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(54) Title: APPARATUS AND METHODS TO DISSIPATE HEAT IN A DOWNHOLE TOOL

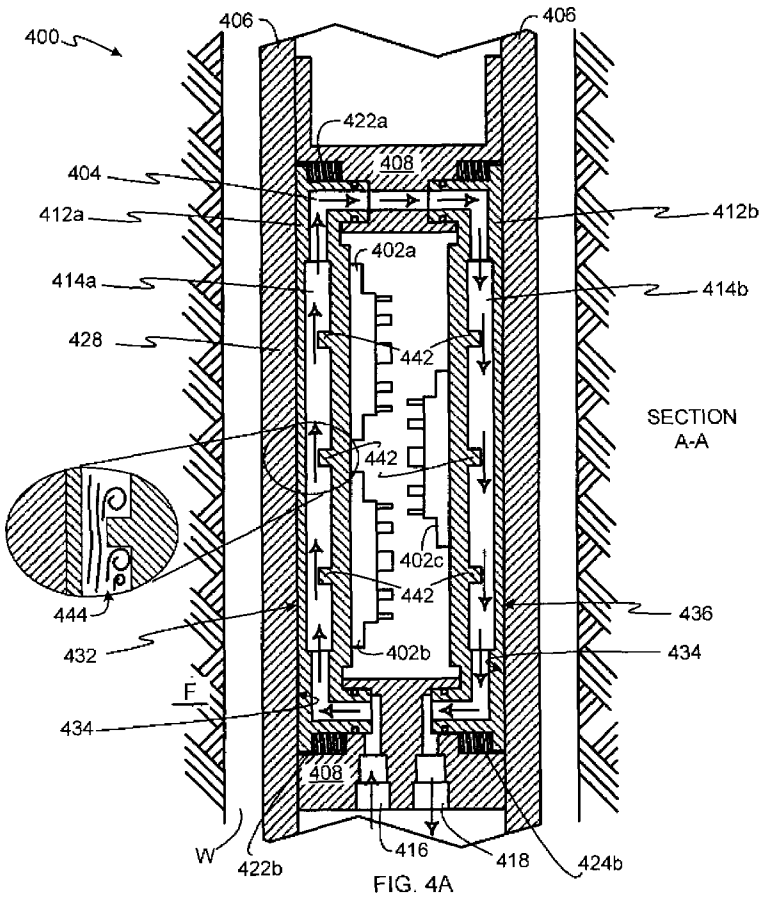

FIG. 4A

(57) Abstract: Apparatus (400) and methods to dissipate heat in a downhole tool are disclosed. A disclosed example tool collar (160) includes a body (408) having a first outer surface, a first fluid inlet (514), and a first fluid outlet (512). The example tool collar also includes a passageway (404) formed therethrough, a second fluid inlet (516) to engage the first fluid outlet of the body, a second fluid outlet (730a) to engage the first fluid inlet of the body, and a first inner surface (718) having at least one protrusion (746) extending into the passageway.

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1. An apparatus, comprising:

a pad comprising:

a fluid inlet detachably coupled to a fluid outlet of a downhole tubular member;

a fluid outlet detachably coupled to a fluid inlet of the downhole tubular member; and

a passageway extending between the fluid inlet of the pad and the fluid outlet of the pad, wherein the passageway includes an inwardly extending protrusion configured to transfer heat from a heat-generating member to a fluid flowing through the passageway.

2. The apparatus of claim 1 further comprising the downhole tubular member.

3. The apparatus of claim 1 or 2 wherein the pad is coupled to the heat-generating member.

4. The apparatus of one of claims 1-3 wherein the heat-generating member includes at least one of electronic circuitry, a motor, and an alternator.

5. The apparatus of one of claims 1-4 further comprising a radiator and at least one compression spring biasing the pad toward the radiator.

6. The apparatus of claim 5 wherein the radiator comprises a sleeve surrounding a body portion of the downhole tubular member.

7. The apparatus of one of claims 1-6 further comprising a pump fluidly coupled to the passageway.

8. The apparatus of one of claims 1-7 further comprising a compensator configured to maintain fluid pressure in the passageway substantially the same as atmospheric pressure in the downhole tubular member.

9. The apparatus of one of claims 1-8 further comprising a controller and a sensor, wherein the controller is configured to control a flow rate of the fluid through the passageway based on a temperature detected by the sensor.

10. A heat dissipating method, comprising:
receiving a fluid in a passageway via a fluid inlet that is detachably coupled to a fluid outlet of a downhole tubular member;
transferring heat from a heat-generating member to the fluid in the passageway through an inwardly extending protrusion of the passageway; and
dispensing the fluid from the passageway via a fluid outlet that is detachably coupled to a fluid inlet of the downhole tubular member.

11. The method of claim 10 wherein the heat-generating member includes at least one of electronic circuitry, a motor, and an alternator.

12. The method of one of claims 10 and 11 wherein receiving the fluid in the passageway and dispensing the fluid from the passageway comprises operating a pump fluidly to pump the fluid into or out of the passageway, respectively.

13. The method of claim 12 further comprising:
detecting a temperature with a sensor; and
controlling a flow rate of the fluid through the passageway based on the detected temperature.