

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

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(54) **ELECTRICAL THERMAL STORAGE WITH  
EDGE-OF-NETWORK TAILORED ENERGY  
DELIVERY SYSTEMS AND METHODS**

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patent is extended or adjusted under 35  
U.S.C. 154(b) by 403 days.

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**G01R 15/00** (2006.01)  
**G01R 13/00** (2006.01)

(52) **U.S. Cl.**  
USPC ..... **700/295; 700/275; 700/276; 700/277;**  
**700/278; 702/57; 702/58; 702/59**

(58) **Field of Classification Search**  
None  
See application file for complete search history.

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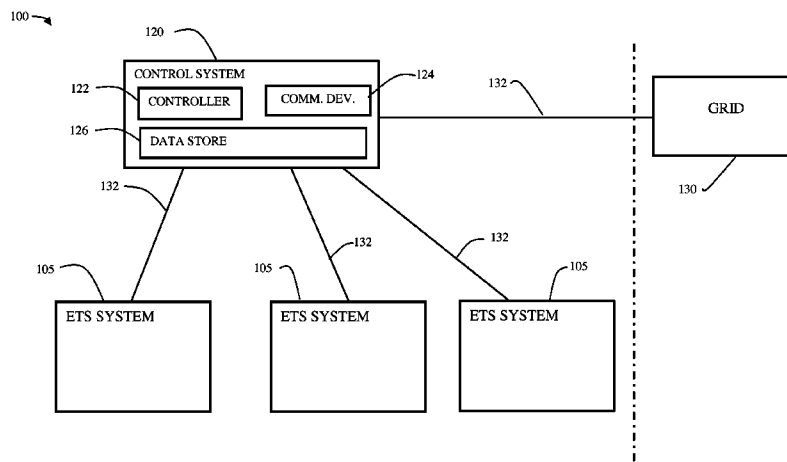
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(57) **ABSTRACT**

A method and apparatus of controlling the electric power usage of electric thermal storage heaters and systems are based on: 1) current and recorded measurements local to the heater and building; 2) current measurements external to the heater and building; 3) forecasts communicated to the apparatus. The method also includes sending out communications about power use as well as various other local measurements. The apparatus has local controls on the electric thermal storage, including but not limited to the relays that control flow of power into the heating elements, a logic module that integrates the local controls, as well as communication channels that extend outside the building to entities capable of providing automatic forecasts and potentially other types of information not available locally.

**10 Claims, 6 Drawing Sheets**



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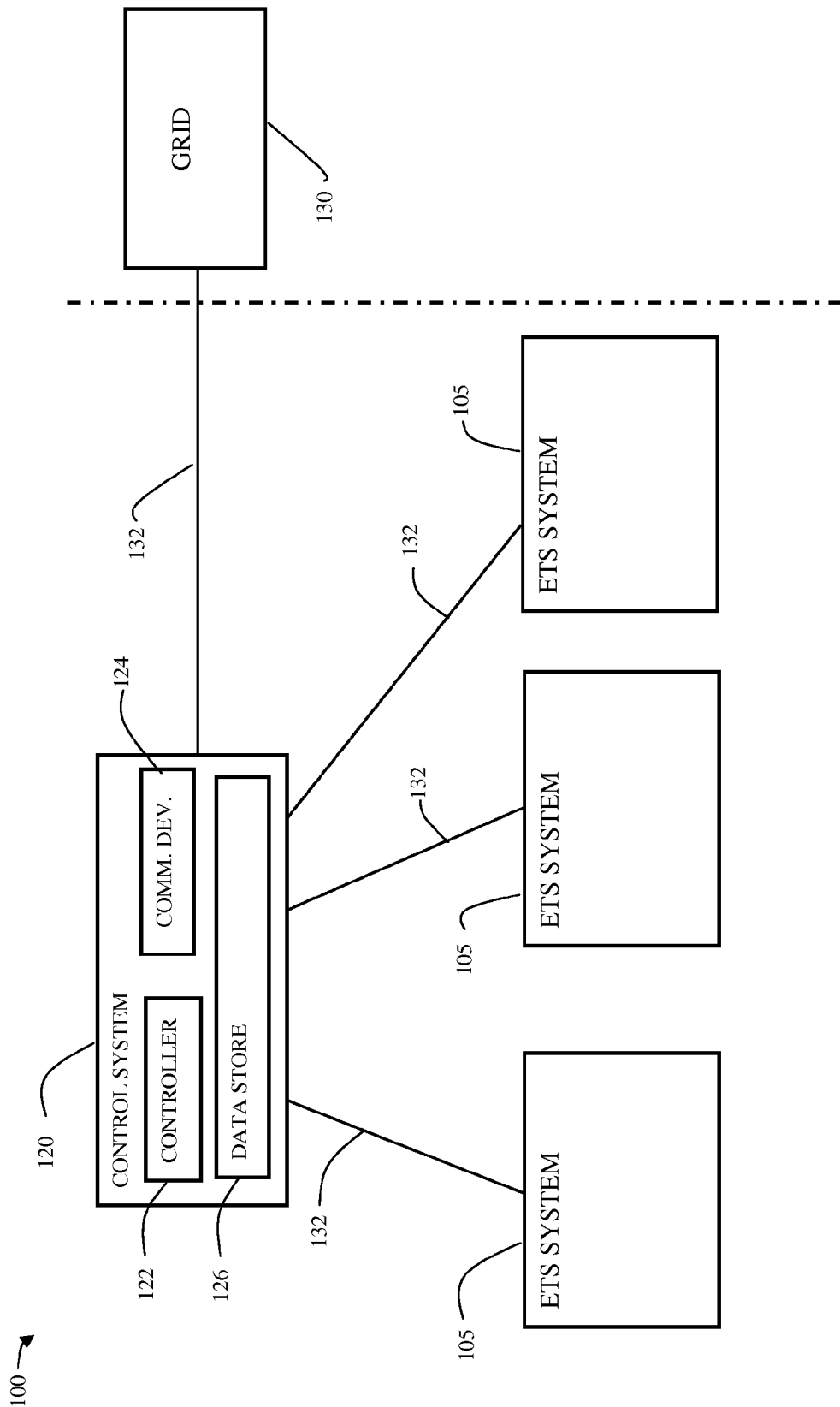


FIGURE 1

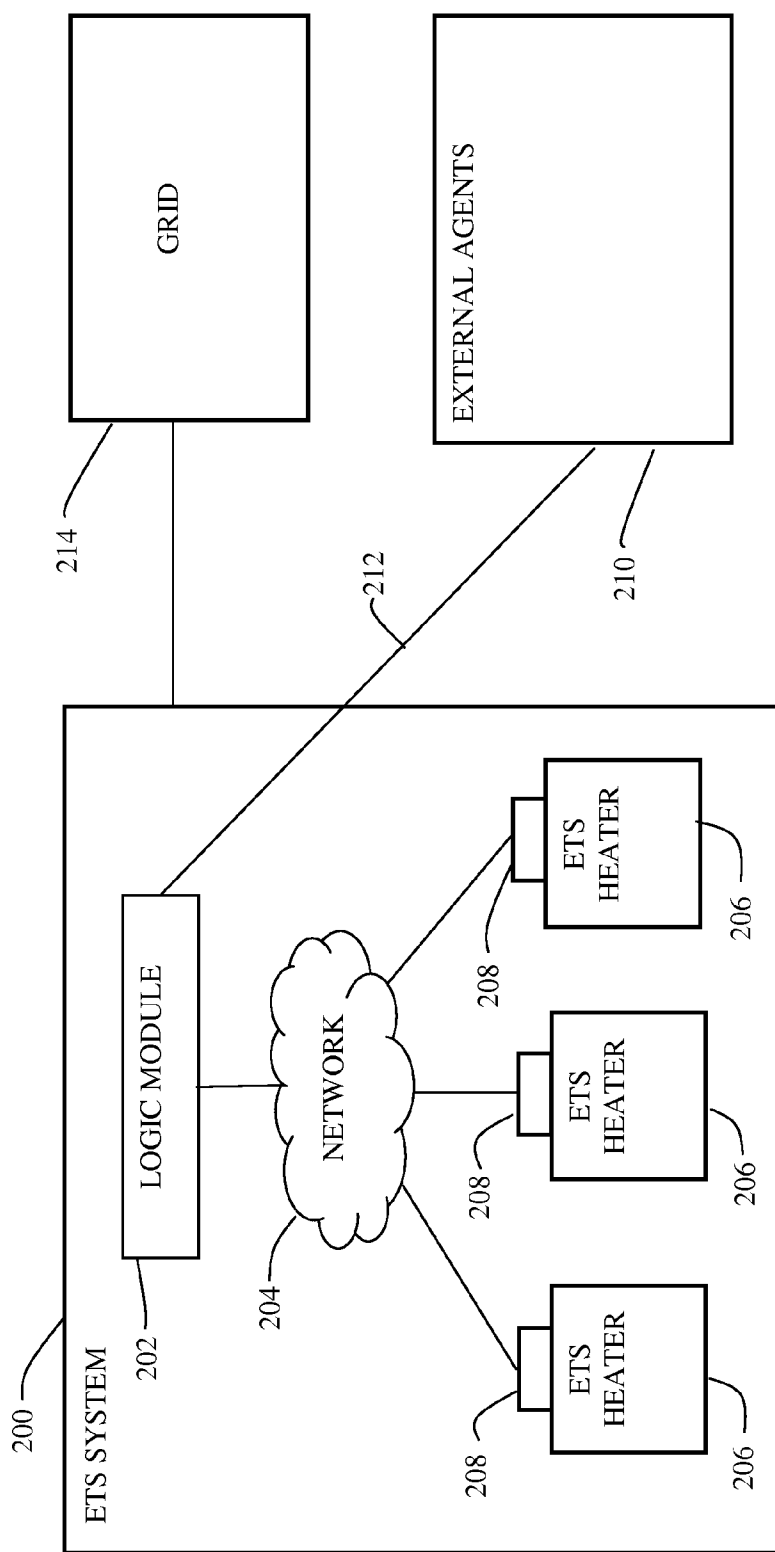


FIGURE 2

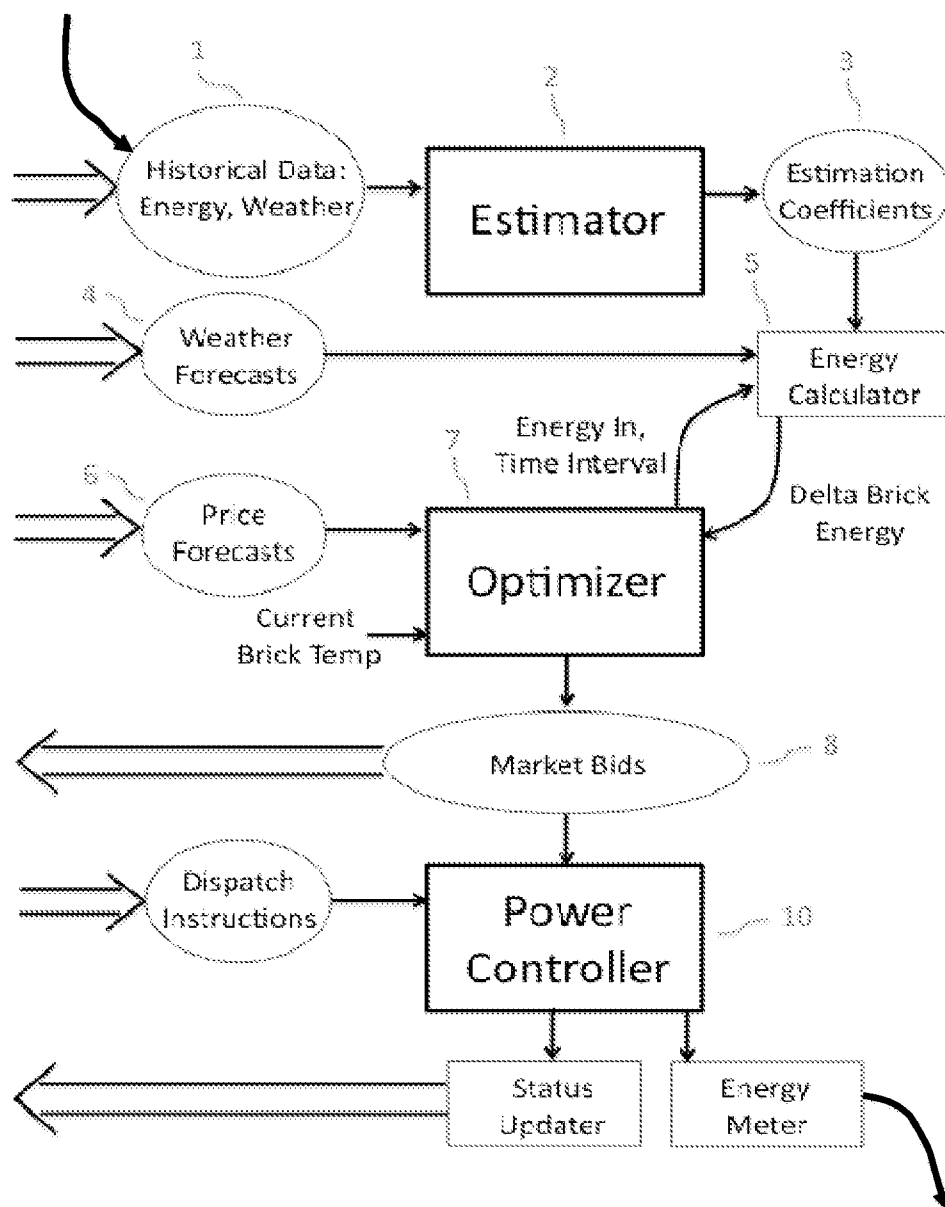


FIGURE 3

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