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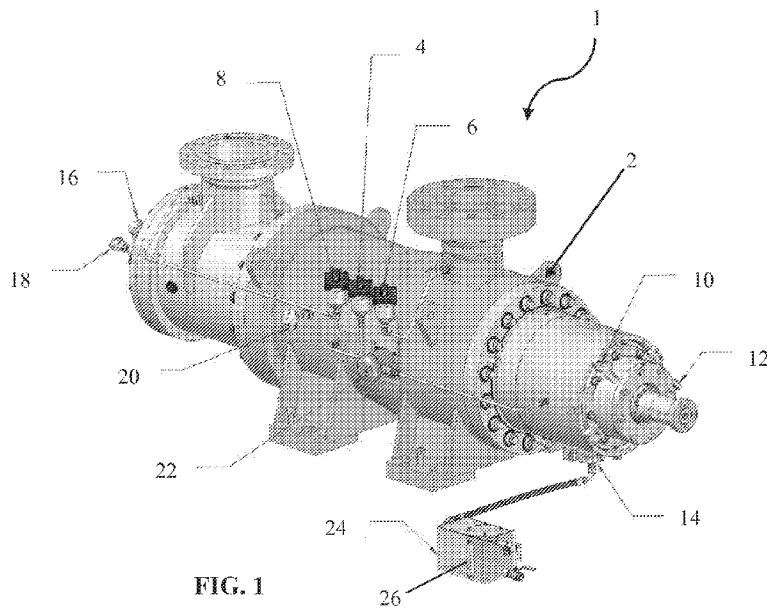
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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(54) Title: INTELLIGENT PUMP MONITORING AND CONTROL SYSTEM



(57) Abstract: A system and method for monitoring and controlling a pump are disclosed. The method may defining processing targets, deriving a first actuator control signal Y<sub>c</sub> from the processing targets, and deriving actual operating parameters. The method may further include the steps of comparing the actual operating parameters to predefined system and pump limits to determine a second actuator control signal Y'<sub>c</sub>, comparing the actual operating parameters to predefined fluid limits to determine a third actuator control signal Y''<sub>c</sub>, comparing the actual operating parameters to predefined normal processing limits to determine a fourth actuator control signal Y'''<sub>c</sub>, and comparing the actual operating parameters to at least one predefined abnormal processing limit to determine a fifth actuator control signal Y''''<sub>c</sub>. The method may further include determining which of the actuator control signals is a most conservative actuator control signal, and driving the pump in accordance with the most conservative actuator control signal.

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC(8) - F04B 49/00 (2014.01)  
 USPC - 417/63  
 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)  
 IPC(8) Classification(s): F04B 49/00 (2014.01)  
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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)  
 MicroPatent (US-G, US-A, EP-A, EP-B, WO, JP-bib, DE-C,B, DE-A, DE-T, DE-U, GB-A, FR-A); IP.com; Google/Google Scholar; DialogPRO; Searched Terms Used: signal, control, pump, sensor, vibrate, pressure, wear, monitor, compare, parameter, actuator, proportional, integral, derivative, programmable, logic,

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,663,349 B1 (DISCENZO FM et al.) December 16, 2003; figure 1; column 6, lines 10-40	1-20
A	US 2012/0258000 A1 (PATTON K) October 11, 2012; figure 1; paragraph [0027]	1-20
A	US 2002/0123856 A1 (ERUREK E) September 5, 2002; figure 1; paragraph [0022]	1-20

Further documents are listed in the continuation of Box C.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
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Date of the actual completion of the international search 29 May 2014 (29.05.2014)	Date of mailing of the international search report <b>13 JUN 2014</b>
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