



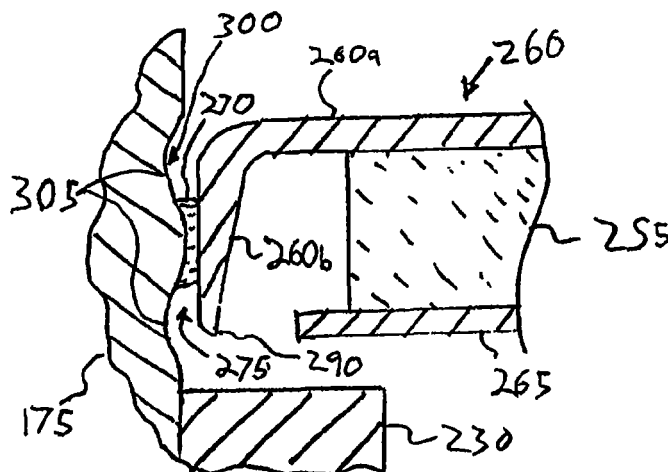
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G00001

(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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