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(12) **United States Patent**
Saaski et al.

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(54) **RECHARGEABLE HEARING AID SYSTEM**

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

Long Life, Rechargeable Hearing Aid; Owens, Boone B.;
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Related U.S. Application Data

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1998.

ABSTRACT

(51) **Int. Cl.**⁷ **H04R 25/00**
(52) **U.S. Cl.** **381/323; 381/328; 381/322**
(58) **Field of Search** 381/322, 323,
381/327, 328, 331, FOR 127, FOR 132,
FOR 133, FOR 135, FOR 137; 429/163,
164, 175, 176, 94, 161, 209, 186

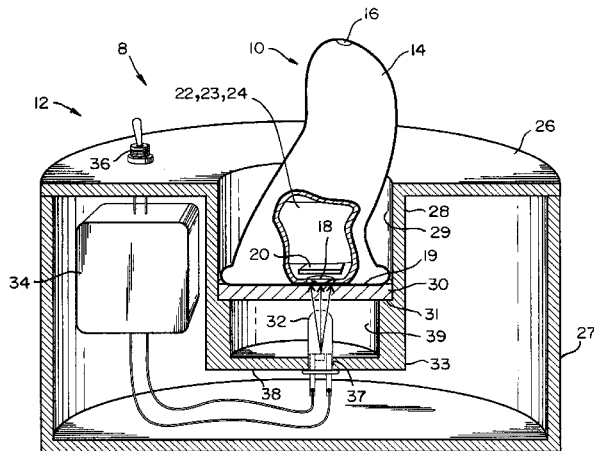
A contactless rechargeable hearing aid system in which a rechargeable hearing aid may be optically or inductively recharged by an optical or an inductive recharger. The optically rechargeable hearing aid may have a dual purpose optical fiber that may act as a light conduit for the recharging light, and that may also act as a draw string for the hearing aid. The rechargeable hearing aid may use a high energy nickel metal-hydride rechargeable battery or a high energy, high voltage lithium based rechargeable battery, in conjunction with a DC to DC voltage regulating circuit for converting the rechargeable battery's declining DC output voltage to the fixed DC input voltage needed by the hearing aid's audio related circuitry. The DC to DC voltage regulating circuit may also help to present a supply impedance that matches the input impedance of the audio related circuitry in the hearing aid. The rechargeable battery may have an alternately folded cell stack, a spiral wound cell stack or an accordion folded cell stack, in order to provide, in a minimized volume, the large anode, cathode and electrolyte areas that may be needed to reduce the rechargeable battery's output impedance, in order to help reduce internal resistance losses during use of the battery.

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27 Claims, 14 Drawing Sheets



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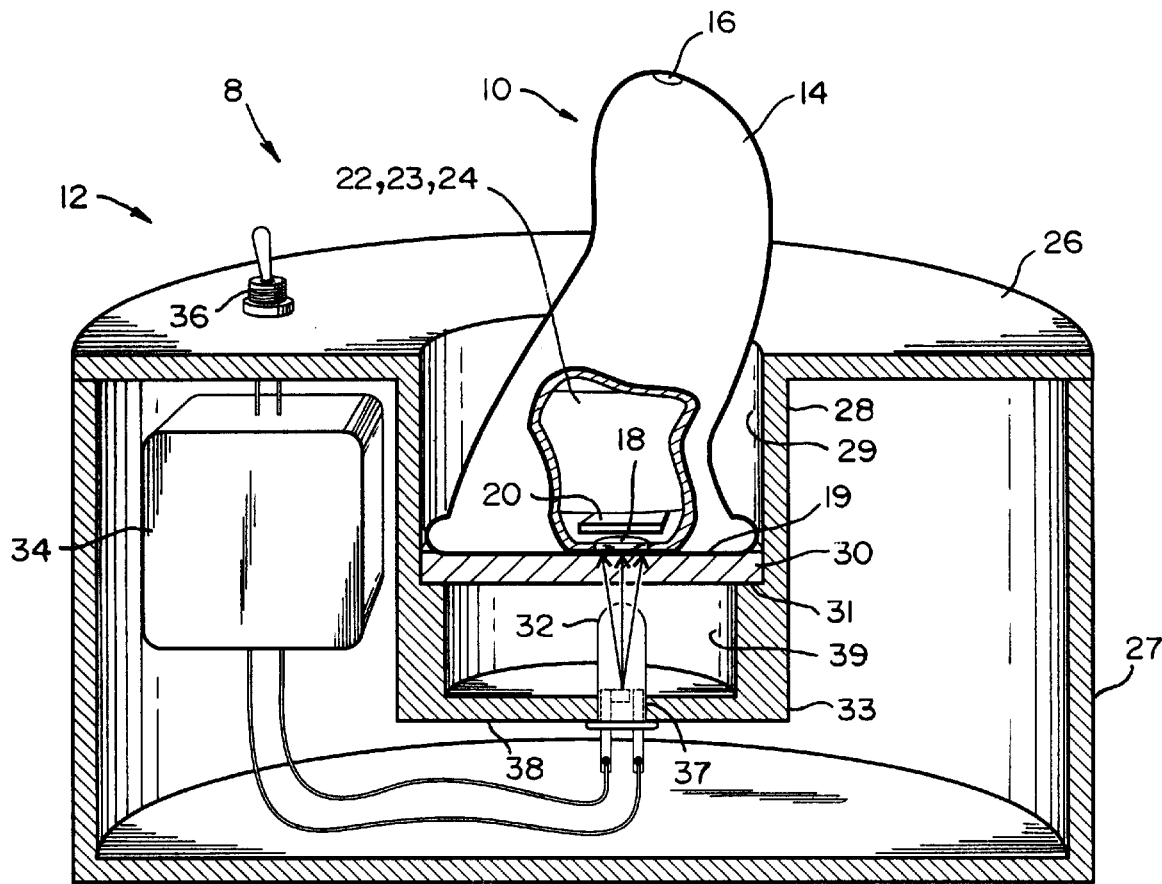


FIG. 1

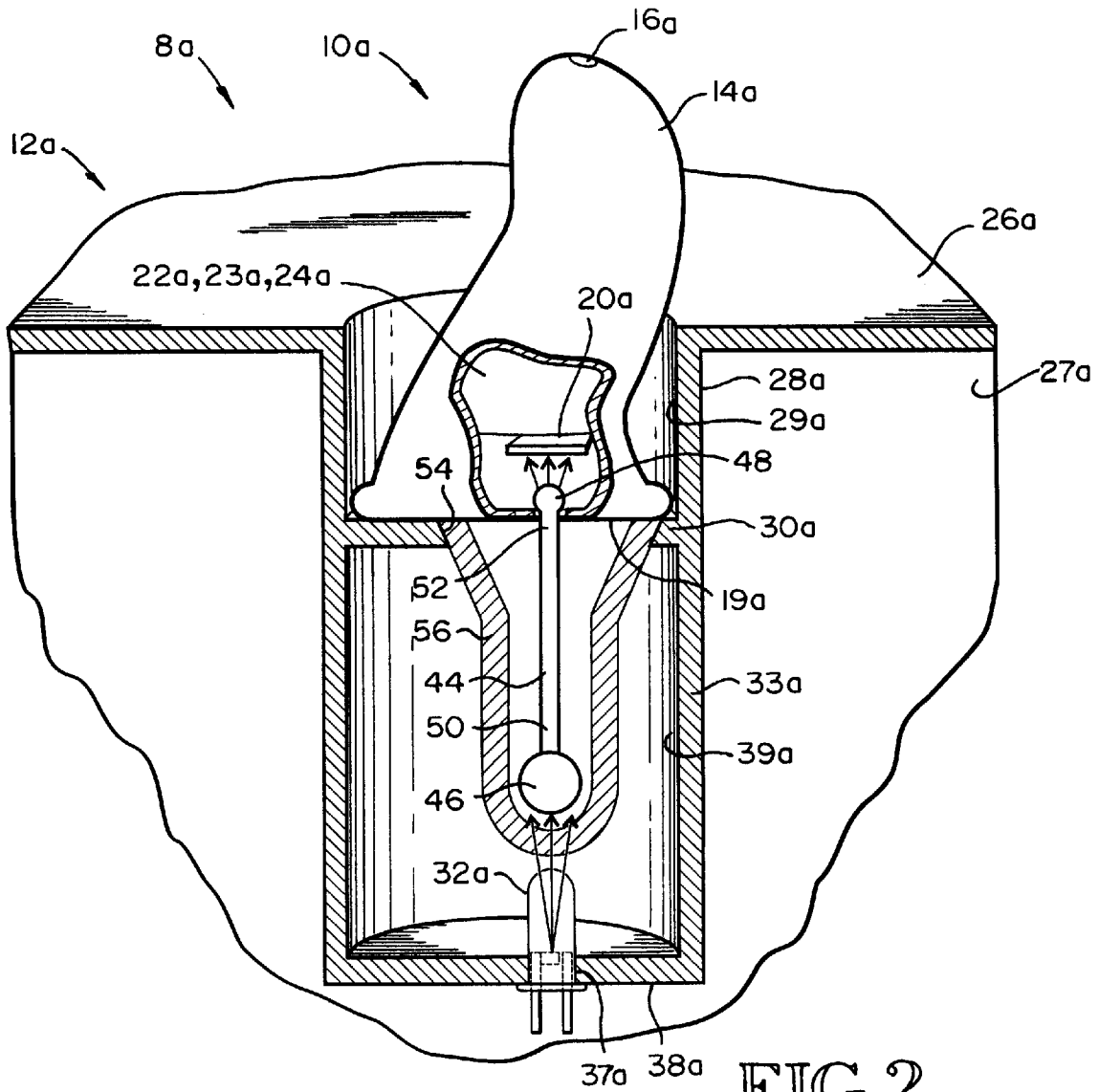


FIG. 2

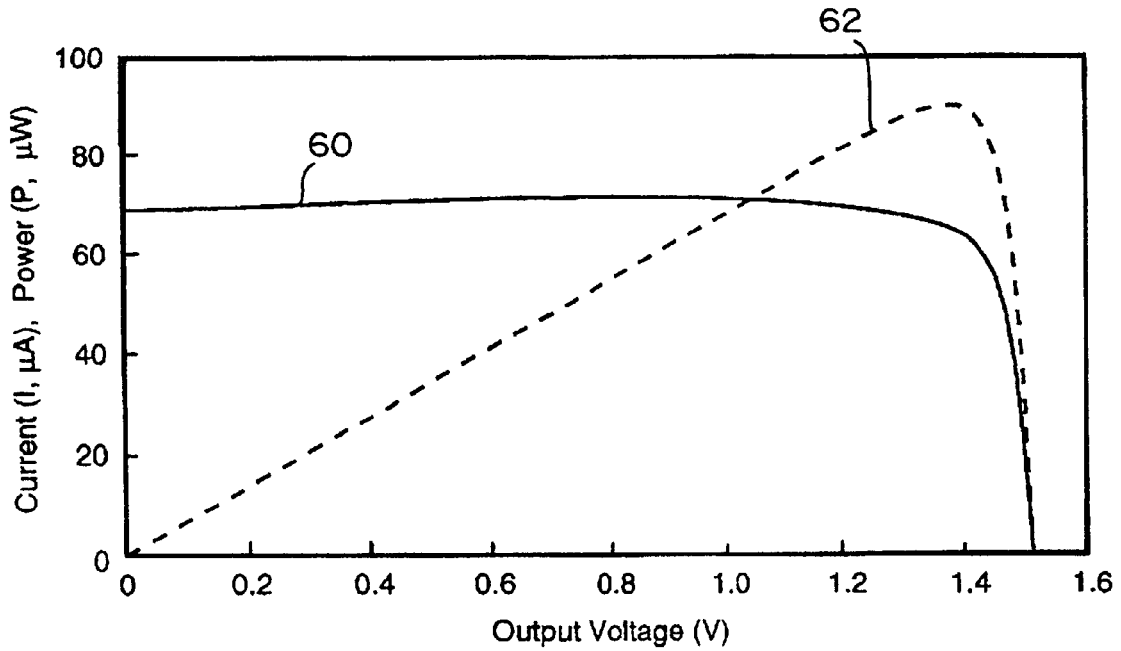


FIG. 3

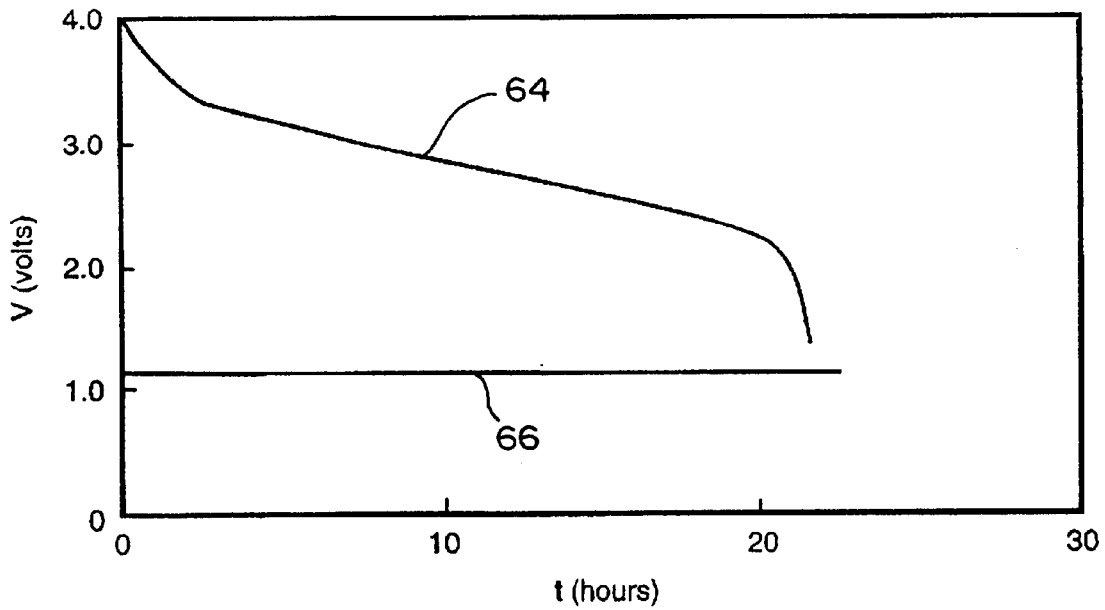


FIG. 4

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