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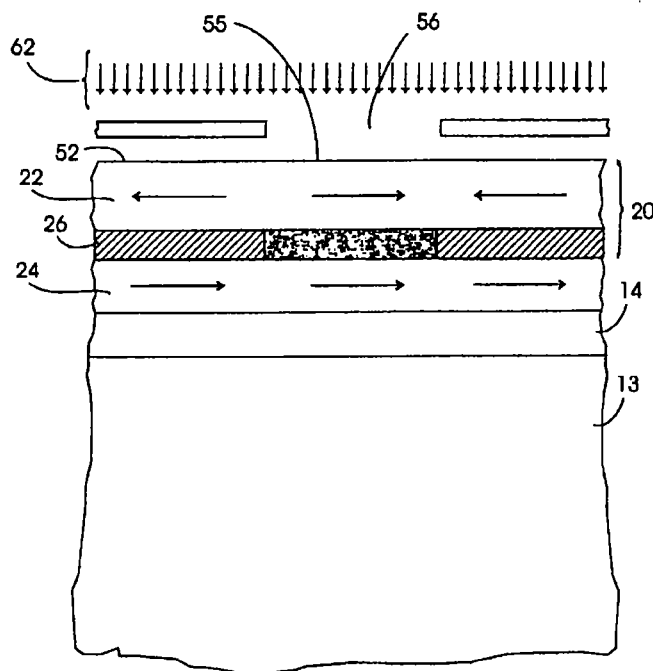
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09/602,609 21 June 2000 (21.06.2000) US</p> <p>(71) Applicant: INTERNATIONAL BUSINESS MACHINES CORPORATION [US/US]; New Orchard Road, Armonk, NY 10504 (US).</p> <p>(71) Applicant (for MC only): IBM UNITED KINGDOM LIMITED [GB/GB]; P.O. Box 41, North Harbour, Portsmouth, Hampshire PO6 3AU (GB).</p> <p>(72) Inventors: FULLERTON, Eric, Edward; 17212 Quail Court, Morgan Hill, CA 95037 (US). TERRIS, Bruce,</p> | <p>David; 1241 Nelis Court, Sunnyvale, CA 94087 (US). WELLER, Dieter, Klaus; 7080 Broodtree Way, San Jose, CA 95120 (US).</p> <p>(74) Agent: BURT, Roger, James; 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, CR, CU, CZ, DE, DK, DM, DZ, 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, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.</p> <p>(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, 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, GW, ML, MR, NE, SN, TD, TG).</p> |
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(54) Title: MAGNETIC RECORDING MEDIUM AND METHOD FOR FABRICATING A MAGNETIC RECORDING MEDIUM



(57) Abstract: A magnetic recording disk is patterned into discrete magnetic and nonmagnetic regions with the magnetic regions serving as the magnetic recording data bits. The magnetic recording layer (20) comprises two ferromagnetic films (22, 24) separated by a nonferromagnetic spacer film (26). The spacer film (26) material composition and thickness is selected such that the first and second ferromagnetic films (22, 24) are antiferromagnetically coupled across the spacer film (26). After this magnetic recording layer (20) has been formed on the disk substrate (11), ions (62) are irradiated onto it through a patterned mask (60). The ions disrupt the spacer film (62) and thereby destroy the antiferromagnetic coupling between the two ferromagnetic films (22, 24). As a result, in the regions (55) of the magnetic recording layer (20) that are ion-irradiated the first and second ferromagnetic films (22, 24) are essentially ferromagnetically coupled so that the magnetic moments from the ferromagnetic films (22, 24) are parallel and produce a magnetic moment that is essentially the sum of the moments from the two films (22, 24). In the non-irradiated regions (52, 54) of the magnetic recording layer (20), the first and second ferromagnetic films (22, 24) remain antiferromagnetically coupled so that

their magnetic moments are oriented antiparallel. The composition and thicknesses of the first and second ferromagnetic films (22, 24) are selected such that essentially no magnetic field is detectable at a predetermined distance above the magnetic recording layer (20) corresponding to the height that the magnetic recording head would be located.

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