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(54) **LIQUID COOLING SYSTEM INCLUDING
HOT-SWAPPABLE COMPONENTS**

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(58) **Field of Classification Search** 361/687,
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See application file for complete search history.

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(57) **ABSTRACT**

The specification discloses an apparatus comprising a cold plate having an inlet and an outlet, the cold plate being attachable to a heat source, a heat exchanger having an inlet and an outlet, wherein the outlet of the heat exchanger is coupled to the inlet of the cold plate, and a hot-swappable pump module including at least one pump, the pump module being coupled to the cold plate and to the heat exchanger. The specification also discloses a process comprising cooling a heat source using a closed-loop cooling system comprising a cold plate having an inlet and an outlet, the cold plate being attachable to the heat source, a heat exchanger having an inlet and an outlet, wherein the outlet of the heat exchanger is coupled to the inlet of the cold plate, and a hot-swappable pump module including at least one pump, the pump module being coupled to the cold plate and to the heat exchanger, and removing or installing the pump module while the cooling system is operating. Other embodiments are described and claimed.

29 Claims, 5 Drawing Sheets

