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Ali et al.

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(54) **UNIVERSAL/UPGRADING PULSE OXIMETER**

WO WO 97/22293 6/1997
WO WO 00/42911 7/2000

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OTHER PUBLICATIONS

Mallinckrodt Product Catalog, Jan. 8, 2000.

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(57) **ABSTRACT**

A Universal/Upgrading Pulse Oximeter (UPO) comprises a portable unit and a docking station together providing three-instruments-in-one functionality for measuring oxygen saturation and related physiological parameters. The portable unit functions as a handheld pulse oximeter. The combination of the docked portable and the docking station functions as a standalone, high-performance pulse oximeter. The portable-docking station combination is also connectable to, and universally compatible with, pulse oximeters from various manufacturers through use of a waveform generator. The UPO provides a universal sensor to pulse oximeter interface and a pulse oximetry measurement capability that upgrades the performance of conventional instruments by increasing low perfusion performance and motion artifact immunity, for example. Universal compatibility combined with portability allows the UPO to be transported along with patients transferred between an ambulance and a hospital ER, or between various hospital sites, providing continuous patient monitoring in addition to plug-compatibility and functional upgrading for multiparameter patient monitoring systems.

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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.

(21) Appl. No.: **09/516,110**

(22) Filed: **Mar. 1, 2000**

Related U.S. Application Data

(63) Continuation of application No. 09/491,175, filed on Jan. 25, 2000.

(60) Provisional application No. 60/117,097, filed on Jan. 25, 1999, and provisional application No. 60/161,565, filed on Oct. 26, 1999.

(51) **Int. Cl.⁷** **A61B 5/00**

(52) **U.S. Cl.** **600/323**

(58) **Field of Search** 600/300, 323;
128/903, 904

(56) **References Cited**

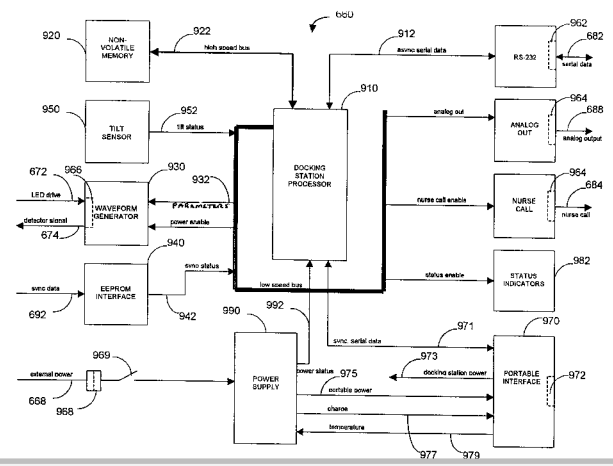
U.S. PATENT DOCUMENTS

5,687,717 A 11/1997 Halpern et al.
5,931,791 A 8/1999 Saltzstein et al.

FOREIGN PATENT DOCUMENTS

EP 0 601 589 9/1993

37 Claims, 16 Drawing Sheets



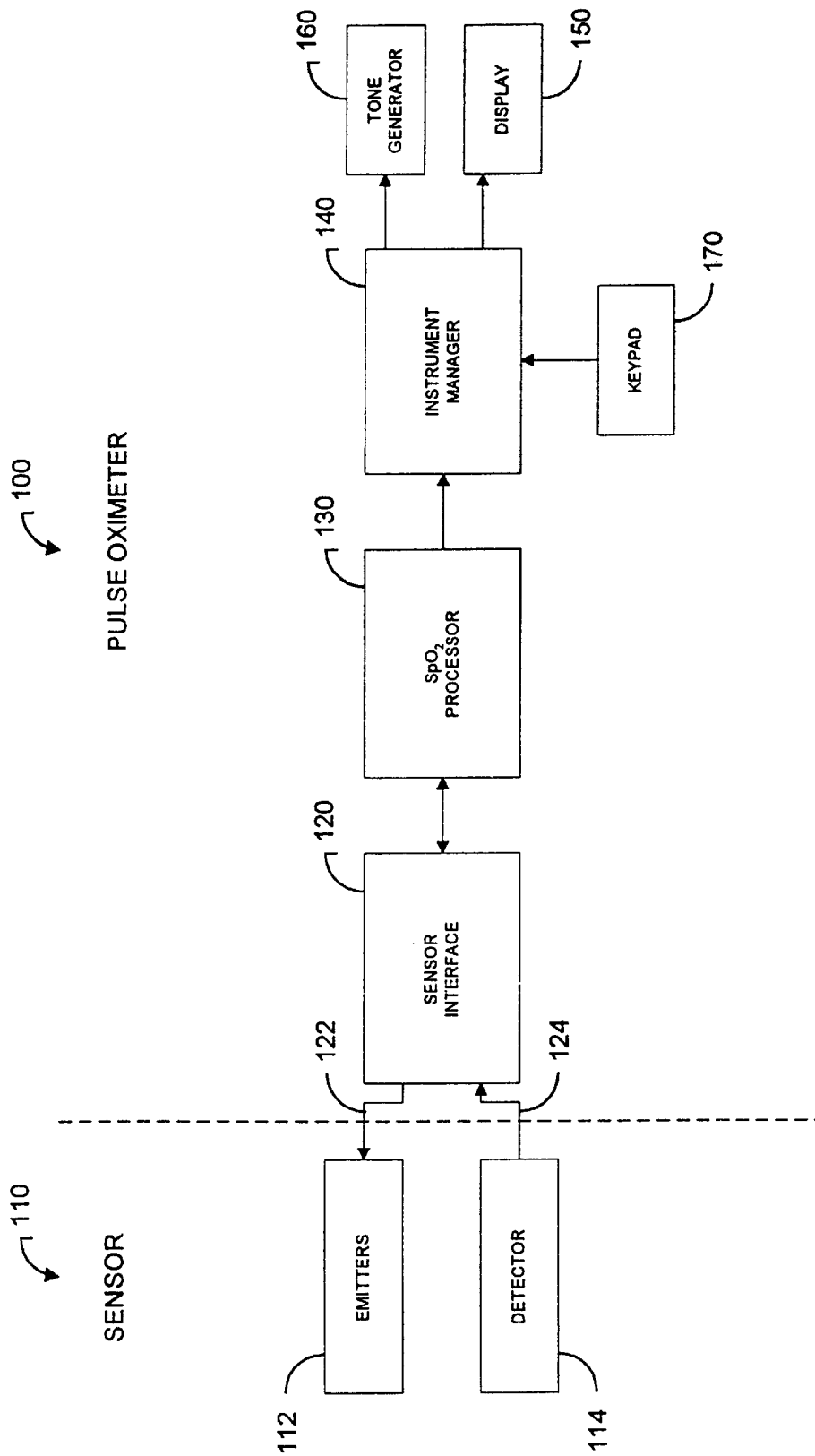


FIG. 1 (prior art)

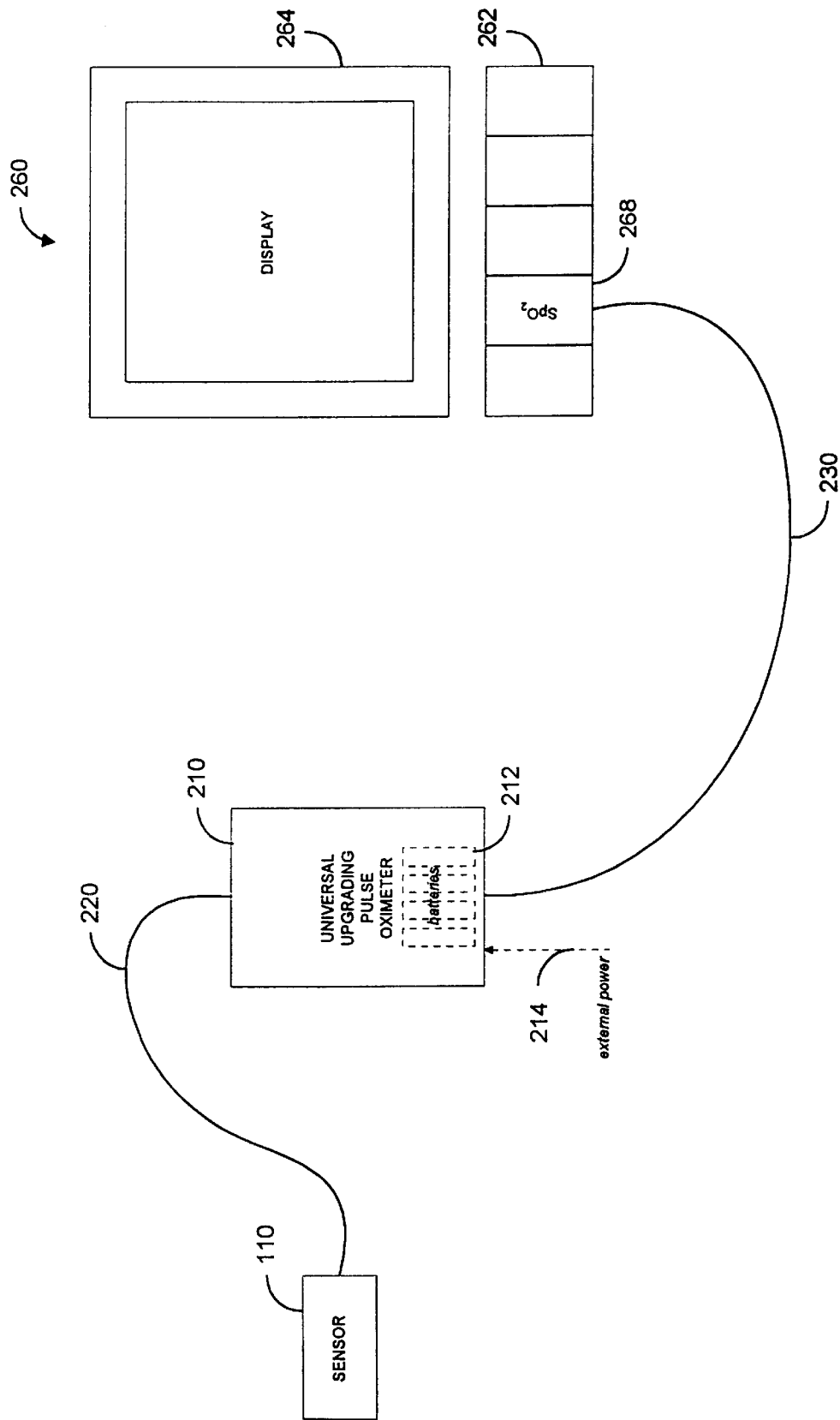


FIG. 2

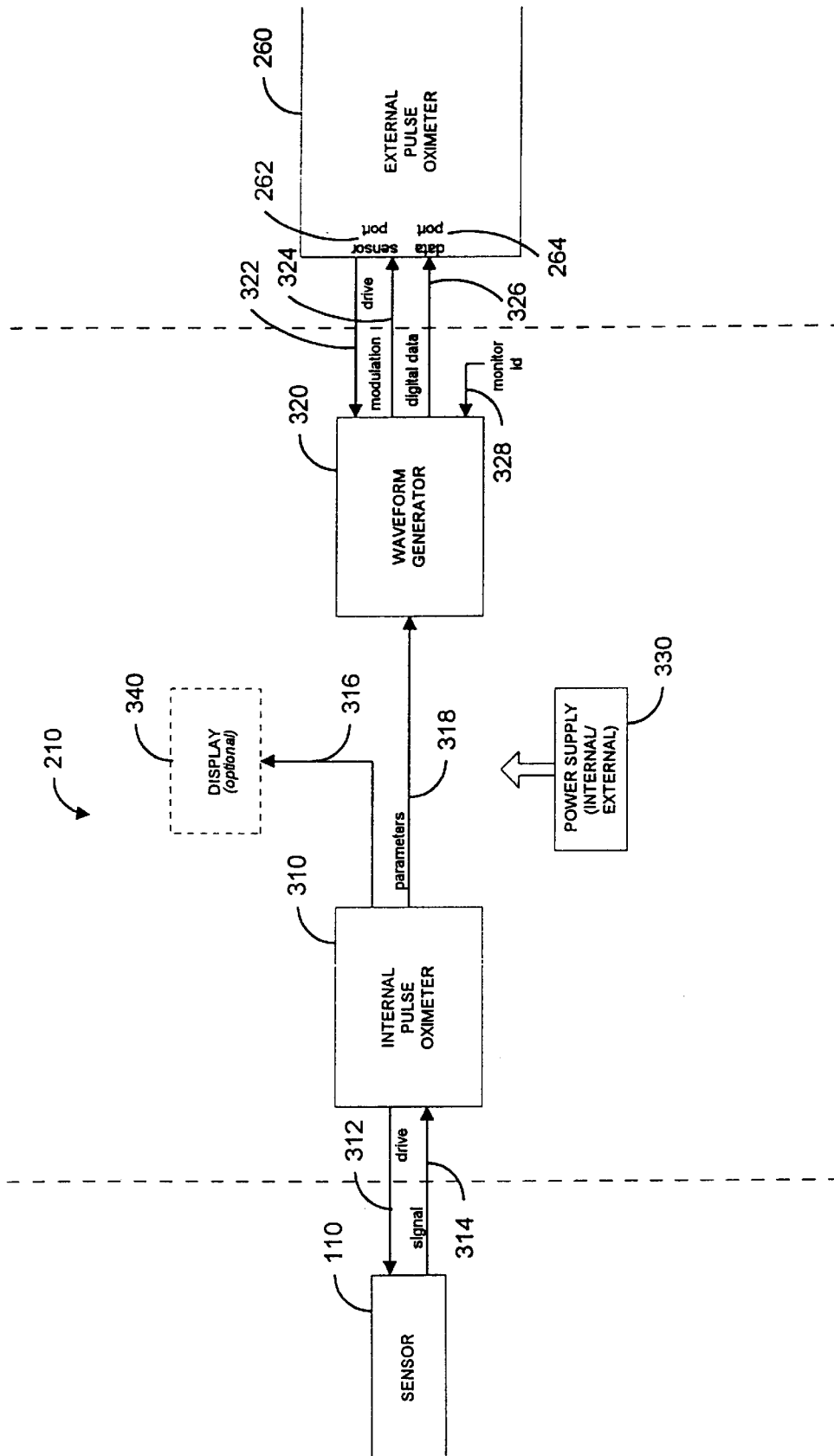


FIG. 3

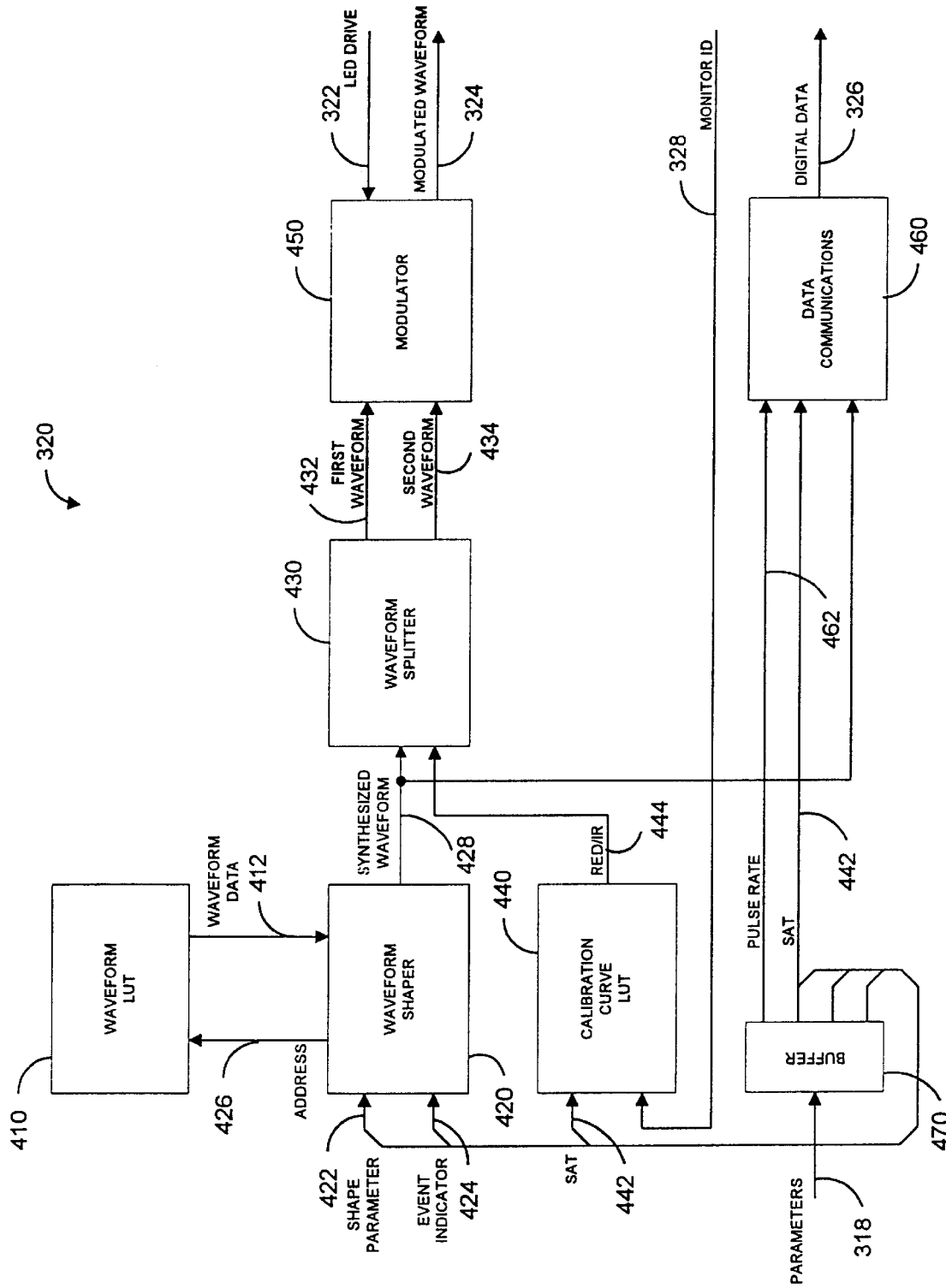


FIG. 4

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