



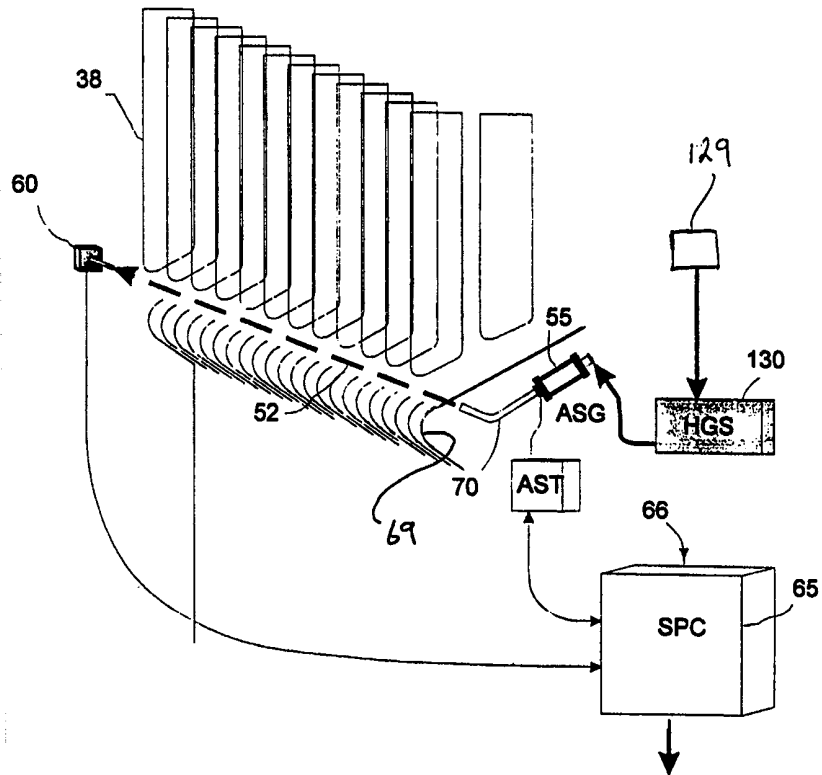
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : G01K 11/22</p>	<p>A3</p>	<p>(11) International Publication Number: WO 99/01727 (43) International Publication Date: 14 January 1999 (14.01.99)</p>
<p>(21) International Application Number: PCT/US98/13839 (22) International Filing Date: 4 July 1998 (04.07.98) (30) Priority Data: 60/052,930 5 July 1997 (05.07.97) US (71) Applicant (for all designated States except US): COMBUSTION SPECIALISTS, INC. [US/US]; 23616 South East 225th Street, Maple Valley, WA 98038 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): DRAXTON, Dean, E. [US/US]; 7570 Pinebrook Road, Park City, UT 84060 (US). DROPPA, James, G., III [US/US]; 6002 St. Albion Way #208, Mountlake Terrace, WA 98043 (US). HOGLE, Richard, E. [US/US]; 12424 Littlerock Road, Olympia, WA 98512 (US). KYCHAKOFF, George [US/US]; 23616 South East 225th Street, Maple Valley, WA 98038 (US). (74) Agent: NEARY, J., Michael; 542 S.W. 298th Street, Federal Way, WA 98023 (US).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, 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). Published With international search report. (88) Date of publication of the international search report: 25 March 1999 (25.03.99)</p>

(54) Title: ACOUSTIC PYROMETER

(57) Abstract

An acoustic pyrometer measures the average gas temperature across a wide space of known distance, especially turbulent, high temperature gas loaded with caustic particulate. It includes an acoustic signal generator (55) that generates a high amplitude acoustic signal with a short rise time and a detector positioned adjacent the signal generator that detects the onset of the acoustic signal in the signal generator and generates a first electrical signal corresponding in time to the onset of the acoustic signal in the signal generator. A receiver (60) positioned across the space from the signal generator (55) receives acoustic signals from the space and generates electrical signals corresponding to amplitude and frequency of the caustic signals received in the receiver. The signal processor (65) then compares the time of the onset of the acoustic signal in the receiver with the onset of the acoustic signal in the signal generator to determine the transit time of the acoustic signal to traverse the space, and also calculates the temperature of the gas in the space based on the transit time.



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/13839

A. CLASSIFICATION OF SUBJECT MATTER		
IPC(6) :G01K 11/22 US CL :374/119; 374/117 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. : 374/119; 374/117; 374/118,119; 73/632, 597,		
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) U.S. PTO		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,848,924 A (NUSPL ET AL) 18 JULY 1989 (18.07.89), ENTIRE DOCUMENT	1-16
Y	US 5,624,188 A (WEST) 29 APRIL 1997 (29.04.97), ENTIRE DOCUMENT	1-16
Y,P	US 4,772,131 A (VARELA ET AL) 20 SEPTEMBER 1998 (20.09.98) ENTIRE DOCUMENT	1-16
Y	US 4,317,366 A (TEWES ET AL) 2 MARCH 1982 (02.03.82), ENTIRE DOCUMENT	1-16
Y	US A 5,349,859 (KLEPPE) 27 SEPTEMBER 1994 (27.09.94), ENTIRE DOCUMENT	3,4,7,8,9
Y	US A 4,541,279 (SCHOMBERG) 17 SEPTEMBER 1985, ABSTRACT	3,4,7,8,9
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:	"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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Date of the actual completion of the international search 28 OCTOBER 1998	Date of mailing of the international search report 21 JAN 1999	
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 BERNARD ROSKOSKI Telephone No. (703) 308-1783	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/13839

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US A 5,197,019 (DELON-MARTIN ET AL) 23 MARCH 1993 (23.03.93), ABSTRACT	3,4,7,8,9,

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-16

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.