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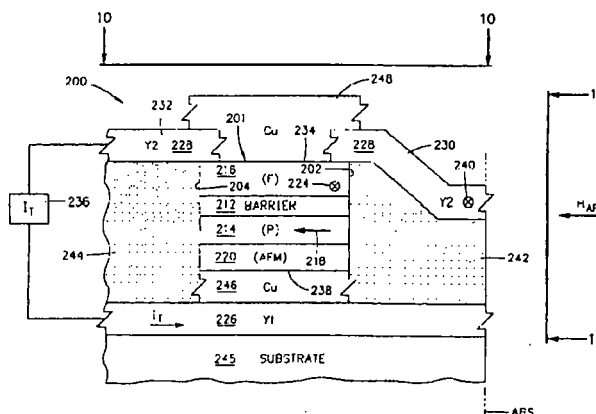
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09/878,817 11 June 2001 (11.06.2001) US</p> <p>(71) Applicant: INTERNATIONAL BUSINESS MACHINES CORPORATION [US/US]; New Orchard Road, Armonk, NY 10504 (US).</p> <p>(71) Applicant (for MG only): IBM UNITED KINGDOM LIMITED [GB/GB]; PO Box 41, North Harbour, Portsmouth, Hampshire PO6 3AU (GB).</p> <p>(72) Inventor: GILL, Hardayal, Singh; 1380 Oak Creek Drive, No 305, Palo Alto, CA 94304 (US).</p> | <p>(74) Agent: WALDNER, Philip; IBM United Kingdom Limited, Intellectual Property Law, Hursley Park, Winchester, Hampshire SO21 2JN (GB).</p> <p>(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW.</p> <p>(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published:
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(54) Title: LOW TEMPERATURE YOKE TYPE TUNNEL VALVE SENSOR



(57) Abstract: A read head includes electrically conductive ferromagnetic first (Y1, 226) and second (Y2, 228) yoke layers and a tunnel valve sensor (201) which is recessed from the ABS and is located between the first and second yoke layers. The first and second yoke layers extend to an air bearing surface (ABS) for conducting flux to the sensor and extend into the head beyond the sensor. A bottom copper structure (246) interfaces a bottom surface of the tunnel valve sensor and a top copper structure (248) interfaces a top surface of the tunnel valve sensor. In a first embodiment of the invention, the first and second copper structures conduct heat from the sensor to the first and second yoke layers respectively, and in a second embodiment of the invention the bottom copper structure conducts heat to a substrate (245) while the top copper structure conducts from the sensor to the second yoke layer. Further, in the first embodiment the first and second yoke layers serve as leads for a tunneling current while in the second embodiment the bottom copper structure and the second yoke layer serve as leads for the tunneling current.



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WO 02/101731 A3