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61/480,835 29 April 2011 (29.04.2011) US(71) Applicant (for all designated States except US): **FIRE-STAR ENGINEERING, LLC** [US/US]; 1122 Flightline Road, #76, Mojave, California 93501 (US).

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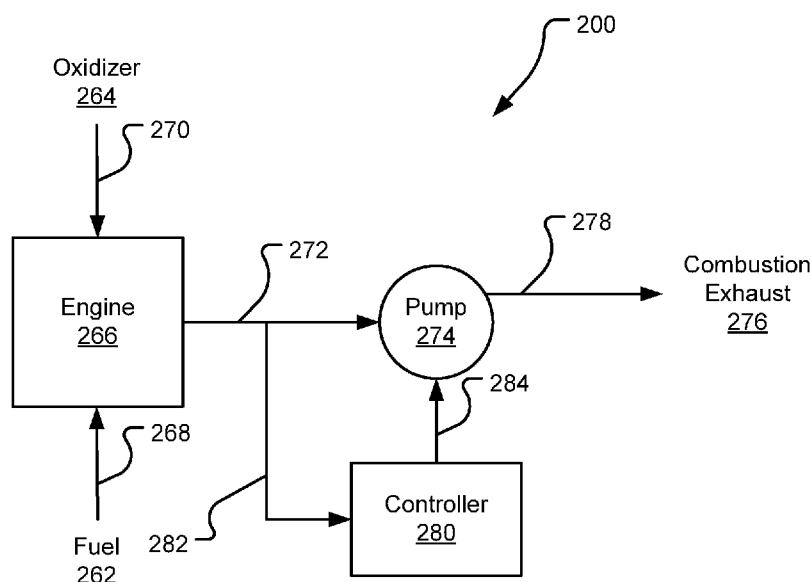
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[Continued on next page]

(54) Title: VARIABLE SUCTION EXHAUST

**FIG. 2**

(57) **Abstract:** A throttleable exhaust venturi (700) is described herein that generates strong suction pressures at an exhaust outlet (718) by accelerating an incoming ambient fluid stream with the aid of a venturi to high gas velocities and injecting a combustion exhaust stream into the ambient fluid stream at an effective venturi throat (728). A mixing element (544) downstream of the venturi throat ensures that the mixed fluid stream recovers from a negative static pressure up to local atmospheric pressure. A physical (724) and the effective (728) throat of the venturi (700) are designed to promote mixing and stabilize the ambient fluid flow to ensure that high velocity is achieved and the effective venturi is operable over a variety of combustion exhaust stream mass flow rates.



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A. CLASSIFICATION OF SUBJECT MATTER***F01N 13/08(2010.01)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)

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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)

exhaust, vacuum pump, venturi

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	KR 20-1997-0003232 Y1 (Ryu, Jeong In) 14 April 1997 See page 2, lines 26-37, and figure 4	1-5, 9, 15-20 6-8
X Y	WO 2009-099399 A1 (ZAFER OZEL) 13 August 2009 See page 10, lines 2-33, page 11, lines 1-10 and figure 3-2	10-14, 21-25 6-8
A	WO 98-37317 A1 (EQUILIBRIUM I SODERHAMN AB et al.) 27 August 1998 See page 4, lines 22 - page 5 lines 30	1-25
A	KR 10-2010-0111802 A (KIM, SOO WON) 18 October 2010 See claim 1 and figure 2	1-25



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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WO 98-37317 A1	27.08.1998	AU 1998-63155 B2 EP 1012453 A1	24.02.2000 28.06.2000
KR 10-2010-0111802 A	18.10.2010	None	