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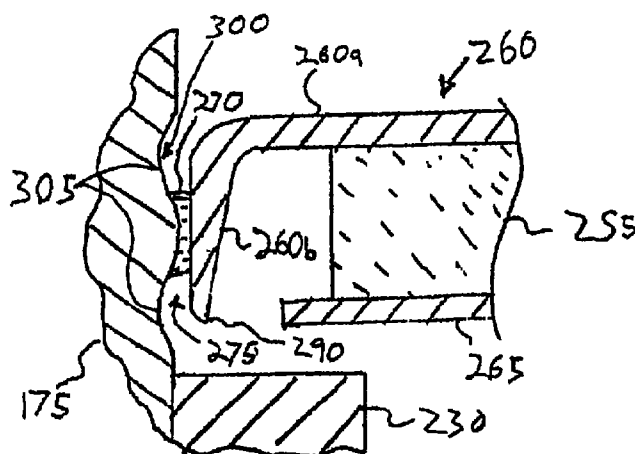
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(71) Applicant: SEAGATE TECHNOLOGY, INC. [US/US]; Legal Dept., Building 15, 920 Disc Drive, Scotts Valley, CA 95066-4544 (US).			
(71)(72) Applicants and Inventors: MACLEOD, Donald, James [GB/US]; 59 Erba Lane, Scotts Valley, CA 95066 (US). PELSTRING, Robert, Michael [US/US]; 127 De La Costa Avenue, Santa Cruz, CA 95060 (US). BYL, Marten, Fredrick [US/US]; 24750 Miller Hill Road, Los Gatos, CA 95030 (US). LEBLANC, Jeffry, Arnold [US/US]; 6565 Oakridge Road, Aptos, CA 95003 (US). PHAM, Tan, Hung [FR/US]; 111 Bean Creek Road, Scotts Valley, CA 95066 (US). NOTTINGHAM, Robert, Alan [US/US]; 1816 Hector Lane, Santa Cruz, CA 95062 (US). WHITTOME, Michael, James [US/US]; 24 A Meadow Way, Scotts Valley, CA 95066 (US).			



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(54) Title: FERROFLUIDIC SEAL BETWEEN A SHAFT AND A HUB FOR A DISK HARD DRIVE



(57) Abstract

An apparatus and method are provided for sealing an outer surface (170) of a shaft (175) to an inner surface (165) of a hub (160). The seal includes a magnet (155), with top and bottom pole pieces (260 and 265) and a ferrofluid (270) magnetically held in a gap (275) between the pole pieces (260 and 265) and the hub (160) or the shaft (175). The top pole piece (260) has a cross-section that is L-shaped, with a horizontal portion (260a) parallel to the magnet (155) and a shorter vertical portion (260b) facing the shaft (175). In one embodiment, the vertical portion (260b) or the portion of the shaft (175) facing it is contoured to provide a flux gradient that axially concentrates the ferrofluid (270) in the gap (275). In another aspect, a catcher (335) is provided to reduce loss of ferrofluid (270) when the ferrofluidic seal (185) is used to form an outside seal. In yet another aspect, a stationary ferrofluidic seal (345) is provided for sealing a stationary shaft (350) to a rotating hub (355).

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Description

18 JUL 2003

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