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(12) **United States Patent**
Kates

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(54) **ZONE THERMOSTAT FOR ZONE HEATING AND COOLING**

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(76) Inventor: **Lawrence Kates**, 1111 Bayside Dr.,
Corona Del Mar, CA (US) 92625

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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.

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(Continued)

Related U.S. Application Data

Primary Examiner—Marc E Norman

(63) Continuation of application No. 10/959,494, filed on Oct. 6, 2004, now Pat. No. 7,156,316.

(74) *Attorney, Agent, or Firm*—Knobbe, Martens, Olson & Bear, LLP

(51) **Int. Cl.**

F24F 11/00 (2006.01)

F24F 3/00 (2006.01)

G05D 23/00 (2006.01)

(57) **ABSTRACT**

(52) **U.S. Cl.** **236/1 B**; 236/49.3; 236/94;
165/208

A zone thermostat for use in connection with an Electronically-Controlled Register vent (ECRV) that can be easily installed by a homeowner or general handyman is disclosed. The ECRV can be used to convert a non-zoned HVAC system into a zoned system. The ECRV can also be used in connection with a conventional zoned HVAC system to provide additional control and additional zones not provided by the conventional zoned HVAC system. In one embodiment, the ECRV is configured have a size and form-factor that conforms to a standard manually-controlled register vent. In one embodiment, the zone thermostat is configured to provide thermostat information to the ECRV. In one embodiment, the zone thermostat communicates with a central monitoring system that coordinates operation of the heating and cooling zones.

(58) **Field of Classification Search** 236/1 B,
236/49.3, 94; 165/205, 208, 217

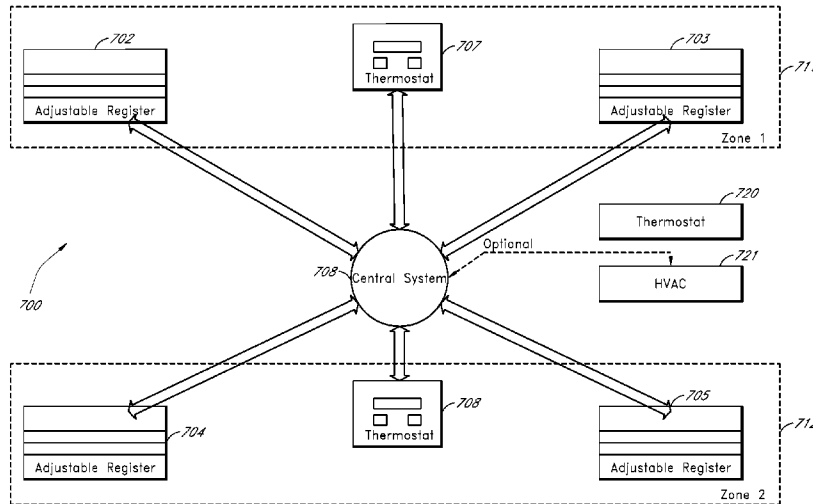
See application file for complete search history.

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28 Claims, 20 Drawing Sheets



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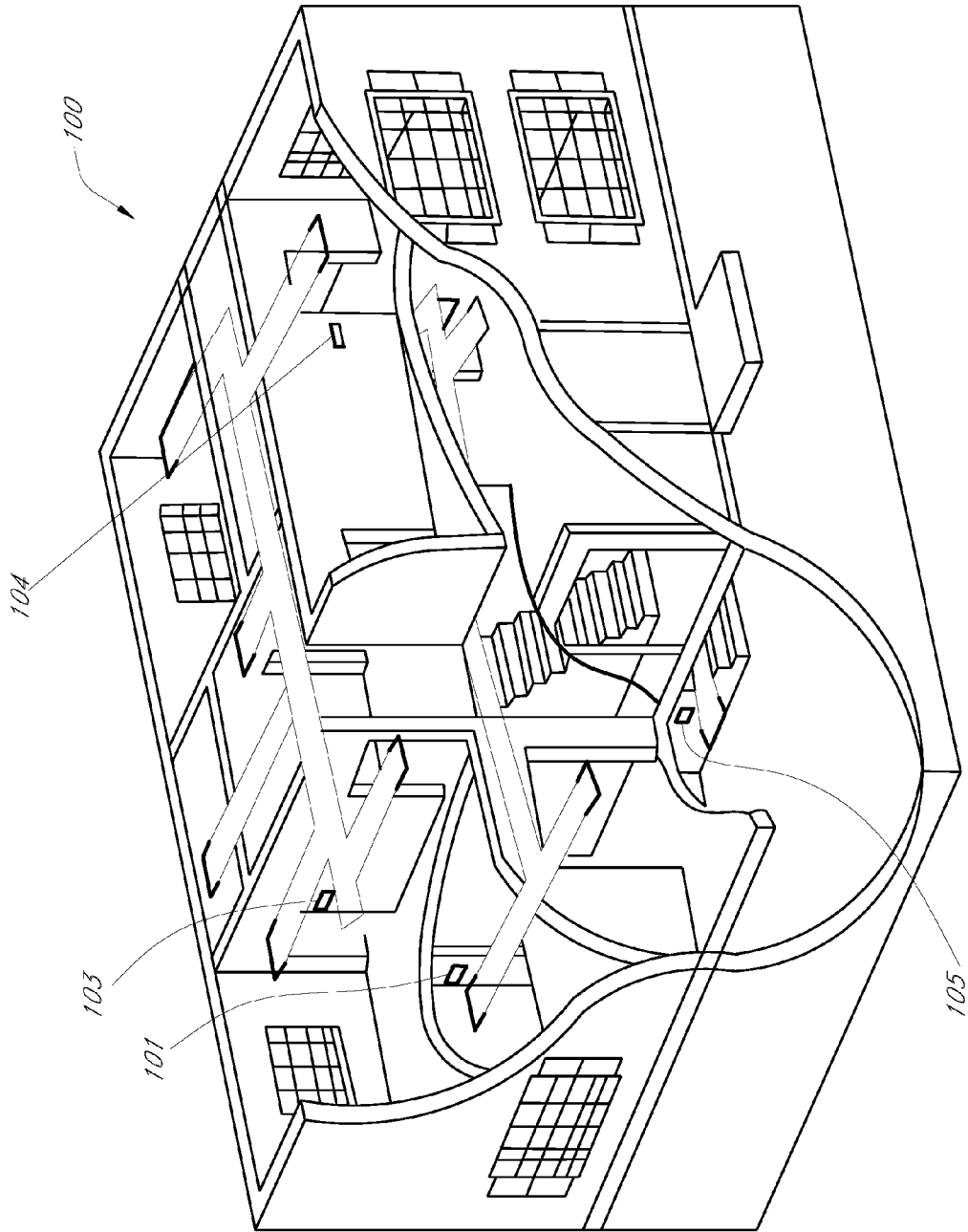


FIG. 1

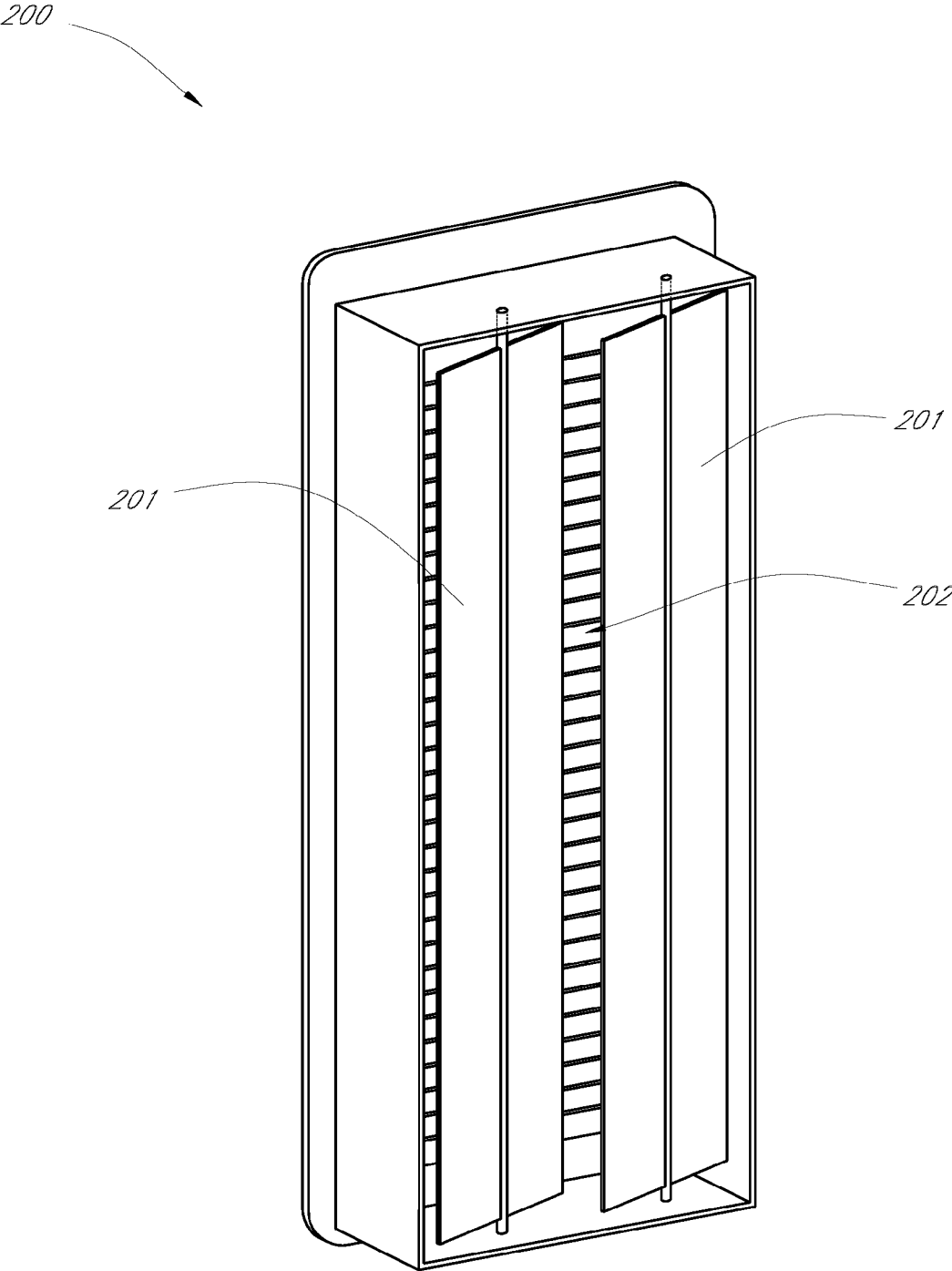


FIG. 2 (PRIOR ART)

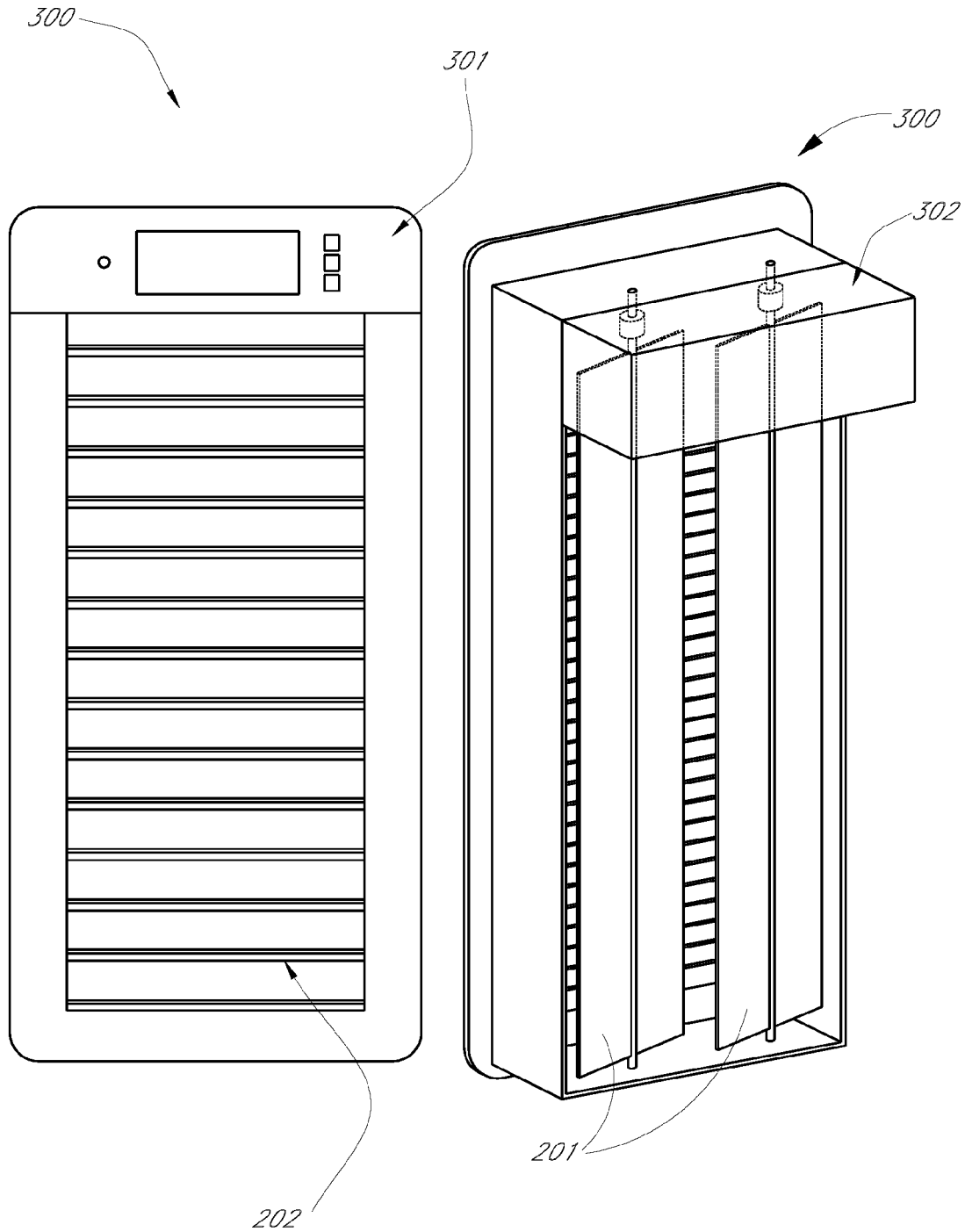


FIG. 3A

FIG. 3B

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