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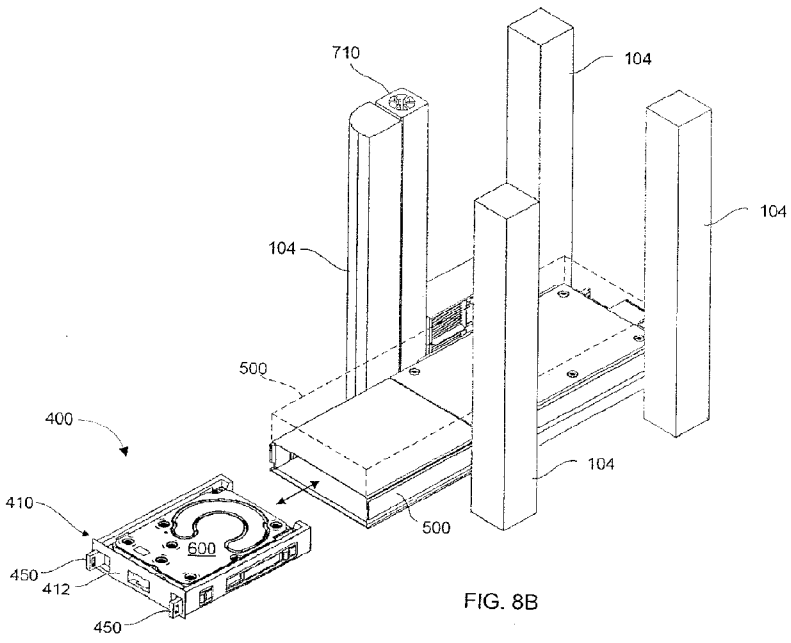

FIG. 8B

(57) Abstract: A storage device test slot thermal control system includes a test slot (500, 500a, 500b, 540) including a housing (508, 550) having an outer surface (530, 559), an internal cavity (517, 556) defined by the housing and including a test compartment (526, 560) for receiving and supporting a storage device transporter (400) carrying a storage device (600) for testing, and an inlet aperture (528, 551) extending from the outer surface of the housing to the internal cavity. The storage device test slot thermal control system also includes a cooling conduit (710), and a thermoelectric device (742) mounted to the cooling conduit. The thermoelectric device is configured to cool or heat an air flow entering the internal cavity through the inlet aperture.

WO 2009/129403 A4

AMENDED CLAIMS
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WHAT IS CLAIMED IS:

1. A storage device test slot thermal control system comprising:

a test slot (500, 500a, 500b, 540) comprising:

a housing (508, 550) comprising:

an outer surface (530, 559),

an internal cavity (517, 556) defined by the housing and comprising a test compartment (526, 560) for receiving a storage device (600) for testing, and

an inlet aperture (528, 551) extending from the outer surface of the housing to the internal cavity;

a cooling conduit (710); and

an thermoelectric device (742) mounted to the cooling conduit and configured to cool or heat an air flow entering the internal cavity through the inlet aperture.

2. The storage device test slot thermal control system of claim 1, wherein the cooling conduit is configured to absorb heat dissipated by the thermoelectric device.

3. The storage device test slot thermal control system of claim 1 or claim 2, wherein the cooling conduit is liquid cooled.

4. The storage device test slot thermal control system of claim 1, wherein the thermoelectric device comprises a thermoelectric cooler.

5. The storage device test slot thermal control system of claim 1, further comprising a heatpump heatsink (743) connected to the thermoelectric device.

6. The storage device test slot thermal control system of claim 1, wherein the test slot includes a ducting conduit (532) disposed within the internal cavity and configured to convey an air flow from the inlet aperture towards the test compartment.

7. The storage device test slot thermal control system of claim 6, wherein the ducting conduit is configured to direct an air flow underneath a storage device disposed within the test compartment.

8. The storage device test slot thermal control system of claim 6 or claim 7, further comprising an electric heating device (729) disposed within the internal cavity and configured to heat the air flow being conveyed through the ducting conduit.

9. The storage device test slot thermal control system of claim 8, wherein the electric heating device comprises a resistive heater.

10. The storage device test slot thermal control system of claim 8, further comprising a heater heatsink (728) disposed within the ducting conduit and connected to the electric heating device, wherein the electric heating device is configured to heat the heater heatsink.

11. The storage device test slot thermal control system of claim 8, further comprising test electronics (160) in electrical communication with the thermoelectric device and/or the electric heating device and configured to control current flows to the thermoelectric device and/or the electric heating device.

12. The storage device test slot thermal control system of claim 11, further comprising one or more temperature sensors (526) disposed within the internal cavity, wherein the one or more temperature sensors are electrically connected to the test electronics, and wherein the test electronics are configured to control flows of current to the thermoelectric device and/or the electric heating device based, at least in part, on signals received from the one or more temperature sensors.

13. The storage device test slot thermal control system of claim 1, further comprising test electronics (160) configured to communicate one or more test routines to a storage device within the test compartment.

14. The storage device test slot thermal control system of claim 13, further comprising a test slot connector (524, 574) disposed within the internal cavity and configured to engage a mating connector on a storage device, wherein the test slot connector is electrically connected to the test electronics.

15. The storage device test slot thermal control system of claim 13, wherein the test electronics are disposed outside of the internal cavity.

16. The storage device test slot thermal control system of claim 15, further comprising a connection interface circuit (182) disposed within the internal cavity, wherein the connection interface circuit is configured to provide electrical communication between the test slot connector and the test electronics.

17. A storage device test rack (100) comprising:

multiple test slots (500, 500a, 500b, 540);

a cooling conduit (710) configured to convey a liquid toward the test slots; and

multiple thermoelectric devices (742) each mounted to the cooling conduit and each associated with a corresponding one of the test slots, wherein the thermoelectric devices are each configured to cool or heat an air flow entering the associate one of the test slots.

18. The storage device test rack of claim 17, comprising

a test slot compartment (700) comprising the test slots, the cooling conduit, and the thermoelectric devices; and

a test electronics compartment (800) comprising test electronics (160) configured to communicate with the test slots for executing a test algorithm.

19. The storage device test rack of claim 18, further comprising a heat exchanger (810) disposed within the test electronics compartment and in fluid communication with the cooling conduit, wherein the heat exchanger is configured to cool an air flow within the test electronics compartment, thereby to the cool the test electronics.

20. The storage device test rack of claim 19, further comprising an air mover (816) disposed within the test electronics compartment and configured to direct an air flow across the heat exchanger and toward the test electronics for cooling the test electronics.

21. The storage device test rack of claim 20, further comprising an air filter (46) disposed between the air mover and the heat exchanger and configured to filter an air flow within the test electronics compartment.

22. The storage device test rack of claim 20, further comprising an air filter (46) disposed at an inlet of the air mover and configured to filter an air flow directed toward the test electronics compartment.

23. The storage device test rack of any one of claims 18-22, wherein the thermoelectric devices are in electrical communication with the test electronics, wherein the test electronics are configured to control operation of the thermoelectric devices.

24. The storage device test rack of claim 18, wherein each of the test slots includes one or more temperature sensors (526) in electrical communication with the test electronics, and wherein the test electronics are configured to control operation of the thermoelectric devices based, at least in part, on signals received from the one or more temperature sensors.

25. The storage device test rack of any one of claim 18, wherein the test electronics compartment is substantially isolated from the test slot compartment such that air flow between the test electronics compartment and the test slot compartment is substantially inhibited.

5

26. The storage device test rack of claim 17, wherein the cooling conduit is configured to absorb heat dissipated by the thermoelectric devices.

27. The storage device test rack of claim 17, wherein the thermoelectric
10 devices are operable to remove heat energy from the cooling conduit.

28. The storage device test rack of claim 17, wherein the thermoelectric devices are operable to remove heat energy from a liquid flowing in the cooling conduit.