

[54] SOLAR CELL PACKAGING ASSEMBLY FOR SELF-CONTAINED LIGHT

[75] Inventors: **Klara Szekely**, West Hills; **Bethanne Felder**; **Lloyd V. Wallace**, both of Thousand Oaks, all of Calif.

[73] Assignee: **Siemens Solar Industries, L.P.**, Camarillo, Calif.

[21] Appl. No.: 392,502

[22] Filed: Aug. 11, 1989

[51] Int. Cl.⁵ H01L 31/048

[52] U.S. Cl. 136/251; 136/259; 136/291; 362/183

[58] Field of Search 136/251, 259, 291; 362/183

[56] References Cited

U.S. PATENT DOCUMENTS

4,057,439	11/1977	Lindmayer	136/251
4,241,493	12/1980	Andrulitis et al.	437/2
4,280,853	7/1981	Palazzetti et al.	136/246
4,321,417	3/1982	Kurth et al.	136/246

Primary Examiner—Aaron Weisstuch

Attorney, Agent, or Firm—Nilsson, Robbins Dalgarn, Berliner Carson & Wurst

[57] ABSTRACT

A self-contained photovoltaic powered light which is a stand alone unit. The solar cells which power the light are assembled and maintained within the top, or upper, portion of the self-contained unit. The solar cells are encapsulated within a resiliently deformable material to provide for contraction and expansion of the solar cells while at the same time providing protection from the elements for the assembly.

5 Claims, 3 Drawing Sheets

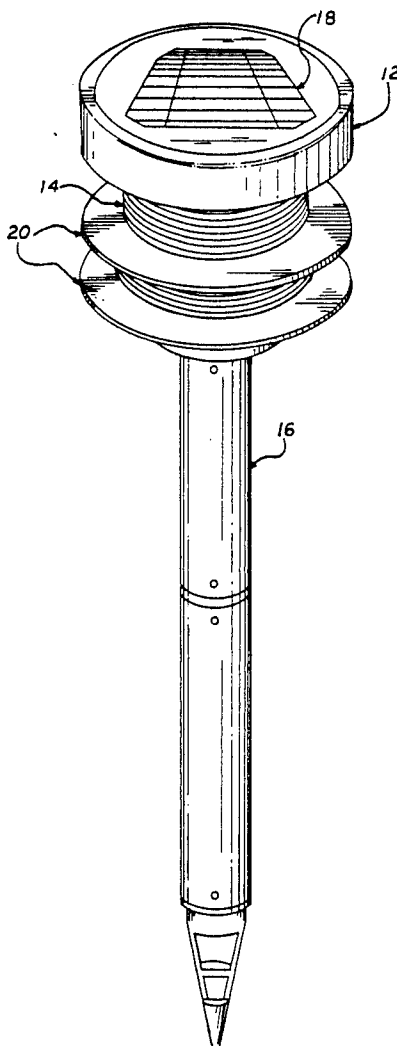


FIG. 1

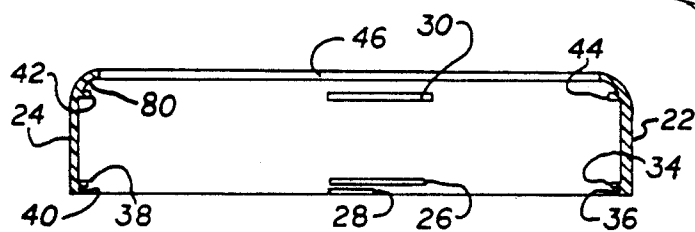
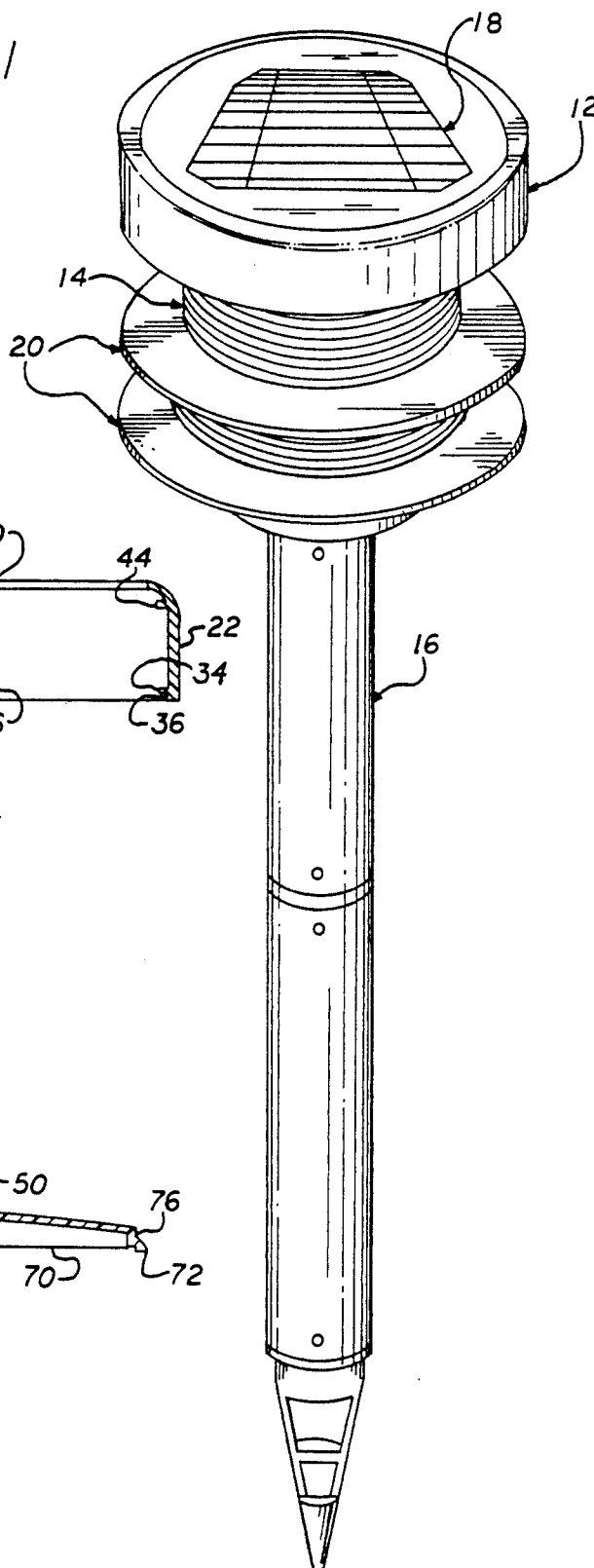


FIG. 3

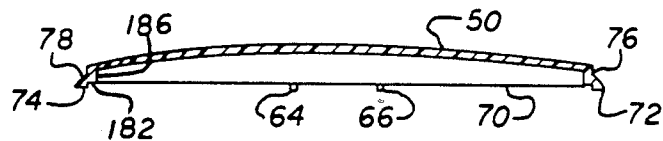
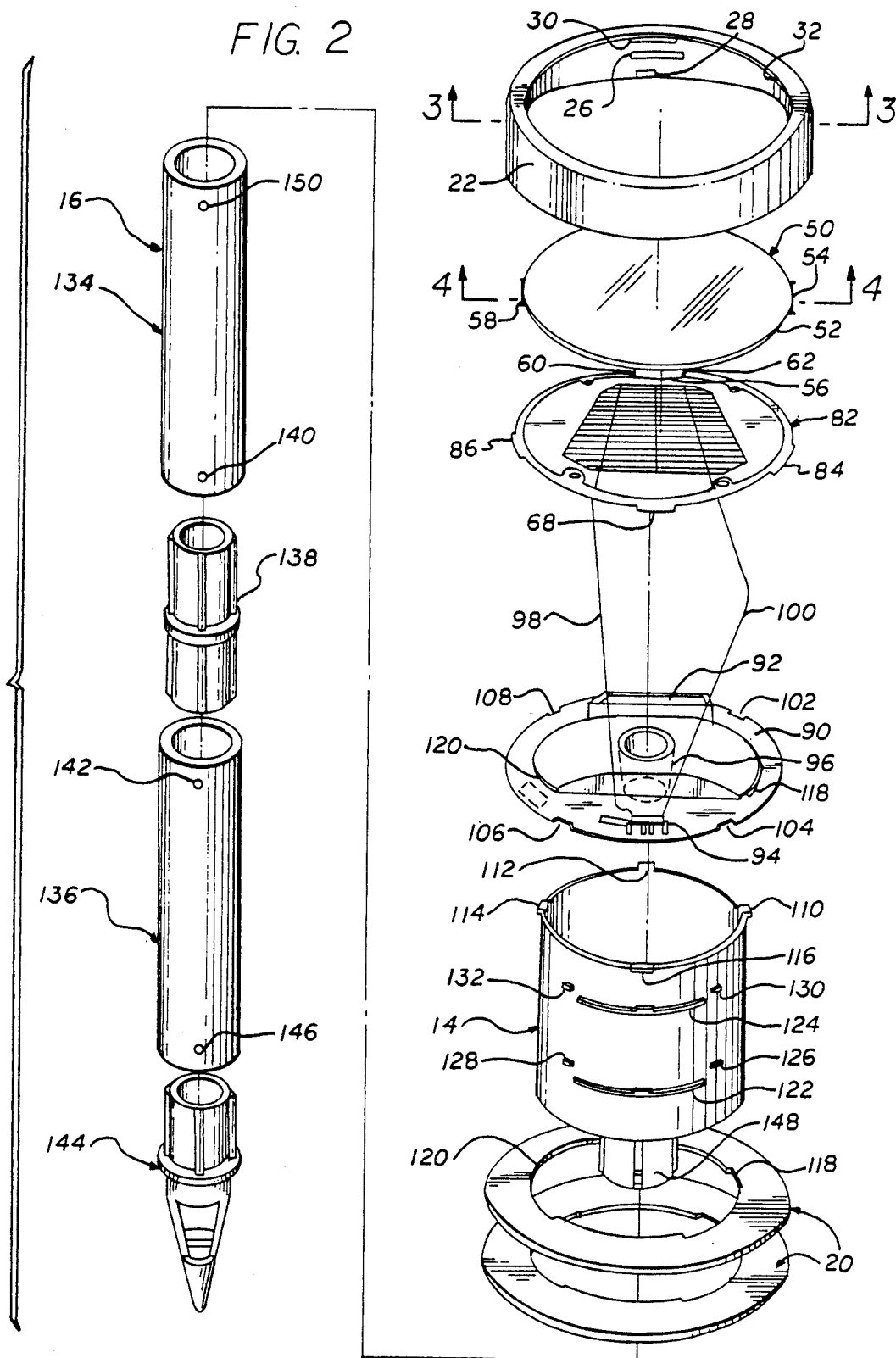


FIG. 4



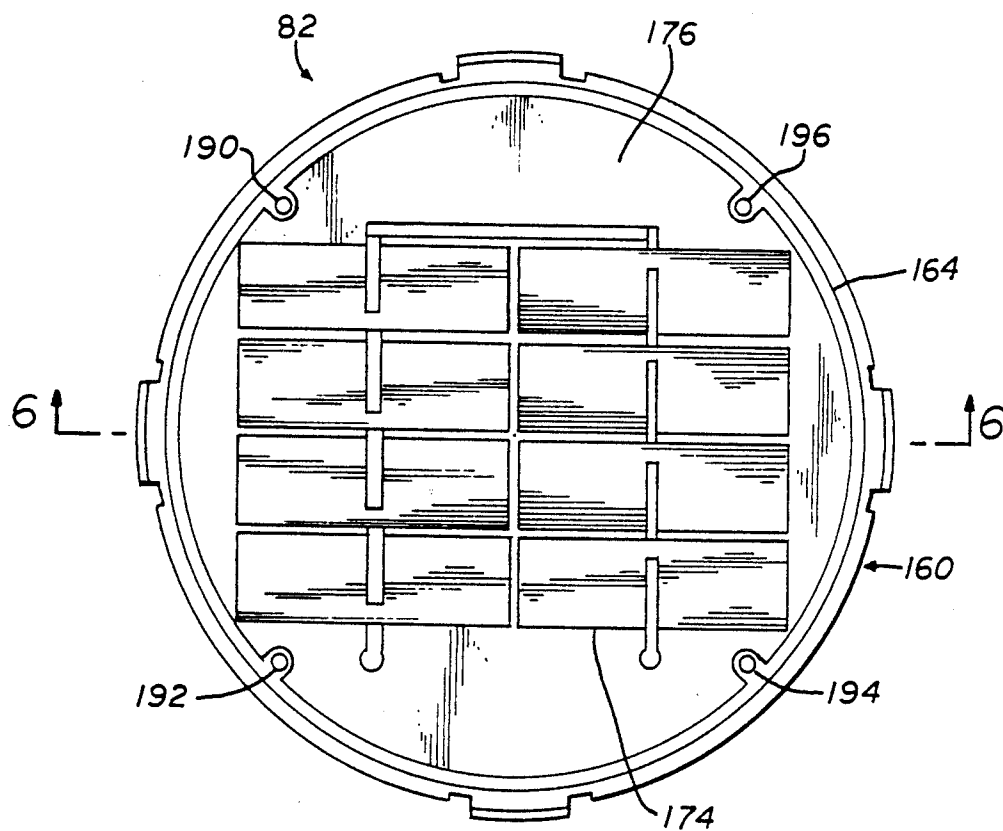


FIG. 5

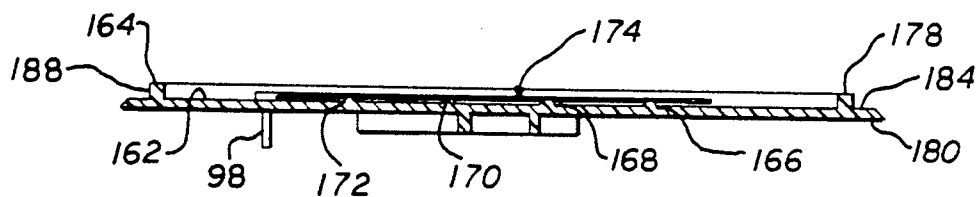


FIG. 6

SOLAR CELL PACKAGING ASSEMBLY FOR SELF-CONTAINED LIGHT

BACKGROUND OF THE INVENTION

This invention relates generally to lighting devices and more particularly to a self-contained photovoltaic powered light. More specifically, the invention is directed to a packaging assembly for the solar cells.

In the prior art, there exists many electrically powered outdoor lighting systems which are utilized to illuminate pathways, yards, certain areas of parks, or other predetermined areas. Typically such lights are connected to the public utility system, or similar source of electrical power and are controlled by preset timing devices so that they illuminate at nightfall and extinguish at a predetermined time, such as approaching daybreak, or the like. Such lights require extensive cabling, including conduits as well as appropriate timing mechanisms and are thus relatively expensive to install and maintain. In addition thereto, by utilizing electric power generated in the traditional manners, such as by the burning of fossil fuels, additional contamination of the environment occurs as well as depletion of fossil fuel sources. Therefore, there is a need to provide a source of illumination for predetermined outdoor areas which does not require connection to a public utility source of power or the like and which is relatively easy and inexpensive to install and requires no maintenance.

SUMMARY OF THE INVENTION

A solar packaging assembly including a tray having a floor and a side wall. A plurality of electrically interconnected solar cells are disposed within the tray. The solar cells are surrounded by an optically clear, resiliently deformable material supported upon the floor of the tray and retained within the side walls thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view illustrative of a light constructed in accordance with the principles of the present invention;

FIG. 2 is an exploded view showing the various component parts of the structure as illustrated in FIG. 1;

FIG. 3 is a cross-sectional view of the bezel taken about the lines 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view of the cover taken about the lines 4—4 of FIG. 2;

FIG. 5 is a top plan view illustrating the encapsulation of the solar cells; and

FIG. 6 is a cross-sectional view of the solar cell encapsulation taken about the lines 6—6 of FIG. 5.

DETAILED DESCRIPTION

The self-contained lamp 10 is illustrated in FIG. 1 and is a stand alone lamp which includes a self-contained electrical power source such as a battery which is maintained in a charged condition by a solar cell array and includes an electrical circuit which controls application of electrical power to an electric light bulb contained therein. The electrical power from the battery is supplied to the light bulb when the solar cell array is not producing electricity, that is, when the ambient light falls below a predetermined level. The lamp 10 includes top portion 12 having a lens 14 affixed thereto. A stake 16 is, in turn, attached to the lens 14 and is used to position the lamp 10 in the desired area such, for exam-

ple, as by inserting the stake 16 into the earth. A solar cell assembly 18 is retained within the top portion 12 while decorative disks 20 are retained upon the lens 14. The entire lamp assembly 10, as illustrated in FIG. 1, may be moved from place to place and positioned at any particular point which may be desired for any particular application. For example, a plurality of the lamps 10 may be positioned to illuminate a pathway as well as to delineate the same. In addition, such a plurality of lamps 10 may be placed to illuminate a given area during nighttime hours.

By reference to FIG. 2, a more detailed understanding of the structure of the lamp 10 may be obtained. The upper portion 12 of the lamp includes a bezel 22 which is preferably constructed of a molded plastic, such as ASA (acrylic styrene acrylonitrile) or the like, which is sturdy yet somewhat flexible for the purposes to be described below.

The bezel 22 defines an inner surface 24 from which there inwardly extends a plurality of spaced apart latching ribs as shown at 26 and 28. Similar ribs, such as those illustrated at 26 and 28, are angularly disposed about the inner surface 24 of the bezel 22. Preferably, the latching ribs are disposed at 90° intervals about the surface 24; however, they may be disposed at different angular positions such as 120° or 60° depending upon the number desired. Also inwardly directed from the surface 24 are a plurality of snap lock retainers as shown at 30. Again, such snap lock retainers are angularly disposed about the surface 24 and preferably at 90° intervals although other intervals may be utilized as desired.

The bezel 22 also defines an upper opening 32 within which the solar cell array is disposed to receive the sunlight during daylight hours to charge the battery contained within the light. The details of construction of the bezel 22 may be better understood by reference to FIG. 3 which more clearly shows the position and relationships of the latching ribs and the snap lock retainer. As is therein shown, additional latching ribs 34, 36, 38 and 40 are shown extending inwardly from the inner surface 24 of the bezel 22. Additional snap lock retainers 42 and 44 are also illustrated. As is more clearly shown in FIG. 3, the snap lock retainer 30 is displaced downwardly from the edge 46 of the bezel which defines the opening 32. As will be described more fully hereinafter, such spacing permits the solar cell assembly 18 to be snapped into place within the bezel 22 and securely held there.

By reference, again, to FIG. 2 and also to FIG. 4, there is illustrated a cover which fits over the solar cells and which forms a part of the solar cell assembly. The cover 50 is optically clear and is preferably constructed of a polycarbonate plastic material which is impact resistant. The polycarbonate material thus protects the solar cells from incidental contact and also from dust. As is shown, the cover 50, at its outer rim 52, includes a plurality of lugs as shown at 54, 56 and 58. Each of the lugs includes spaced apart protrusions as shown at 60 and 62 with respect to the lug 56. Again, the lugs are angularly disposed about the cover 50 and preferably at 90° spacing to match the spacing of the snap lock retainers 30 formed on the bezel 22. The protrusions 60 and 62, when the cap 50 is positioned in place within the bezel 22, are spaced one on each side of a snap lock tongue formed on the solar cell assembly such, for example, as shown at 68 and to be described more fully below. As is more clearly shown in FIG. 4, the protr-

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.