



(51) International Patent Classification:

F01N 3/10 (2006.01) *F01N 3/20* (2006.01)
F01N 3/28 (2006.01) *B01D 53/94* (2006.01)

(21) International Application Number:

PCT/US2011/044642

(22) International Filing Date:

20 July 2011 (20.07.2011)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/840,383 21 July 2010 (21.07.2010) US

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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, 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, IS, JP, KE, KG, KM, 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, PE, PG, PH, PL, PT, RO, RS, RU, 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.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG,
ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

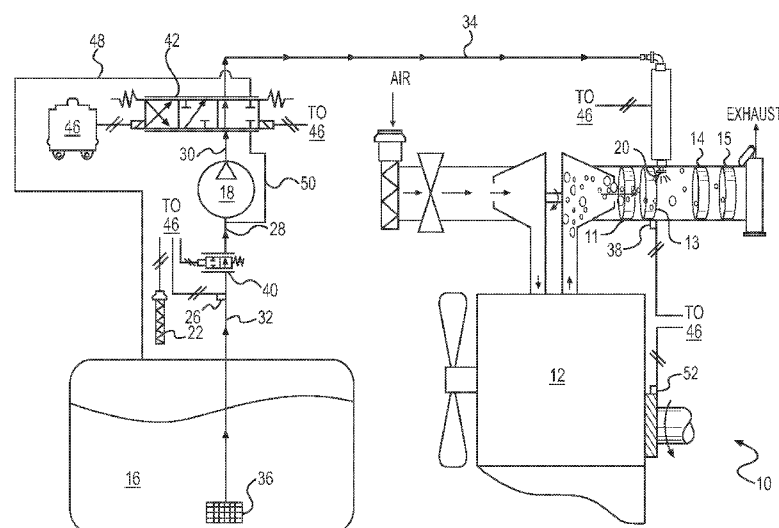
Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

5 April 2012

(54) Title: DOSING SYSTEM HAVING RECIRCULATION HEATING AND VACUUM DRAINING

**FIG. 1**

(57) Abstract: A reductant dosing system (10) is disclosed. The reductant dosing system may have a supply (16) of reductant, a reductant nozzle (20), and a pump (18) with an inlet (28) and an outlet (30). The reductant dosing system may also have a first passage (32) connecting the supply with the inlet of the pump, and a first control valve (40) disposed in the first passage. The reductant dosing system may further have a second passage (34) connecting the outlet of the pump with the reductant nozzle, and a second control valve (42) disposed in the second passage. The reductant dosing system may additionally have a third passage (48) connecting the second control valve to the first passage at a location downstream of the first control valve, and a fourth passage (50) connecting the second control valve with the supply.

A. CLASSIFICATION OF SUBJECT MATTER***F01N 3/10(2006.01)i, F01N 3/28(2006.01)i, F01N 3/20(2006.01)i, B01D 53/94(2006.01)i***

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)

F01N 3/10; F01N 3/00; B01D 53/56; B01D 53/34; F01N 7/12; E03B 7/14; F01N 3/20

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: reductant, dosing system, SUPPL, pump

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2010-0122521 A1 (SUN JINHUI et al.) 20 May 2010 See abstract, paragraphs 17, 19, 22, claim 9 and figure 1.	1-10
A	US 2006-0277899 A1 (WILLIAM RUONA) 14 December 2006 See abstract, paragraphs 20, 25, claim 9 and figure 1.	1-10
A	US 2005-0069476 A1 (PHILIP, GERALD BLAKEMAN et al.) 31 March 2005 See abstract, paragraph 64, claim 76 and figure 1.	1-10
A	US 2010-0064670 A1 (STARCK ROLAND et al.) 18 March 2010 See abstract, paragraphs 25, 26, claim 1 and figure 2.	1-10



Further documents are listed in the continuation of Box C.



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Date of the actual completion of the international search

30 JANUARY 2012 (30.01.2012)

Date of mailing of the international search report

09 FEBRUARY 2012 (09.02.2012)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 189 Cheongsu-ro,
Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2011/044642

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0122521 A1	20.05.2010	WO 2010-059819 A2	27.05.2010
US 2006-0277899 A1	14.12.2006	DE 102006027201 A1	28.12.2006
US 2005-0069476 A1	31.03.2005	EP 1458960 A2	22.09.2004
		US 7264785 B2	04.09.2007
		WO 03-054364 A2	03.07.2003
US 2010-0064670 A1	18.03.2010	EP 1893852 A1	05.03.2008
		KR 10-2008-0030618 A	04.04.2008
		WO 2006-136306 A1	28.12.2006