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(54) **SYSTEM AND METHOD FOR SPEED CONTROL OF VARIABLE SPEED PUMPING SYSTEMS**

(56) **References Cited**

U.S. PATENT DOCUMENTS

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3,985,467 A * 10/1976 Lefferson F04B 49/06
417/20

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5,580,221 A 12/1996 Triezenberg
5,883,489 A 3/1999 Konrad
5,941,690 A * 8/1999 Lin F04B 49/065
417/44.2

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5,945,802 A 8/1999 Konrad et al.
6,050,918 A * 4/2000 Kuramoto F04B 49/065
417/44.3

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6,220,747 B1 4/2001 Gosselin
6,254,353 B1 7/2001 Polo et al.

(Continued)

FOREIGN PATENT DOCUMENTS

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CN 202431495 9/2012

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OTHER PUBLICATIONS

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The P-Only Control Algorithm—Control Guru.*
(Continued)

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CPC **F04B 49/065** (2013.01); **F04B 1/26** (2013.01); **F04B 23/04** (2013.01); **G05B 11/38** (2013.01); **G05B 11/42** (2013.01); **H02P 23/0004** (2013.01); **F04B 2203/0209** (2013.01)

(57) **ABSTRACT**

(58) **Field of Classification Search**
CPC G05B 11/38; F04B 49/065; F04B 49/08; F04B 2203/0209; H02P 23/0004
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See application file for complete search history.

A system and method for controlling a speed of a pumping system includes a controller, a variable frequency drive connected to the controller, a motor connected to the variable frequency drive, a pump connected to the motor, a set of sensors connected to the motor, the pump, and the controller, and an interface connected to the controller. The controller includes a processor and a memory connected to the processor. A motor control process is saved in the memory and executed by the processor that generates a motor control signal to control the speed of the motor and the pump.

13 Claims, 11 Drawing Sheets

