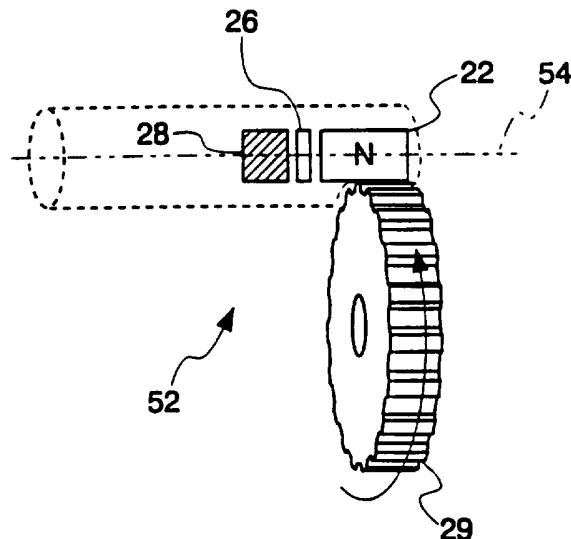




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<p>(21) International Application Number: PCT/US96/12102 (22) International Filing Date: 22 July 1996 (22.07.96) (30) Priority Data: 08/510,419 2 August 1995 (02.08.95) US (71) Applicant: DURAKOOL INCORPORATED [US/US]; 1010 N. Main Street, P.O. Box 280, Elkhart, IN 46515 (US). (72) Inventors: WOLF, Ronald, J.; 3353-1B Bay Pointe Drive, Elkhart, IN 46514 (US). HEDEEN, Larry; 6060 North 160 West, Howe, IN 46746 (US). (74) Agents: SAMPLES, Kenneth, H. et al.; Fitch, Even, Tabin & Flannery, Room 900, 135 South LaSalle Street, Chicago, IL 60603 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p>(88) Date of publication of the international search report: 10 April 1997 (10.04.97)</p>	

(54) Title: GEAR TOOTH SENSOR WITH IMPROVED RESOLUTION AND STABILITY



(57) Abstract

A gear tooth sensor having increased sensitivity and temperature tolerance enables relatively small ferrous targets to be detected. All of the embodiments include a magnet (22) and a single input Hall effect IC (26) and may include one or more flux concentrators (28). In one embodiment the sensor is configured such that the magnet is disposed adjacent the periphery of a target wheel (29) such that the magnetic axis is generally parallel to the direction of travel of the ferrous target. In an alternate embodiment, the magnet, Hall IC and flux concentrator are all aligned and disposed such that the magnetic axis is generally parallel to the direction of travel of the ferrous target. Additional flux concentrators may also be provided for adjusting the operating points of the Hall IC's. In yet other embodiments, the sensor is configured such that the sensing plane of the IC is generally perpendicular to the magnetic axis.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/12102

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G01P 3/488, 3/66; G01B 7/14; G01R 33/07
US CL : 324/174, 207.2, 207.25, 251

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 324/174, 207.2, 207.21, 207.24, 207.25, 251, 252; 338/32H, 32R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US, A, 4,626,781 (FORKEL) 02 December 1986, Figures (1A-1D), column 1, line 65 - column 4, line 2.	1, 12-14, 20, 21, 24 ----- 2-11, 15-19, 22, 23, 25-27
X, P --- Y, P	US, A, 5,444,370 (WU) 22 August 1995, Figures 1-3, column 3, lines 14-68.	24, 27, 28 ----- 1-23, 25, 26, 29-43
X	US, A, 4,481,469 (HAULER ET AL.) 06 November 1984, Figures 1-2, column 2, line 12 - column 3, line 33.	24

Further documents are listed in the continuation of Box C. See patent family annex.

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Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

ROGER C. PHILLIPS 

Telephone No. (703) 308-5223

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y, P	US, A, 5,510,708 (SHIRAI ET AL.) 23 April 1996, Figures 1-4, column 1, line 53 - column 3, line 48.	1-43
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A, P	US, A, 5,444,369 (LUETZOW) 22 August 1995.	1-43
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