fixing the support arm 7 relative to the body 8 consists of a bushing 28 which fits into the lower end of aperture 27 and wedges the support arm 7 against the wall of the aperture 27 to hold that arm in fixed relation with the body 8. A notch 29 in the arm 7 and a notch 31 in the top of the body 8 provide means for visually indexing the support arm 7 in the assembly. Similar indexing means is provided for each of the other support arms, however only one has been illustrated. The support arms 7' and 7'' are releasably fixed in position relative to the body 8 by means of set screws 32. When the set screws 32 are loosened the arms 7' and 7'' can be rotated to nest compactly with the fixed arm 7 as is illustrated in FIG. 6. This feature contributes to the ease of storage or shipping of the entire light fixture assembly 1.

The home owner receives the light fixture assembly 1 in knocked down sections, one of which is as illustrated in FIG. 6. After he has attached the assembly shown in FIG. 6 to the top of the pole 2 he need only loosen the set screws 32 and rotate each of the arms 7' and 7'' until their respective notches 29 and 31 are in alignment and then tighten the set screws 32. The arm 7 is indexed and fixed in place at the factory to insure proper alignment of the arms relative to each other.

Electric supply leads 33 extend upwardly from the slip fitter 4 through one of the support arms, preferably the fixed arm 7, then extend along the inner surface of hood 16 and terminate in an electrical receptacle 34 in the aperture 19. The receptacle 34 snaps into and is supported by an L-shaped clip 36 which is suitably connected to the lip 20, as for example by means of rivet 37. More particularly, the receptacle 34 has an upper shoulder 34a and has, suitably connected thereto, a spring 35 the ends of which engage the clip 36 and lock the receptacle 34 in place.

4

Where automatic operation of the light fixture assembly is desired a photocontrol may be included, and in accordance with our invention is included in the light source support means 21 which then constitutes a unitary light socket-photocontrol assembly. The photocontrol 38 can then be positioned at the top of the light fixture assembly 1 for most efficient control and further becomes an integral part of the light fixture assembly 1. A problem which heretofore has existed and which prevented the incorporation of a photocontrol 38 and a light socket assembly 39 into a unitary assembly, is that the photocontrol being essentially a thermally actuated switch would be adversely affected by heat which is generated by the light source 22. This, even in view of the fact that many photocontrol switches are provided with ambient temperature compensation, because the heat generated by the light source greatly exceeds any possible ambient temperature rise and will adversely affect the operating characteristics of the photocontrol assembly. Further, the photoelectric cell itself is adversely affected in that the materials used therein are sensitive to and will deteriorate upon undue exposure to high temperatures, as will many of the other photocontrol components. Hence the operating life of the photocontrol would be greatly reduced if exposed to high temperature for prolonged periods. To overcome these problems we have provided means, disposed between the light socket 39 and the photocontrol 38, for thermally insulating one from the other.

Although the particular design of the photocontrol assembly 38 forms no part of this invention a brief description thereof will be made. Referring to FIG. 3, temperature sensitive switch means including a fixed contact 40 and a movable contact 41 fixed to an over-center snap-action switch element 42 is provided. Contacts 40 and 41 are normally closed as illustrated to electrically energize the lamp 22 and the switch element 42 is actuated by a bi-metal 44. A second bi-metal 45 is associated with the switch element 42 to provide compensation for normal variations in ambient temperature. A fine electrical resistance wire 43 is wrapped around the bi-metal 44 to provide means for supplying heat to the bi-metal 44. In a manner well known in the art, a photoelectric cell (not shown) is connected in series with a resistance wire and controls the amount of electricity supplied thereto in accordance with the amount of light falling on the photoelectric cell.

Thus it can be seen that by placing the photocontrol 38 and the light socket 39 in a unitary assembly the danger exists that the switch in the photocontrol 38, being a temperature sensitive switch, will be affected by heat generated by the light source 22 and interfere with the consistent operation of the photocontrol assembly; and further the heat generated by the light source will adversely affect the components of the photocontrol and cause deterioration thereof.

As stated above, to eliminate this danger and permit the integrated assembly of photocontrol 38 and light socket 39 thermal insulating means is provided therebetween. This thermal insulating means includes a mass of insulating material 47 and a ring of insulating material 50 between the photocontrol 38 and light socket assembly 39. Fiberglass insulation and asbestos have provided favorable results as the insulation 47 and 50 respectively. Also included in the thermal insulating means is a metal disk 48 which is disposed above the insulation 47 and 50 and between the photocontrol 38 and light socket assembly 39. The disk 48 is suitably apertured to allow passage of electrical leads therethrough and includes a peripherally extending lip portion 49 exposed to the atmosphere ambient the light fixture. The metallic plate serves as a heat shield in that it reflects a substantial amount of the heat back towards the lamp 22 and will absorb the remainder. The disk 48 is preferably made of a good heat conducting material, such as aluminum, so that any heat which is absorbed thereby

is readily conducted to the peripheral lip 49 where it is dissipated to the ambient atmosphere. In this manner the photocontrol is not materially affected by the heat which is generated by the light source. Under normal operating conditions, and using a 150 w. lamp for the light source 22, it has been observed that using the insulating means described the temperature within the photocontrol assembly has not exceeded 60° C. Thus the temperature is maintained in a range which will not adversely affect either the operating characteristics or the materials of the photocontrol assembly.

The light source support means 21 also includes an electric plug connection 51. Suitable electrical leads connect the plug 51 to the switch of the photocontrol assembly and the plug 51 releasably engages the electrical receptacle 34 to complete the electric connection to the lamp 22 through the photocontrol 38. The light source support means 21 is thus supported in the aperture 19 of the hood 16 by means of the receptacle and plug connection. If desired to insure adequate support of and to electrically ground the light source support means 21 connecting means in the form of a screw 52 and bracket 53, fixedly attached to the light socket 21 may be used.

As can be seen from FIG. 1 and FIG. 3, the light source support means 21 provides a unit which readily plugs into and out of the light fixture assembly 1.

The light fixture assembly embodying our invention can be assembled and maintained by even the most unskilled home owner. The home owner receives the assembly in knocked down sections. He need only suitably anchor a proper mounting, such as the pole 2, in the ground and then mount the assembly consisting of the connecting means 4 and the support arms 7, 7' and 7'' atop the pole 2, making the necessary connections of the line leads. The arms 7' and 7'' are then loosened and rotated to their proper position with the aid of the indexing means. The light diffuser 17 is placed atop the support arms and rests upon the clips 23 and then the hood 16 is placed in position and finger screws 24 are tightened. The electrical receptacle 34 is then snapped into its mounting clip 36 and the light socket support means 21 is plugged into the optical assembly 6. The only connections which have to be made are the connections of the supply leads 33 to the connecting means 4, and after this has been done the home owner should never again have to handle electrically live leads. The plug-in feature of the light socket support means 21 makes for ready replacement of the lamp 22 and further when the light source support means 21 is lifted from the assembly it is completely de-energized so that the home owner can work in complete safety. Further, the major sources of trouble in the light fixture assembly 1 being the light socket and the photocontrol, these elements are detachably mounted in the light fixture and can be readily removed and replaced without disturbing any other part of the light fixture assembly.

With the above disclosure of our invention other embodiments and modifications will become readily apparent to those skilled in the art and therefore the discussion of our invention in relation to a particular preferred embodiment and use thereof should be considered as having been made for illustrative purposes only and it is intended in the appended claims to cover all modifications and embodiments which fall within the true spirit and scope of our invention.

We claim:

1. An outdoor light fixture adapted to be mounted on a pole top comprising, in combination, a slip fitter engaging said pole top and including an electric outlet, a metallic sleeve slidably disposed on said slip fitter and normally covering said outlet, means for locking said cover in said covering position, three generally arcuate arms extending upwardly and outwardly from said slip fitter, one of said arms being fixed relative to said slip

fitter and the remainder of said arms being releasably held in and rotatable in said slip fitter so that said arms can be rotated to nest compactly with said fixed arm, a generally conical light reflecting hood supported by said arms and having a centrally located aperture therein, a light diffusing member attached to said hood, electrical supply leads extending from said slip fitter through said fixed arm and terminating in an electrical receptacle in said aperture in said hood, an integral photocontrol and light socket assembly disposed in said aperture and having an electric plug connection releasably engaging said electrical receptacle, means disposed between said photocontrol and said light socket to thermally insulate said photocontrol from said light socket and including a metallic heat absorbing plate having an exteriorly disposed peripherally extending heat radiating lip.

2. An outdoor light fixture adapted to be mounted on a pole top comprising, in combination, a slip fitter engaging said pole top, a plurality of generally arcuate arms extending upwardly and outwardly from said slip fitter, one of said arms being fixed relative to said slip fitter and the remainder of said arms being releasably held in and rotatable in said slip fitter so that said arms can be rotated to nest compactly with said fixed arm, a generally conical light reflecting hood supported by said arms and having a centrally located aperture therein, a light diffusing member attached to said hood, electrical supply leads extending from said slip fitter through said fixed arm and terminating in an electrical receptacle in said aperture in said hood, a light socket assembly disposed in said aperture and having an electric plug connection releasably engaging said electrical receptacle.

3. In an outdoor lighting fixture adapted to be mounted atop a pole and including means for connecting said fixture to said pole, a light reflecting hood and a light source connected to and mounted within said hood; the combination with said connecting means and said hood of means for supporting said hood and light source in spaced relation with said connecting means, said support means including a plurality of substantially identically configured support arms, each of said support arms engaging said connecting means at one end and diverging outwardly therefrom to engage said hood at the other end, one of said support arms being fixed to said connecting means and the remainder thereof being rotatable in said connecting means so that said arms can be rotated into substantial parallelism to nest compactly with said fixed arm.

4. In an outdoor lighting fixture adapted to be mounted atop a pole and including means for connecting said fixture to said pole, a light reflecting hood and a light source connected to and mounted within said hood; the combination with said connecting means and said hood of a plurality of support arms each having one end engaging said connecting means and the other end diverging upwardly and outwardly to engage said hood, one of said support arms being fixed relative to said connecting means and the remainder of said support arms being rotatably mounted in said connecting means so that said support arms can be rotated into substantial parallelism to nest compactly.

5. An outdoor light fixture comprising base means for attaching said fixture to supporting structure, an inverted dish light reflecting hood, a plurality of support arms extending generally upwardly and outwardly from said base means, means for fixedly attaching said hood to the upper end of said arms, said hood having a central opening formed therein, a globe affixed to said hood and defining therewith a hollow light source chamber, said arms engaging said hood at the periphery of said globe, at least one of said arms having a hollow interior opening into the interior of said light source chamber, an electrical receptacle in said hood adjacent said central opening, electrical leads extending through said hollow arm and into said light source chamber to connect with said electrical receptacle, a light socket assembly removably

7

mounted in said opening and engaging the periphery of said opening to close the same and cover said electrical receptacle, said assembly having an electric plug connection releasably engaging said receptacle, whereby the electrical circuitry for said light fixture is totally enclosed.

6. An outdoor light fixture adapted to be mounted on a vertical pole comprising a slipfitter engaging said pole, an inverted dished light reflecting hood, a plurality of support arms extending upwardly and outwardly from said slipfitter and supportingly engaging the underside of said hood, means for fixedly attaching said hood to the upper end of said arms, said hood having a central opening formed therein, a dished globe affixed to said hood with its periphery engaging the underside thereof to define therewith a hollow light source chamber, said arms engaging said hood at the periphery of said globe, at least one of said arms having a hollow interior and an aperture at its upper end opening into said light source chamber, an electrical receptacle in said hood adjacent said central opening, electrical leads extending through said hollow arm and said aperture and into said light source chamber to connect with said electrical receptacle, said leads being completely enclosed by said arm and said chamber, a light socket assembly removably mounted in said opening and engaging the periphery of said opening to close the same and cover said electrical receptacle, said assembly having an electric plug connection releasably engaging said receptacle, whereby the electrical circuitry for said light fixture is totally enclosed.

7. An outdoor light fixture comprising, base means for mounting said fixture on supporting structure, an inverted dished light reflecting hood, a plurality of support arms extending upwardly and outwardly from said base means and supportingly engaging the underside of said hood, said hood having a central opening formed therein, a globe affixed to said hood and defining therewith a hollow light source chamber, said arms engaging said hood at the periphery of said globe, at least one of said arms having a hollow interior opening into said light source chamber, an electrical receptacle in said hood adjacent said central opening, electrical leads extending through said hollow arm and into said light source chamber to connect with said electrical receptacle, an integral light socket assembly and photocontrol unit removably mounted in said opening for supporting a light source and engaging the periphery of said opening to close the same and cover said electrical receptacle, said assembly having an electric plug connection releasably engaging said receptacle, whereby the electrical circuitry for said light fixture is totally enclosed, means disposed between said light source and said photo-control for thermally insulating said unit from said light source, said thermal insulating means including heat conductive means for absorbing the heat generated by said light source and having a portion exposed to the atmosphere for dissipating the heat absorbed thereby, said electrical plug means being connected to said light socket assembly and said photocontrol unit.

8. An outdoor light fixture comprising, base means for mounting said fixture on supporting structure, an inverted light reflecting hood having an opening formed therein, a plurality of support arms extending upwardly and outwardly from said base means and supportingly engaging the underside of said hood, a globe disposed adjacent the underside of said hood, attachment means for affixing said hood to the upper end of said arms, said attachment means including support means engaging the periphery of said globe for affixing the latter to said hood, at least one of said arms having a hollow interior in communication with the interior of said globe, an electrical recep-

8

tacle mounted in said hood adjacent said opening, a light socket assembly removably mounted in said opening and having an electric plug connection releasably engaging said electric receptacle, and electrical leads extending through said hollow arm and into said globe to connect with said electrical receptacle.

9. An outdoor light fixture comprising, a slipfitter, an inverted light reflecting hood having an opening formed therein, a plurality of support arms extending upwardly and outwardly from said slipfitter and supportingly engaging the underside of said hood, a globe disposed adjacent the underside of said hood and having its periphery adjacent the intersections of said arms and said hood, attachment means for fixedly mounting said hood to the upper end of said arms, said attachment means including support means extending laterally from said arms and engaging the periphery of said globe for affixing the latter to said hood, at least one of said arms having a hollow interior and an aperture at its upper end opening into said globe, an electrical receptacle in said hood adjacent said central opening, electrical leads extending through said hollow arm and said aperture and into said globe to connect with said electrical receptacle, and a light socket assembly removably mounted in said opening in said hood and having an electric plug connection releasably engaging said electrical receptacle.

10. An outdoor light fixture adapted to be mounted on a vertical pole comprising a slipfitter engaging said pole, an inverted, dished light reflecting hood, a plurality of support arms extending upwardly and outwardly from said slipfitter, means for fixedly attaching said hood to the upper ends of said arms, said hood having a central opening formed therein, a globe affixed to the underside of said hood to define therewith a hollow light source chamber, at least one of said arms having a hollow interior and an aperture at its upper end opening into said globe, an electrical receptacle in said hood adjacent said central opening, electrical leads extending through said hollow arm and said aperture and into said globe to connect with said electrical receptacle, a light socket assembly removably mounted in said opening and engaging the periphery of said opening to close the same and cover said electrical receptacle, said lamp assembly having an electric plug connection releasably engaging said electrical receptacle, an electrical outlet mounted in said slipfitter, a metallic sleeve movable into and out of surrounding relation with said slipfitter to respectively cover and uncover said outlet, and means for locking said sleeve in said covering position, said outlet being in electrical circuitry with said electrical leads.

References Cited in the file of this patent

UNITED STATES PATENTS

55	932,613	Jones	Aug. 31, 1909
	1,543,293	Nelson	June 23, 1925
	1,665,703	Kernes	Apr. 10, 1928
	2,038,817	Wiedenhoef et al.	Apr. 28, 1936
	2,489,076	Bjontegard	Nov. 22, 1949
60	2,491,448	Hillenbrand et al.	Dec. 13, 1949
	2,678,380	Westby	May 11, 1954
	2,709,224	Garnick	May 24, 1955
	2,764,670	Van Dusen	Sept. 25, 1956
	2,812,423	Penna	Nov. 5, 1957
65	2,834,873	Cooper	May 13, 1958
	2,875,267	Sutton	Feb. 24, 1959
	2,962,688	Werner	Nov. 29, 1960
	2,967,230	Goetz et al.	Jan. 3, 1961
70	3,021,502	Lehman	Feb. 13, 1962