



US005780993A

United States Patent [19]

[11] Patent Number: **5,780,993**

Tsang

[45] Date of Patent: **Jul. 14, 1998**

[54] **COMBINATION BATTERY CHARGER AND POWER SOURCE FOR ELECTRICALLY POWERED DEVICES**

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5,525,888	6/1996	Toya	320/2

[76] Inventor: **John Moong Hung Tsang**, 5947 King Hill Dr., Farmington, N.Y. 14425

Primary Examiner—Edward Tso
Attorney, Agent, or Firm—Cumpston & Shaw

[57] ABSTRACT

[21] Appl. No.: **560,322**

[22] Filed: **Nov. 17, 1995**

[51] **Int. Cl.⁶** **H01M 10/46**

[52] **U.S. Cl.** **320/111; 320/112**

[58] **Field of Search** 320/2, 15, 56, 320/107, 110, 111, 112, 137, 101, 104, 155; D13/103, 107-108; 429/96-100

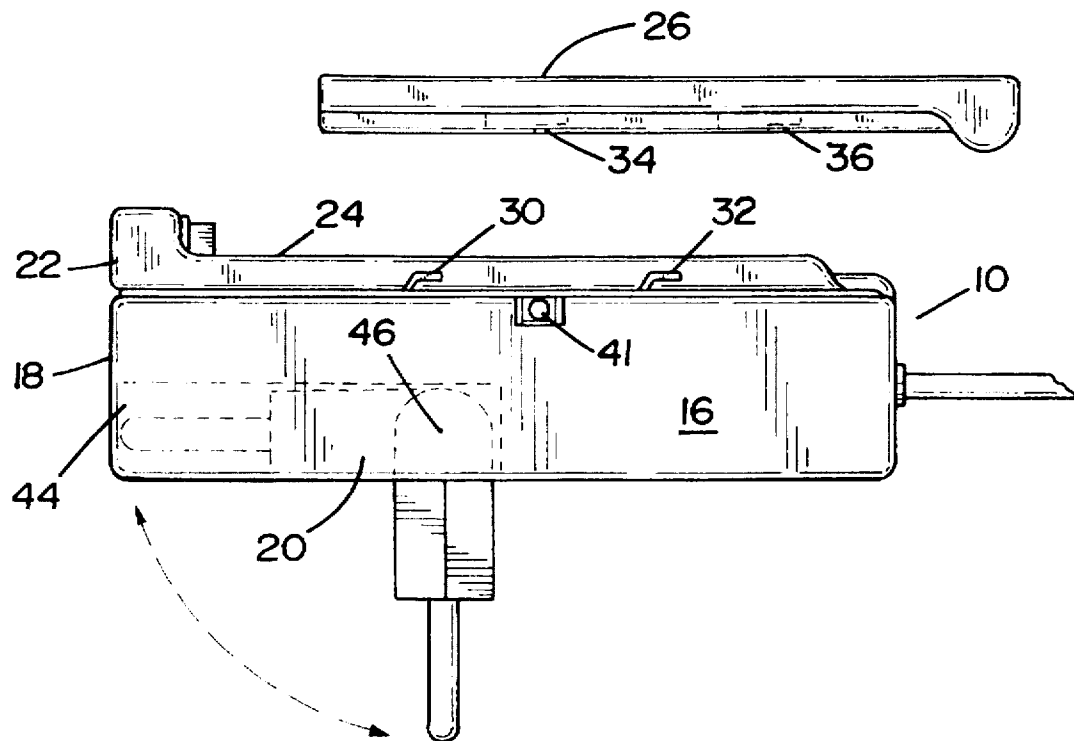
A combination charger and power source for an electrically powered device having a removable battery pack that has one or more batteries enclosed within a battery pack case having a mechanical connector for removably mechanically attaching the battery pack to the device and an electrical connector for electrically connecting batteries within the case to the device when the battery pack is mechanically attached to the device comprises a case having a mechanical connector adapted to engage the mechanical connector of the battery pack for attaching the battery pack to the charger, an electrical connector adapted to make an electrical connection to the battery pack when the battery pack is attached to the charger, a recess in the case and an integral plug in the recess and pivotally attached to the case for movement between an extended position permitting the charger to be plugged directly into a conventional AC connector, and a recessed position in which the plug is disposed substantially within the recess in the case.

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9 Claims, 4 Drawing Sheets



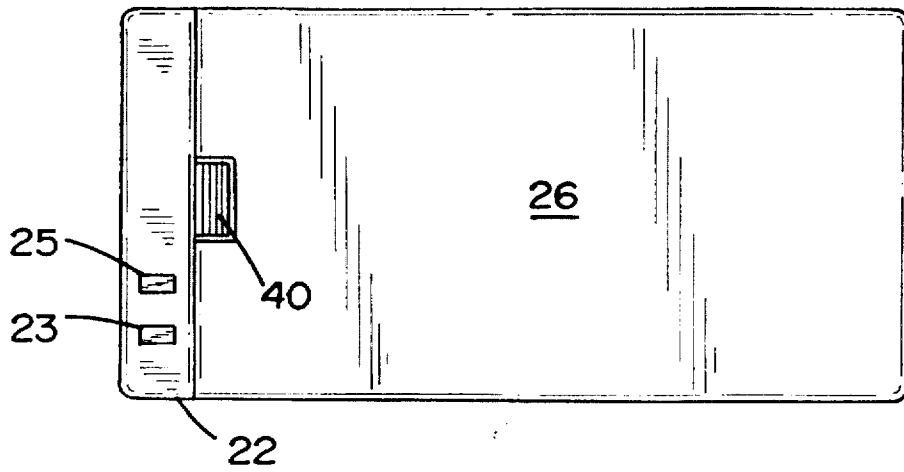


FIG. 2

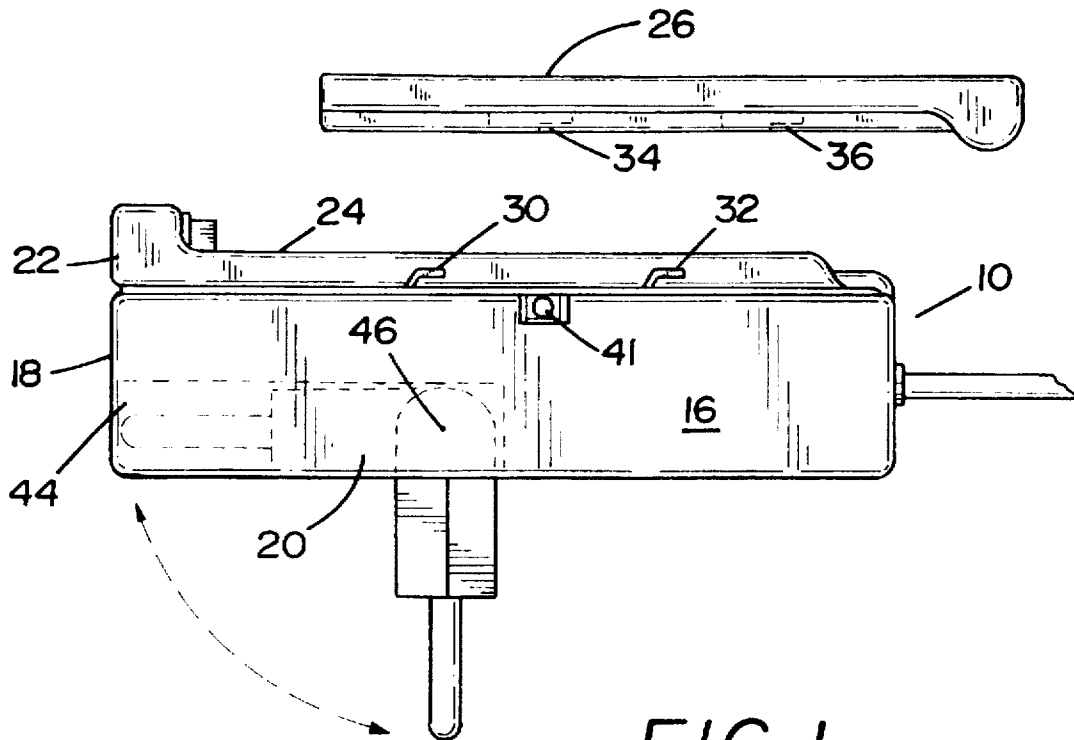


FIG. 1

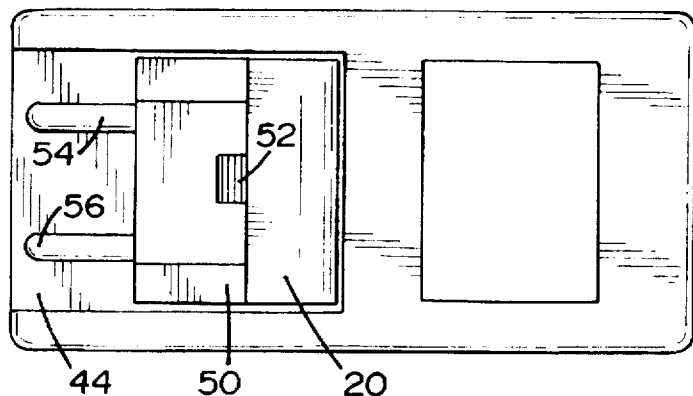


FIG. 3

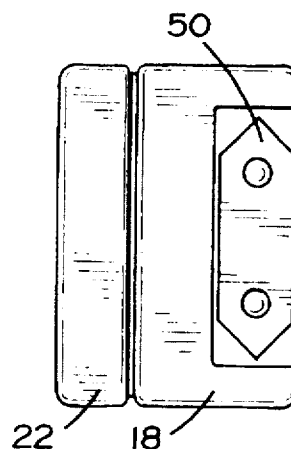


FIG. 6

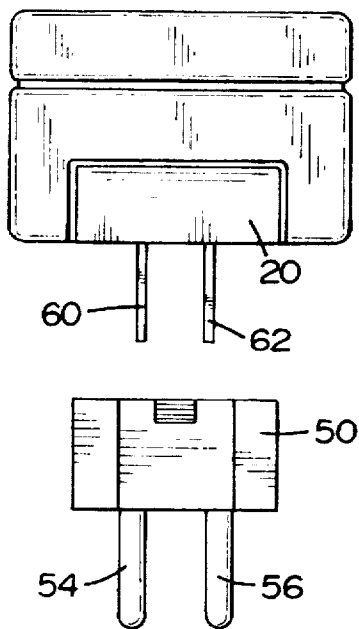


FIG. 4

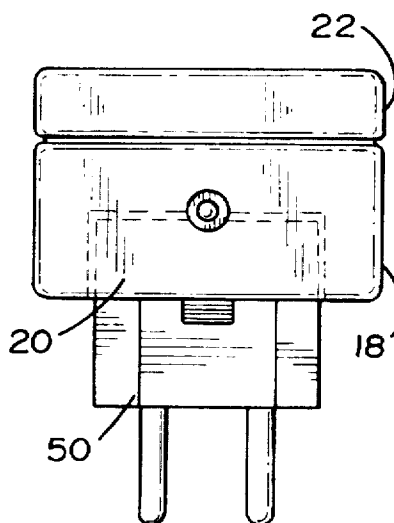


FIG. 5

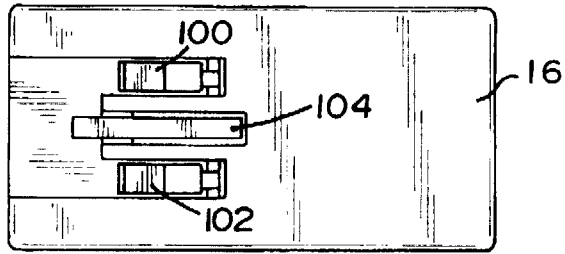


FIG. 7

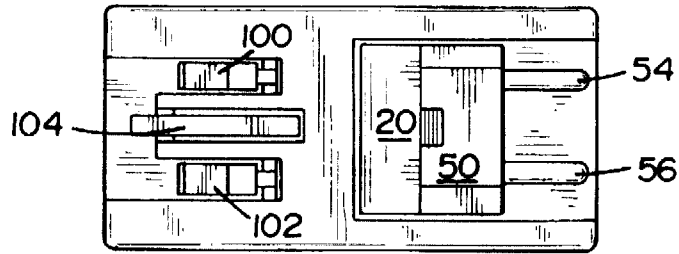


FIG. 12

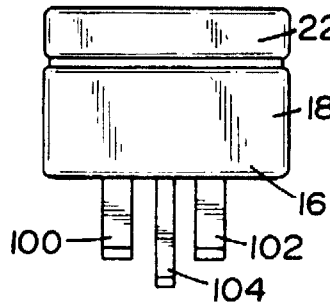


FIG. 8

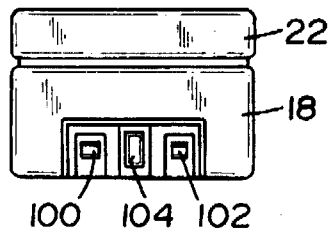


FIG. 9

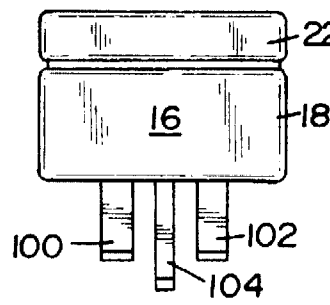


FIG. 13

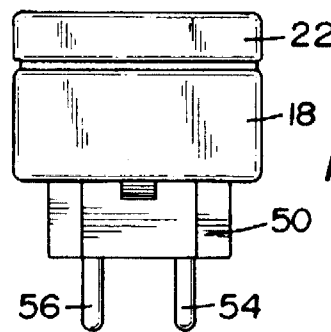


FIG. 14

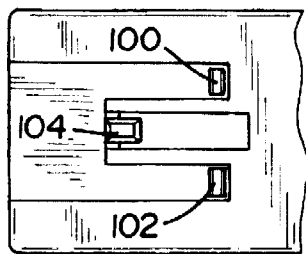


FIG. 10

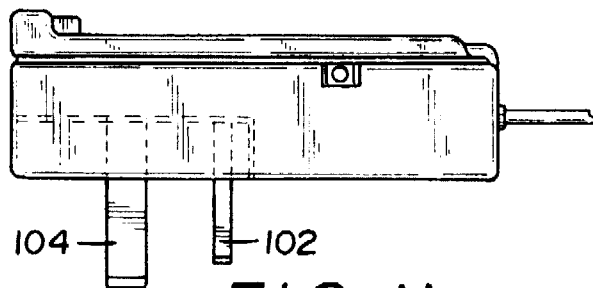


FIG. 11

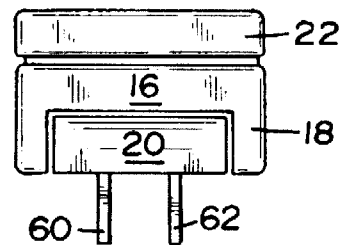


FIG. 15

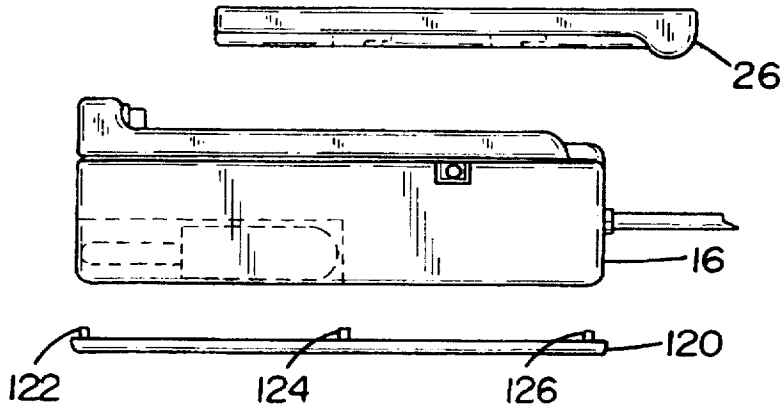


FIG. 16

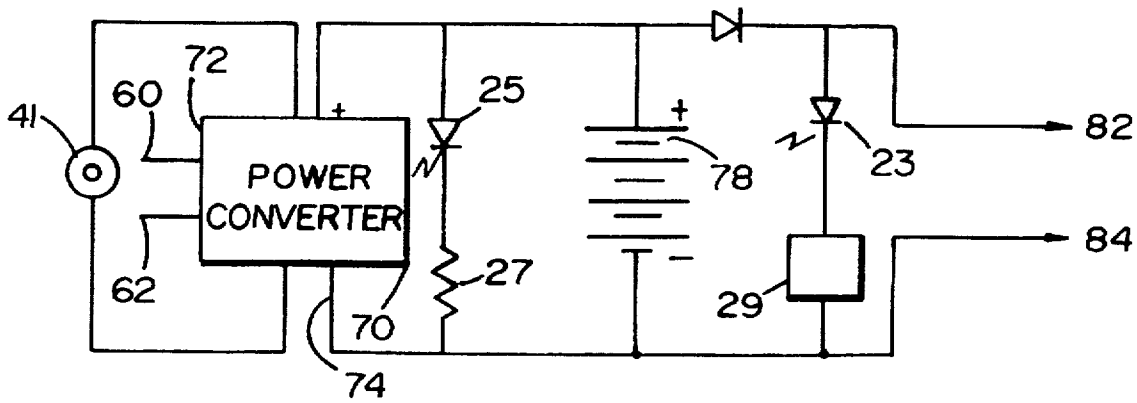


FIG. 17

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