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Eriksen

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(54) **COOLING SYSTEM FOR A COMPUTER SYSTEM**

(2013.01); *G06F 2200/201* (2013.01); *H01L 2924/00* (2013.01); *H01L 2924/0002* (2013.01)

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(58) **Field of Classification Search**

None

See application file for complete search history.

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(56) **References Cited**

Reexamination Request:

No. 95/002,386, Sep. 15, 2012

To view the complete listing of prior art documents cited during the proceeding for Reexamination Control Number 95/002,386, please refer to the USPTO's public Patent Application Information Retrieval (PAIR) system under the Display References tab.

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(57) **ABSTRACT**

Related U.S. Application Data

(63) Continuation of application No. 11/919,974, filed as application No. PCT/DK2005/000310 on May 6, 2005.

The invention relates to a cooling system for a computer system, said computer system comprising at least one unit such as a central processing unit (CPU) generating thermal energy and said cooling system intended for cooling the at least one processing unit and comprising a reservoir having an amount of cooling liquid, said cooling liquid intended for accumulating and transferring of thermal energy dissipated from the processing unit to the cooling liquid. The cooling system has a heat exchanging interface for providing thermal contact between the processing unit and the cooling liquid for dissipating heat from the processing unit to the cooling liquid. Different embodiments of the heat exchanging system as well as means for establishing and controlling a flow of cooling liquid and a cooling strategy constitutes the invention of the cooling system.

(51) **Int. Cl.**

F28F 7/00 (2006.01)

H05K 7/20 (2006.01)

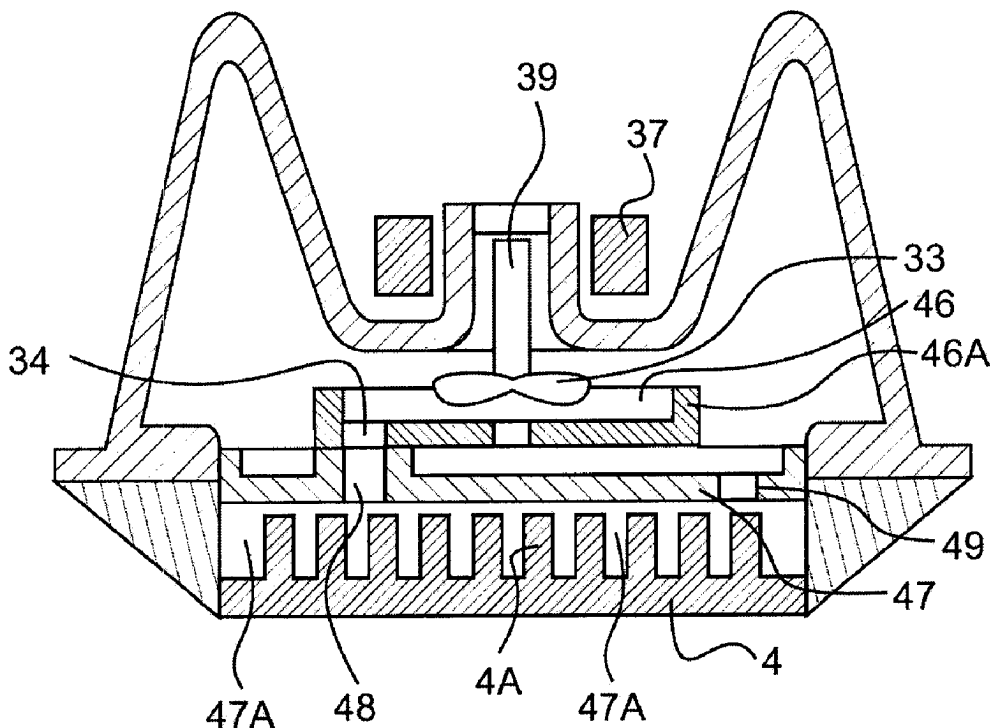
H01L 23/473 (2006.01)

G06F 1/20 (2006.01)

F04D 15/00 (2006.01)

(52) **U.S. Cl.**

CPC **H01L 23/473** (2013.01); **F04D 15/0066** (2013.01); **G06F 1/20** (2013.01); **G06F 1/206**



**INTER PARTES
REEXAMINATION CERTIFICATE**

THE PATENT IS HEREBY AMENDED AS
INDICATED BELOW.

Matter enclosed in heavy brackets [] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-18 is confirmed.

New claims 19-30 are added and determined to be patentable.

19. *The cooling system of claim 1, wherein the one or more passages include a passage configured to direct cooling liquid from the pump chamber directly into the thermal exchange chamber.*

20. *The cooling system of claim 1, wherein the one or more passages include a plurality of passages positioned within the reservoir that opens into the thermal exchange chamber.*

21. *The cooling system of claim 1, wherein an entire surface of the heat-exchanging interface in contact with the cooling liquid in the reservoir forms the boundary wall of the thermal exchange chamber.*

22. *The cooling system of claim 1, wherein the reservoir further includes an inlet configured to direct the cooling liquid into the reservoir and an outlet configured to discharge the cooling liquid from the reservoir.*

23. *The cooling system of claim 10, wherein the one or more passages include a passage configured to direct cooling liquid from the pump chamber directly into the thermal exchange chamber.*

24. *The cooling system of claim 10, wherein the one or more passages include a plurality of passages positioned within the reservoir that opens into the thermal exchange chamber.*

25. *The cooling system of claim 12, wherein an entire surface of the heat-exchange interface in contact with the cooling liquid in the reservoir forms a boundary wall of the thermal exchange chamber.*

26. *The cooling system of claim 10, wherein the reservoir further includes an inlet configured to direct the cooling liquid into the reservoir and an outlet configured to discharge the cooling liquid from the reservoir.*

27. *The cooling system of claim 15, wherein the pump chamber and the thermal exchange chamber are fluidly coupled together by one or more passages, the one or more passages including a passage configured to direct cooling liquid from the pump chamber directly into the thermal exchange chamber.*

28. *The cooling system of claim 15, wherein the pump chamber and the thermal exchange chamber are fluidly coupled together by a plurality of passages positioned within the reservoir that open into the thermal exchange chamber.*

29. *The cooling system of claim 15, wherein an entire surface of the heat-exchanging interface in contact with the cooling liquid in the reservoir forms a boundary wall of the thermal exchange chamber.*

30. *The cooling system of claim 15, wherein the pump chamber and the thermal exchange chamber are fluidly coupled together by one or more passages, and the reservoir further includes an inlet configured to direct the cooling liquid into the reservoir and an outlet configured to discharge the cooling liquid from the reservoir.*

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