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(54) **NON-INVASIVE ENERGY METER FOR FIXED AND VARIABLE FLOW SYSTEMS**

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(58) **Field of Search** 374/40, 39, 32, 374/41, 31, 147

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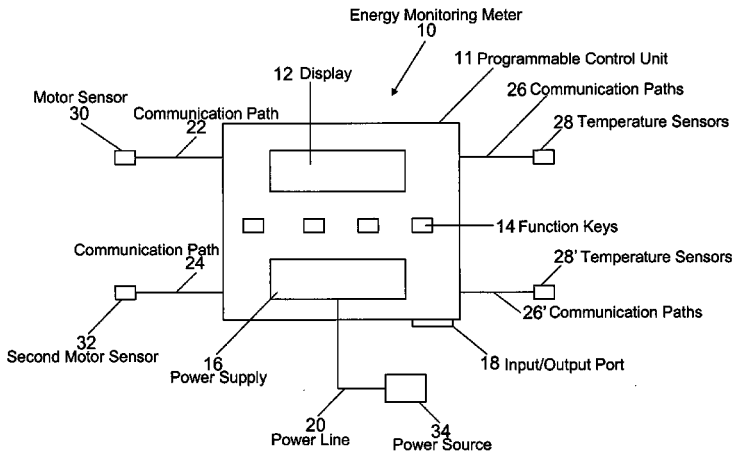
(57) **ABSTRACT**

An energy metering method and apparatus for liquid flow systems comprising first and second segments of one or more conduits through which a liquid flows, comprising: attaching a first temperature sensor for connection to an outside of the first conduit segment; attaching a second temperature sensor for connection to an outside of the second conduit segment; via a programmable control unit, receiving data from the sensors and calculating energy data therefrom; and communicating energy data from the meter; whereby the method and apparatus operate without need to temporarily disconnect or alter the first or second conduit segments. The invention operates with both variable and fixed flow systems, and is especially useful for both active and passive solar energy systems.

17 Claims, 3 Drawing Sheets