



File Histories

The world's leading IP decision makers turn to us for one reason. Trust.

Good decisions require reliable intelligence. That's why more IP decision makers rely on us.

We empower companies to build and protect their valuable assets with services that span the full IP lifecycle. Our blend of global expertise, resources, and technology translates to results you can rely on with certainty. In any language, we're the name you can trust.

IP Services from Clarivate Analytics

Patent search and analytics

- Prior art search
- Patent watch
- Patent profiles

Patent licensing

- Patent-to-product mapping
- Standards mapping
- Licensing opportunity analysis
- Patent acquisition analysis
- Claims charting

Patent preparation and prosecution

- Patent drafting
- Prosecution services

IP analytics

- Technology landscaping
- Patent portfolio audit
- Competitive portfolio assessment

IP management

- Data validation services
- IP payments
- IP docketing
- IP management consulting
- Paralegal services
- Proofreading

Translation services and file histories

For more information, call us at +1-800-445-9760
or email fhservice@clarivate.com

Alexandria

+1 800 445 9760 (US)
+1 703 916 1500 (International)
filehistories.clarivate.com

IP 1702 300
07.2017
© 2017 Clarivate Analytics

FILE HISTORY

US 8,909,482

PATENT: 8,909,482

INVENTORS: MASO PORTABELLA ALBERTO

TITLE: Device for measuring power consumption
and performance with respect to the
environment of a power-consuming unit

APPLICATION
NO: US13054355A

FILED: 14 JAN 2011

ISSUED: 09 DEC 2014

COMPILED: 19 SEP 2022

8,909,482

**Device for measuring power consumption and performance with respect to
the environment of a power-consuming unit**

Transaction History

Date	Transaction Description
01-14-2011	Request for Foreign Priority (Priority Papers May Be Included)
01-14-2011	Preliminary Amendment
01-14-2011	Electronic Information Disclosure Statement
01-14-2011	Information Disclosure Statement (IDS) Filed
01-14-2011	Initial Exam Team nn
01-18-2011	371 Completion Date
02-22-2011	Sent to Classification Contractor
02-23-2011	Email Notification
02-23-2011	Filing Receipt
02-23-2011	Notice of DO-EO Acceptance Mailed
02-25-2011	Email Notification
03-17-2011	Application Dispatched from OIPE
06-02-2011	PG-Pub Issue Notification
06-03-2011	Email Notification
05-23-2012	Case Docketed to Examiner in GAU
05-24-2012	Case Docketed to Examiner in GAU
08-02-2012	Case Docketed to Examiner in GAU
04-04-2014	Case Docketed to Examiner in GAU
04-07-2014	Case Docketed to Examiner in GAU
04-15-2014	Information Disclosure Statement considered
04-16-2014	Non-Final Rejection
04-21-2014	Electronic Review
04-21-2014	Email Notification
04-21-2014	Mail Non-Final Rejection
07-16-2014	Response after Non-Final Action
07-22-2014	Date Forwarded to Examiner
08-05-2014	Notice of Allowance Data Verification Completed
08-11-2014	Electronic Review
08-11-2014	Email Notification
08-11-2014	Mail Notice of Allowance
09-13-2014	Pubs Case Remand to TC
09-15-2014	Corrected Notice of Allowability
09-19-2014	Email Notification
09-19-2014	Printer Rush- No mailing
09-19-2014	Mailing Corrected Notice of Allowability
10-06-2014	Miscellaneous Incoming Letter
11-04-2014	Issue Fee Payment Verified
11-04-2014	Issue Fee Payment Received
11-05-2014	Dispatch to FDC
11-05-2014	Application Is Considered Ready for Issue
11-19-2014	Issue Notification Mailed
11-20-2014	Email Notification
12-09-2014	Recordation of Patent Grant Mailed
12-09-2014	Patent Issue Date Used in PTA Calculation
07-23-2018	Maintenance Fee Reminder Mailed
01-14-2019	Expire Patent
05-12-2020	Petition Requesting Trial
05-14-2020	Payment of Maintenance Fee, 4th Yr, Small Entity
05-14-2020	Mail-Petition Decision - Accept Late Payment of Maintenance Fees - Granted
05-14-2020	Petition Decision - Accept Late Payment of Maintenance Fees - Granted
05-14-2020	Petition to Accept Late Payment of Maintenance Fee Payment Filed
05-14-2020	Surcharge, Petition to Accept Pymt After Exp, Unintentional.

05-15-2020	Correspondence Address Change
05-19-2020	Email Notification
05-19-2020	Change in Power of Attorney (May Include Associate POA)
10-01-2020	Request for Trial Denied
03-21-2022	Payment of Maintenance Fee, 8th Yr, Small Entity

Issue Classification 	Application/Control No. 13054355	Applicant(s)/Patent Under Reexamination MASO PORTABELLA, ALBERTO	
	Examiner JOHN H LE	Art Unit 2862	

CPC						
Symbol					Type	Version
G01D		4		00	F	2013-01-01
G07C		5		02	I	2013-01-01
G01R		22		10	A	2013-01-01
Y02B		70		343	A	2013-01-01
Y04S		20		34	A	2013-01-01
						
						
						
						
						
						
						
						
						

CPC Combination Sets				
Symbol		Type	Set	Ranking
				
				

NONE		Total Claims Allowed:	
(Assistant Examiner) (Date)		16	
/JOHN H LE/ Primary Examiner.Art Unit 2862		O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner) (Date)		1	1

Issue Classification 	Application/Control No. 13054355	Applicant(s)/Patent Under Reexamination MASO PORTABELLA, ALBERTO
	Examiner JOHN H LE	Art Unit 2862

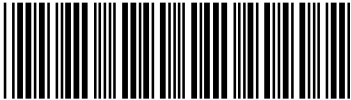
[illegible]

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	16	
/JOHN H LE/ Primary Examiner.Art Unit 2862	07/30/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Issue Classification 	Application/Control No. 13054355	Applicant(s)/Patent Under Reexamination MASO PORTABELLA, ALBERTO
	Examiner JOHN H LE	Art Unit 2862

☐ Claims renumbered in the same order as presented by applicant															
☐ CPA															
☐ T.D.															
☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1														
2	2														
3	3														
4	4														
5	5														
6	6														
7	7														
8	8														
9	9														
10	10														
11	11														
12	12														
13	13														
15	14														
14	15														
16	16														

NONE	Total Claims Allowed:	
(Assistant Examiner)	(Date)	16
/JOHN H LE/ Primary Examiner.Art Unit 2862	07/30/2014	O.G. Print Claim(s)
(Primary Examiner)	(Date)	1
		O.G. Print Figure
		1

Index of Claims 	Application/Control No. 13054355	Applicant(s)/Patent Under Reexamination MASO PORTABELLA, ALBERTO
	Examiner JOHN H LE	Art Unit 2862

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant☐ CPA☐ T.D.☐ R.1.47

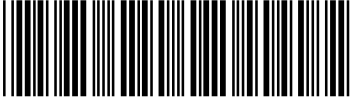
CLAIM		DATE								
Final	Original	04/16/2014	07/29/2014							
1	1	=	=							
2	2	=	=							
3	3	=	=							
4	4	=	=							
5	5	=	=							
6	6	=	=							
7	7	=	=							
8	8	=	=							
9	9	✓	=							
10	10	✓	=							
11	11	✓	=							
12	12	✓	=							
13	13	✓	=							
15	14	✓	=							
14	15	✓	=							
16	16	✓	=							

Index of Claims 	Application/Control No. 13054355	Applicant(s)/Patent Under Reexamination MASO PORTABELLA, ALBERTO
	Examiner JOHN H LE	Art Unit 2862

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant☐ CPA☐ T.D.☐ R.1.47

CLAIM		DATE								
Final	Original	04/16/2014								
	1	=								
	2	=								
	3	=								
	4	=								
	5	=								
	6	=								
	7	=								
	8	=								
	9	✓								
	10	✓								
	11	✓								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								

Search Notes 	Application/Control No. 13054355	Applicant(s)/Patent Under Reexamination MASO PORTABELLA, ALBERTO
	Examiner JOHN H LE	Art Unit 2862

CPC- SEARCHED		
Symbol	Date	Examiner
G01D4/00, G01R22/10, G07C5/02, Y02B70/343, Y04S20/34	4/16/2014	JL
G06Q10/00 G06Q10/063, G06Q10/0639, G06Q10/06393, G06Q30/02	4/16/2014	JL

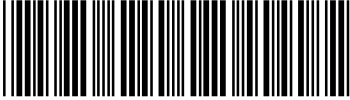
CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
702	19, 24, 45,50, 57, 60, 61, 68, 179, 182, 183, 188	4/16/2014	JL
705	7.11, 7.12, 7.39, 10	4/16/2014	JL

SEARCH NOTES		
Search Notes	Date	Examiner
EAST search (USPAT, USPGPUB, USOCR, FPRS, EPO, JPO, DERWENT, IBM)	4/16/2014	JL
Text search (class 702, 705)	4/16/2014	JL
CPC search (G01D4/00, G01R22/10, G07C5/02, Y02B70/343, Y04S20/34,G06Q10/00, G06Q10/063, G06Q10/0639, G06Q10/06393, G06Q30/02)	4/16/2014	JL
Inventor search	4/16/2014	JL

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/JOHN H LE/ Primary Examiner.Art Unit 2862
--	---

Search Notes 	Application/Control No. 13054355	Applicant(s)/Patent Under Reexamination MASO PORTABELLA, ALBERTO
	Examiner JOHN H LE	Art Unit 2862

CPC- SEARCHED		
Symbol	Date	Examiner
G01D4/00, G01R22/10, G07C5/02, Y02B70/343, Y04S20/34	4/16/2014	JL
G06Q10/00 G06Q10/063, G06Q10/0639, G06Q10/06393, G06Q30/02	4/16/2014	JL

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
702	19, 24, 45, 50, 57, 60, 61, 68, 179, 182, 183, 188	4/16/2014	JL
705	7.11, 7.12, 7.39, 10	4/16/2014	JL
Update search of the above		7/30/2014	JL

SEARCH NOTES		
Search Notes	Date	Examiner
EAST search (USPAT, USPGPUB, USOCR, FPRS, EPO, JPO, DERWENT, IBM)	4/16/2014	JL
Text search (class 702, 705)	4/16/2014	JL
CPC search (G01D4/00, G01R22/10, G07C5/02, Y02B70/343, Y04S20/34,G06Q10/00, G06Q10/063, G06Q10/0639, G06Q10/06393, G06Q30/02)	4/16/2014	JL
Inventor search	4/16/2014	JL
Update search	7/30/2014	JL

INTERFERENCE SEARCH

	/JOHN H LE/ Primary Examiner.Art Unit 2862
--	---

US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
702	19, 45, 61	7/30/2014	JL
705	3.39	7/30/2014	JL

	/JOHN H LE/ Primary Examiner.Art Unit 2862
--	---

/J.L./
07/30/2014

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S48	4	((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with waste with production) and ((determin\$3 measur\$6 calculat\$3) with (ecological near2 parameter))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/29 13:23
S49	1	((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with waste with production) and ((determin\$3 measur\$6 calculat\$3) with (ecological near2 parameter))	US-PGPUB	OR	ON	2014/07/29 13:24
S50	12	((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with waste with production) and ((determin\$3 measur\$6 calculat\$3) with parameter)	US-PGPUB	OR	ON	2014/07/29 13:27
S51	20	((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with waste with production) and ((determin\$3 measur\$6 calculat\$3) with parameter)	US-PGPUB; USPAT	OR	ON	2014/07/29 13:28
S52	1	((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)	US-PGPUB; USPAT	OR	ON	2014/07/29 13:29
S54	1	("702"/\$.ccls. "705"/\$.ccls.) and ((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)	US-PGPUB	OR	ON	2014/07/30 14:27
S53	1	("702"/\$.ccls. "705"/\$.ccls.) and ((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/30 14:27
S56	1	("702"/\$.ccls. "705"/\$.ccls.) and (((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)).clm.	US-PGPUB	OR	ON	2014/07/30 14:28
S55	1	("702"/\$.ccls. "705"/\$.ccls.) and (((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6	US-PGPUB; USPAT; USOCR;	OR	ON	2014/07/30 14:28

		calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)).clm.	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L2	1	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and ((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)	US-PGPUB	OR	ON	2014/07/30 15:54
L1	4	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and ((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/30 15:54
L7	7	Maso near2 Portabella near2 Alberto	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/30 15:55
L4	1	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and (((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)).clm.	US-PGPUB	OR	ON	2014/07/30 15:55
L3	1	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and (((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/30 15:55
L9	1	7 and ((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)	US-PGPUB	OR	ON	2014/07/30 15:56
L8	4	7 and ((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2014/07/30 15:56

		parameter)	DERWENT; IBM_TDB			
--	--	------------	---------------------	--	--	--

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S58	1	("702"/\$.ccls. "705"/\$.ccls.) and (((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)).clm.	US-PGPUB	OR	ON	2014/07/30 14:28
S57	1	("702"/\$.ccls. "705"/\$.ccls.) and (((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2014/07/30 14:28
L6	1	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and (((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)).clm.	US-PGPUB	OR	ON	2014/07/30 15:55
L5	1	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and (((measur\$6 calculat\$3 receiv\$3) with power with consumption) and ((measur\$6 calculat\$3 receiv\$3) with (waste near2 production)) and ((determin\$3 measur\$6 calculat\$3) with parameter)).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2014/07/30 15:55

7/ 30/ 2014 4:04:58 PM
C:\ Users\ jle\ Documents\ EAST\ Workspaces\ 13054355.wsp

/J.L./
04/16/2014

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	6	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and ((energy power) near3 (consum\$3 consumption)) and (((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 20:18
L3	7	Maso near2 Portabella near2 Alberto	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 20:18
L4	7	3 and ((energy power) near3 (consum\$3 consumption)) and (((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 20:19
L5	4	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and ((measur\$6 calculat\$3) with (energy power)) and ecological and (waste near4 product\$3) and waste and ((energy power) near3 consumption) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 20:21
L7	16	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and ((measur\$6 calculat\$3) with (energy power)) and ecological and (waste near4 product\$3) and waste and ((energy power) near3 consumption)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 20:41
L8	4	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and ((measur\$6 calculat\$3) with (energy power)) and ecological and (waste near4 product\$3) and waste and ((energy power) near3 consumption) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 20:42

L9	4	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (energy power) with (consum\$3 consumption)) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (waste near4 product\$3)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 20:45
L10	1	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (energy power) with (consum\$3 consumption)) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (waste near4 product\$3)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB	OR	ON	2014/04/16 20:45
L11	1	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and (((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (energy power) with (consum\$3 consumption)) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (waste near4 product\$3)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 20:45
L12	1	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/00 OR G06Q10/063 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and (((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (energy power) with (consum\$3 consumption)) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (waste near4 product\$3)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)).clm.	US-PGPUB	OR	ON	2014/04/16 20:45
L13	1	("702"/\$.ccls. "705"/\$.ccls.) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (energy power) with (consum\$3 consumption)) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (waste near4 product\$3)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 20:46
L14	1	("702"/\$.ccls. "705"/\$.ccls.) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (energy power) with (consum\$3 consumption)) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (waste near4 product\$3)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB	OR	ON	2014/04/16 20:46
L15	4	3 and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (energy power) with	US-PGPUB; USPAT;	OR	ON	2014/04/16 20:47

		((consum\$3 consumption)) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (waste near4 product\$3)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
L16	1	3 and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (energy power) with (consum\$3 consumption)) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (waste near4 product\$3)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB	OR	ON	2014/04/16 20:47
L17	4	((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (energy power) with (consum\$3 consumption)) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (waste near4 product\$3)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 20:47
L18	1	((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (energy power) with (consum\$3 consumption)) and ((measur\$6 calculat\$3 receiv\$3 obtain\$3) with (waste near4 product\$3)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB	OR	ON	2014/04/16 20:47
S2	13	((measur\$6 calculat\$3) with power) and (ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/15 21:56
S3	2	WO-02067152-\$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/15 22:07
S5	1	"20040117240".pn. and ecological	US-PGPUB; USPAT	OR	ON	2014/04/15 23:13
S6	0	"20040117240".pn. and ((measur\$6 calculat\$3) with power)	US-PGPUB; USPAT	OR	ON	2014/04/15 23:14
S7	1	"20040117240".pn. and ((measur\$6 calculat\$3) with (energy power))	US-PGPUB; USPAT	OR	ON	2014/04/15 23:14
S8	1	"20040117240".pn. and ((measur\$6 calculat\$3) with (energy power)) and ecological	US-PGPUB; USPAT	OR	ON	2014/04/15 23:14
S9	0	"20040117240".pn. and ((measur\$6 calculat\$3) with (energy power)) and ecological and (waste near4 product) and waste	US-PGPUB; USPAT	OR	ON	2014/04/15 23:24
S10	1	"20040117240".pn. and ((measur\$6 calculat\$3) with (energy power)) and ecological and (waste near4 product\$3) and waste	US-PGPUB; USPAT	OR	ON	2014/04/15 23:25
S11	0	"20040117240".pn. and ((measur\$6 calculat\$3) with (energy power)) and ecological and (waste near4 product\$3) and	US-PGPUB; USPAT	OR	ON	2014/04/15 23:26

		waste and ((energy power) near3 composition)				
S12	0	"20040117240".pn. and ((measur\$6 calculat\$3) with (energy power)) and ecological and (waste near4 product\$3) and waste and composition	US-PGPUB; USPAT	OR	ON	2014/04/15 23:26
S13	1	"20040117240".pn. and ((measur\$6 calculat\$3) with (energy power)) and ecological and (waste near4 product\$3) and waste and ((energy power) near3 consumption)	US-PGPUB; USPAT	OR	ON	2014/04/15 23:28
S14	4	((measur\$6 calculat\$3) near3 power near3 consumption) and (environment near2 (power adj consuming adj (device unit)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/15 23:44
S15	4	((measur\$6 calculat\$3) near3 power near3 consumption) and (ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/15 23:46
S16	1	13/054355	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/15 23:53
S17	1	"20040117240".pn.	US-PGPUB; USPAT	OR	ON	2014/04/15 23:54
S18	14	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and ((measur\$6 calculat\$3) with (energy power)) and ecological and (waste near4 product\$3) and waste and ((energy power) near3 consumption)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/15 23:55
S19	4	((measur\$6 calculat\$3) near3 power) and (power near3 consum\$3) and (determin\$3 measur\$6 calculat\$3) with (ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 11:07
S20	9	((measur\$6 calculat\$3) near3 (energy power)) and ((power energy) near3 consum\$3) and (determin\$3 measur\$6 calculat\$3) with (ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 11:08
S21	14	(G01D4/00 OR G01R22/10 OR G07C5/02 OR Y02B70/343 OR Y04S20/34 OR G06Q10/0639 OR G06Q10/06393 OR G06Q30/02).CPC. and ((measur\$6	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2014/04/16 11:30

EAST Search History

		calculat\$3) with (energy power)) and (ecological (percentage near2 (power energy))) and (waste near4 product\$3) and waste and ((energy power) near3 consumption)	EPO; JPO; DERWENT; IBM_TDB			
S22	11	((energy power) near3 (consum\$3 consumption)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 11:35
S23	7	((energy power) near3 (consum\$3 consumption)) and ((determin\$3 measur\$6 calculat\$3) near3 ecological near2 parameter) and waste	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 11:35
S24	3	("20080069641" "20090241797" "20100274629").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2014/04/16 11:38
S25	0	"20040117240".pn. and ((measur\$6 calculat\$3) with (energy power)) and ((measur\$6 calculat\$3 determin\$3) with ecological) and (waste near4 product\$3) and waste and composition	US-PGPUB; USPAT	OR	ON	2014/04/16 12:22
S26	0	"20040117240".pn. and ((measur\$6 calculat\$3) with (energy power)) and ((measur\$6 calculat\$3 determin\$3) with ecological) and (waste near4 product\$3) and waste	US-PGPUB; USPAT	OR	ON	2014/04/16 12:23
S27	0	"20040117240".pn. and ((measur\$6 calculat\$3 determin\$3) with ecological) and (waste near4 product\$3) and waste	US-PGPUB; USPAT	OR	ON	2014/04/16 12:23
S29	0	((measur\$6 calculat\$3 monitor\$3) near3 water near2 flow) and ((measur\$6 calculat\$3 monitor\$3) near3 gases) and ((measur\$6 calculat\$3 monitor\$3) near3 electric near2 power) and ((measur\$6 calculat\$3 monitor\$3) near3 weight near3 wastes)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 15:20
S30	1	((measur\$6 calculat\$3 monitor\$3 input\$3 record\$3 stor\$3) near3 water near2 flow) and ((measur\$6 calculat\$3 monitor\$3 input\$3 record\$3 stor\$3) near3 gases) and ((measur\$6 calculat\$3 monitor\$3 input\$3 record\$3 stor\$3) near3 electric near2 power) and ((measur\$6 calculat\$3 monitor\$3 input\$3 record\$3 stor\$3) near3 weight near3 wastes)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/04/16 15:21

EAST Search History (Interference)

< This search history is empty >

4/ 16/ 2014 8:48:22 PM
C:\ Users\ jle\ Documents\ EAST\ Workspaces\ 13054355.wsp



(12) **United States Patent**
Maso Portabella

(10) **Patent No.:** **US 8,909,482 B2**
(45) **Date of Patent:** **Dec. 9, 2014**

(54) **DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT**

(76) Inventor: **Alberto Maso Portabella**, Cabrera de Mar (ES)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 932 days.

(21) Appl. No.: **13/054,355**

(22) PCT Filed: **Jul. 20, 2009**

(86) PCT No.: **PCT/IB2009/053135**
§ 371 (c)(1),
(2), (4) Date: **Jan. 14, 2011**

(87) PCT Pub. No.: **WO2010/007601**
PCT Pub. Date: **Jan. 21, 2010**

(65) **Prior Publication Data**
US 2011/0130972 A1 Jun. 2, 2011

(30) **Foreign Application Priority Data**
Jul. 18, 2008 (ES) 200802159

(51) **Int. Cl.**
G06F 19/00 (2011.01)
G01R 21/00 (2006.01)
G01D 4/00 (2006.01)
G07C 5/02 (2006.01)
G01R 22/10 (2006.01)

(52) **U.S. Cl.**
CPC .. **G01D 4/00** (2013.01); **G07C 5/02** (2013.01);
G01R 22/10 (2013.01); **Y02B 70/343** (2013.01);
Y04S 20/34 (2013.01)
USPC **702/19**; **702/45**; **702/61**; **705/7.39**

(58) **Field of Classification Search**
CPC G01D 4/00; G01R 22/10; G07C 5/02;
Y02B 70/343; Y04S 20/34; G06Q 10/00;
G06Q 10/063; G06Q 10/0639; G06Q
10/06393; G06Q 30/02
USPC 702/19, 24, 45, 50, 57, 60, 61, 68, 179,
702/182, 183, 188; 705/7.11, 7.12, 7.39, 10
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2004/0117240 A1* 6/2004 Ness et al. 705/10

FOREIGN PATENT DOCUMENTS

WO WO02/067152 8/2002

OTHER PUBLICATIONS

PCT International Search Report completed for PCT/IB2009/053135 Aug. 24, 2010.

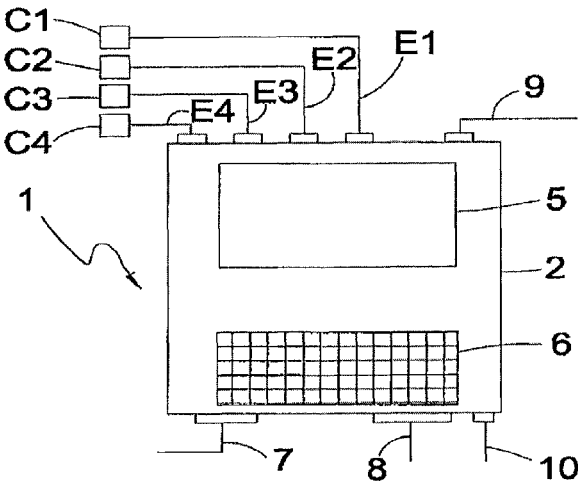
* cited by examiner

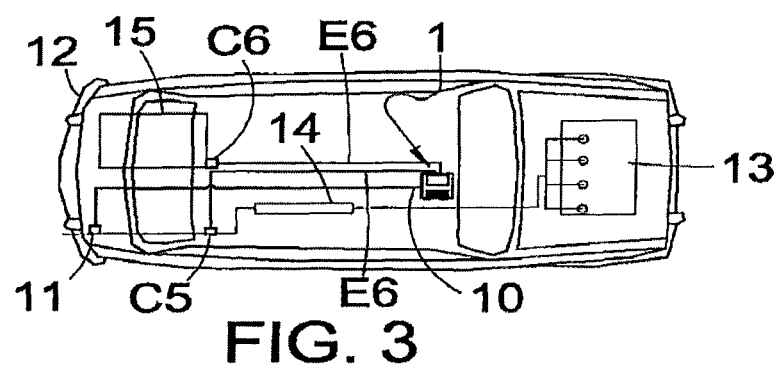
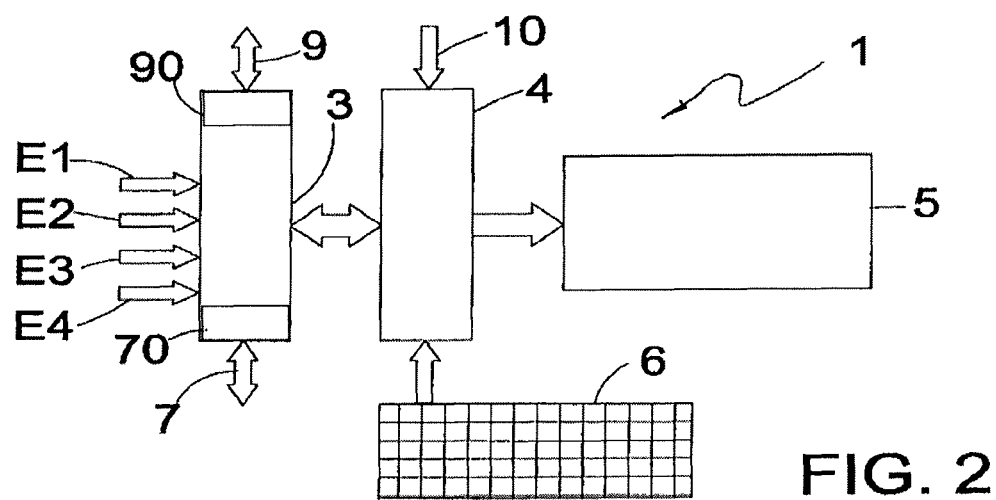
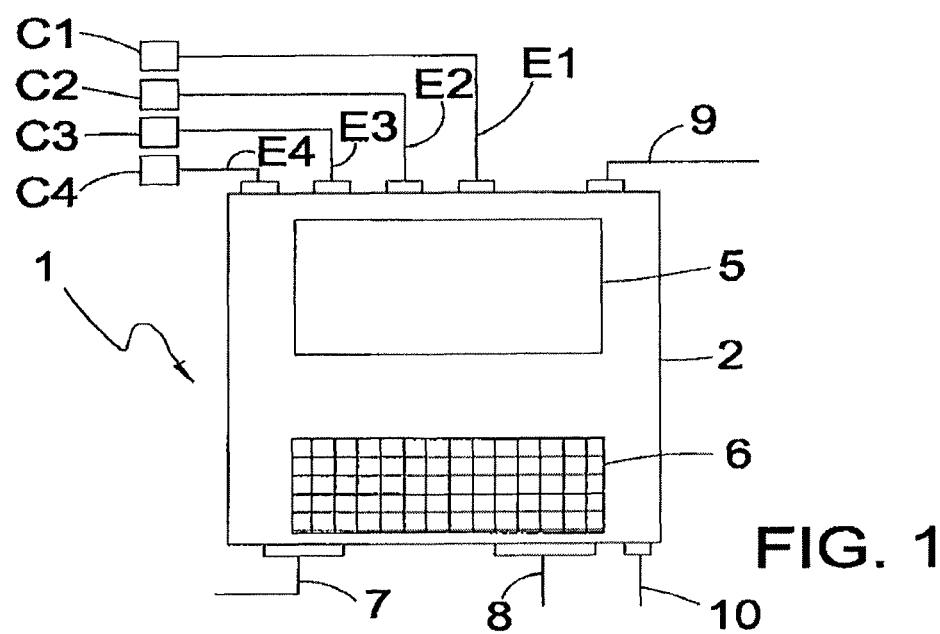
Primary Examiner — John H Le
(74) Attorney, Agent, or Firm — Barnes & Thornburg LLP

(57) **ABSTRACT**

A device for measuring power consumption and performance relative to the environment of a power-consuming unit is disclosed. The device includes a data introduction module, a keyboard for inputting data of waste production in the power-consuming unit, a computing device, and a display screen. The computing device receives the data from the data introduction module and the keyboard. The computing device is also provided with a processor that includes a calculation algorithm of an ecological parameter indicative of the performance relative to the environment of the power-consuming unit. The ecological parameter is calculated as an adjusted mean of the sum of the deviations of each power consumption value with respect to a reference value.

16 Claims, 1 Drawing Sheet





1

**DEVICE FOR MEASURING POWER
CONSUMPTION AND PERFORMANCE WITH
RESPECT TO THE ENVIRONMENT OF A
POWER-CONSUMING UNIT**

**CROSS-REFERENCE TO RELATED
APPLICATIONS**

This application is a U.S. national counterpart application of International Application Serial No. PCT/IB2009/053135 filed Jul. 20, 2009, which claims priority to Spanish Patent Application No. P200802159 filed Jul. 18, 2008. The disclosures of PCT/IB2009/053135 and P200802159 are each hereby incorporated herein by reference.

TECHNICAL FIELD OF THE INVENTION

The invention refers to a device for measuring power consumptions and the respectful performance with the environment, from the measured power consumptions and from the residue production, in a power-consuming unit, a comfort unit (houses, communities, hotels and restaurants, spare time spaces, sport spaces, private and public motor vehicles, and goods vehicles, etc.) or a production unit.

The measurement of this respectful performance or not will be carried out by what we call “ecological parameter”, from the measurements of power consumptions (direct consumptions) and of residues and wastes generated (indirect consumptions).

BACKGROUND OF THE INVENTION

A lot of kinds of programmable logic controllers (PLC) are known, in which, from state variables, the outputs of a system are determined (e.g. electrical or pneumatic, etc.) or another kinds of devices that, from inputs, calculate the values of parameters of interest. Examples of these devices can be the known analysers of the electric mains that, from voltage, current intensity and imbalance signals, calculate the electric power consumed by an installation.

However, in the current art no device or apparatus that calculates ecological parameters or magnitudes are known, from power consumption and waste production data in installations, if we define such parameters or magnitudes as a deviation of an optimal work point, defined by an authority. E.g. in which the emissions of COx or NOx are the minimum possible according to its use.

The present invention has the objective to provide an apparatus that fulfils this gap in the current art.

DESCRIPTION OF THE INVENTION

To this end, the object of the present invention is a new measuring device of power consumptions which calculates ecological parameters from the measured power consumptions and from data of waste production, that it is characterised in that it comprises:

- a module for introducing data, provided with at least an input of a value of power consumption of a magnitude, measured in a corresponding measure apparatus of the power-consuming unit;
- a keyboard for introducing data and for selecting menus, in particular data of waste production of the power-consuming unit;
- computing means that receive the data from the module for introducing data and from the keyboard, and which are provided with a processor that incorporates an algorithm

2

for calculating an ecological parameter from the measured consumptions of power and from the introduced data; and

- a display screen, communicated with the computing means, to display the calculated ecological parameter, said ecological parameter being calculated as an adjusted mean of the sum of the deviations of each value of power consumption measured according to a reference value.

According to another feature of the present invention, the device comprises means for introducing values of waste production.

In preferred variants, the device can comprise an input module of a data bus of a domotic network and/or an USB input for a serial data bus.

In an embodiment of domestic or industrial application, the device comprises at least:

- an input of water flow, from a corresponding first water flow meter;
- an input of combustible gas or liquid flow, from a second flow meter of combustible gases or liquids;
- an input for measuring the electric power, from a counter or analyser of the electric mains; and
- an input for measuring the waste weight from a waste weighting scales.

In an alternative embodiment, for calculating the ecological parameter corresponding to the automobile, the device can comprise at least:

- an input of fuel flow, from a corresponding fuel flow meter of the motor of an automobile; and
- means for introducing the production of wastes of the automobile, selected among: tire rubber wastes, motor oil wastes, coolant liquid wastes, and liquid wastes from closed circuits, not being limitative, by the keyboard of the device.

The device can be provided also with an input for exhaust gases flow, from a corresponding flow meter of exhaust gases of the combustion system of the power-consuming unit, e.g. the motor exhaust; and a gas analyser for measuring the emission levels of gases and particles. The device compares the result obtained with the admitted levels by the current regulations. The incorrect combustion and the subsequent excess of gas (CO₂ and NO_x) and particle emission is not a user or producer question, because they do not influence on it, but the direct responsible is the manufacturer of the apparatus or combustion chamber. However, additionally, the repair of said anomaly it is a question of the user or producer. This does not affect only to explosion motors and domestic boilers, but also to production and transformation centres.

Preferably, the device comprises a shell, which encloses the several components of the device, and in whose external part it is the keyboard and the screen.

BRIEF DESCRIPTION OF THE DRAWINGS

In the attached drawings some embodiments of the device object of the present invention are shown, only as a non-limitative example. In said drawings:

FIG. 1 is a diagrammatical frontal elevation view, that shows a device according to the present invention, with its particular connections;

FIG. 2 is a block diagram that shows the internal composition of the device of FIG. 1; and

FIG. 3 is a diagrammatical view that shows an alternative embodiment of the invention, to be applied to automobiles.

DETAILED DESCRIPTION OF THE DRAWINGS

In said drawings it can be seen the constitution and way of the device for measuring power consumptions and for calcu-

3

lating ecological parameters from the measured power consumptions, directly and indirectly.

The function of the device of the invention is to measure the respectful performance or behaviour with the environment of a “power-consuming unit”. The “power-consuming unit” object of the measure of the possible different power manifestations consumed can be: a house, community (hotel, sports centre, residence, sport spaces, shops, department stores, leisure halls, office buildings and studies, administration centres, etc.), transformation centres, garages, warehouses, motor vehicles or transportation means, private or public.

The basis of the operation will consist in the comparison between the basic actual power flow required by the user for their comfort with the normal consumptions of the current regulations (e.g. UNE, ISO standards, etc.) and/or those recommended by official administrations of the place and/or statistic data of normal power consumptions and wastes (hereinafter “typical consumptions” including flows of power consumptions and wastes by person or by own unit of a preset population).

For this comparison, the proposed system will calculate an ecological parameter as an adjusted mean of the sum of deviations of each value of power consumption measured with respect to its corresponding reference value.

To this end, as seen in FIGS. 1 and 2, the device 1 of the present invention is constituted by an apparatus that has a carcass or shell 2 that includes the following elements:

- a module for introducing data 3, provided with inputs of power consumption values E1, E2, E3, E4, of magnitudes, measured with corresponding measure apparatuses C1, C2, C3, C4;
- a keyboard 6 for introducing data and selecting menus, in particular data of the waste production;
- computing means 4, which receive the data from the module for introducing data 3 and the keyboard 6, and which are provided with a processor that includes a calculation algorithm for an ecological parameter from the measured power consumptions and from the introduced data; and
- a display screen 5, communicated with said computing means 4, to display the calculated ecological parameter.

The apparatus is provided with an electrical source 8, as it can be seen in FIG. 1.

To introduce values of the waste production one of the inputs E4, digital or analogical, can be used, from a weight apparatus, or they can be introduced manually through a keyboard 6.

The device 1 can be complemented with an input module 90 for a data bus 9 of a domotic network, and an USB input 70 for a serial data bus 7, or equivalent means.

In FIG. 1 a device particularly devised for special application in buildings (houses, hotel, sports centre, residence, sport spaces, shops, department stores, leisure halls, office buildings and studies, administration centres, transformation centres, garages, warehouses, etc.) is shown. The shell 2 comprises at least the following inputs:

- an input for the water flow E1 from a corresponding first water flow meter C1;
- an input for the flow of combustible gases or liquids E2, from the second flow meter of combustible gases or liquids C2;
- an input for measuring electric power E3, from a meter or analyser of electric mains C3; and
- an input for measuring the weight of the wastes E4 from a scale for weighting wastes C4, through the corresponding ports.

4

The number of inputs will be according to the complexity of the installation. E.g. an industry can be provided with several devices of this kind, each associated with a corresponding section or unit of factory, warehouse, office, etc.

In FIG. 3 is shown an embodiment particularly devised for automobiles, in which the device comprises an input for fuel flow E6, from a flow meter C6 of fuel, associated with the fuel deposit 15; and an input of exhaust gases flow E5, from a corresponding flow meter C5 of exhaust gases from the exhaust system 14 of the motor 13 of an automobile 12. In this case, by the keyboard the flows of production of wastes of the automobile are introduced manually, e.g. rubber wastes from tires, oil wastes for the motor, coolant liquid wastes, liquid wastes from closed circuits and metal wastes.

The device has an input 10 to collect, optionally, the information from a gas analyser 11 (FIG. 3), to measure the emission levels of gases and particles. The device 1 compares the result obtained with the levels admitted by the current regulations.

The algorithm of the computing means 4 calculates the total basic power flow obtained by the evaluation of the flows of the measured power statements E1, E2, E3, E4, E5, E6, etc. referred to the number of people which use the unit to be measured in each trip. The calculation algorithm integrates all the trips of a time period to be defined or the accumulated total.

Each flow has an incidence in the environment: the water consumption reverts in its exploitation, the fuel consumption is associated to the direct emissions of CO2, NOx, . . . , the electric consumption to the indirect emissions of CO2, NOx, . . . , and the waste production with indirect environmental impact, by the quantity of paper, glass, organic material, plastics, oils and greases, rubbers, metals, . . . expressed in kg that the unit consumes per time unit and please who enjoy the comfort of said unit, to be compared with preset consumptions and wastes. These data, once treated by the algorithm, give as result an ecologic parameter (here denoted as “ecocom”), which is the measure of the conduct that respects our environment, to provide integral or combined or individual “ecocoms” of the comfort or production unit.

Regarding the presentation of the results, from said comparison the actual percentage of power consumption with respect to the preset consumption is obtained, indicating if the performance is respectful (equal to zero or higher) or abusive when it is negative. Both deviations are measured as a percentage. The percent unit of each flow is called positive “ecocom”, if the result is respectful or negative if it is not. The algorithm of all the flows provides the integral “ecocom” of the unit. As there can be difficulties to receive all the flows, the algorithm of the ecometer could provide only “ecocoms” of water exploitation and/or direct gases emission and/or indirect gases emission and/or waste production. It is also possible to measure only those flows the public administration considers suitable to pay ecotaxes, evaluating a specific pack (which can be called “administrative ecocom”).

The results are presented in a permanent way in a screen 5, indicating the periods of time on which they are based: the day, week, month accumulations, etc. or others, such as those consumed by trip in the case of vehicles. To know better the power exploitation, by a menu the “ecocoms” can be displayed (day, week, month, . . .) of exploitation of the different power sources in the screen or to pass to other successive ones with the direct or indirect emissions or waste production.

As stated previously, if the consumption of only one or several flows are calculated for installation difficulties, the permanent screen shows that they are individual “ecocoms” by power source or waste, combined or integral.

5

Regarding the installation of different measuring apparatus C1, C2, C3, C4, C5, C6, etc., the water flow meter C1 is placed downstream the company meter and upstream the home key, with the possibility to emit impulses or analogical or digital or light signals. The same applies to C2, flow meter for combustible gases or liquids, to C3, electric measuring equipment in the general board of the unit, to C5, in the case of exhaust gases, and to C6, in the case of fuel flow of an automobile. The same can be said to the flow of waste production E4, which will be from a scale C4. The emission of information can be wireless or wired. In the case that there is no installation, by the keyboard 6 the flow data can be introduced manually.

Algorithm for Calculating the Ecologic Parameter

It results from the adjusted arithmetic mean of all the quotients between the absolute value of actual flows (E1, E2, E3, E4, E5, . . .) that enter in the power-consuming unit object of the measure of the different possible power statements, with respect to their flows or corresponding reference values. The absolute value of the actual flows is taken because the input power consumption has a sign opposed to a waste, which indirectly is associated to another external power consumption;

therefore, as the contributions of each factor is the interesting part, all are taken in flow absolute value, no the quotient of flows, not being compensated to each other.

It is defined:

1—Flow of an actual input power statement (E1, E2, E3, E4, E5, E6 . . . , generally Ei): As the power quantity consumed by the time unit of that power statement, by user of the unit to be measured. E.g. the drinkable consumed in a home is a power flow because it is obtained from the nature with transportation, purification cost . . . ; these power costs are environmental costs associated with that consumed water. The combustible liquid and gas flow consumed is another actual input power flow associated with the direct emissions of CO2 and others to the atmosphere. The electricity consumption is another power flow associated with the indirect emissions of CO2 and other not desired gases. The wastes are also indicative of the environmental impact and they indicate indirectly a power expense. E.g. it is also an input power flow the quantity of glass we waste for identical reasons, but not those that we buy and remains for the development of the activity in the unit. Also with the paper, the organic material, the containers, the spare parts from repairs, etc.

2—Preset flows (Ct): They would be the average power consumption desired or recommended by the public administration of the zone where the activity of each unit to be measured is developed. If there is no environmental policy defined by the administration, standard consumptions or statistic data of consumptions are taken, inputs as consumption and outputs of wastes per resident or per production unit.

3—Adjustment coefficient (Cpd): Each coefficient designs a deviation percentage with respect to the preset consumption of consumed power statement. But not all have the same importance according to:

3.1. Habits regarding the consumptions of the unit. In certain regions there are power statements that have an important weight due to the proximity to the resource, subsidized prices or no other sources In these situations it must take into account the suitable specific weight that the administration determines or the statistical data. In the case of a motor vehicle, the water consumption will be dismissed, but not the fuel liquids or gases consumptions, the oil and grease wastes and rubber and metal wastes.

3.2. The power policies of the zone. According to the administration of the place and attending if to the environ-

6

ment conduct is associated a tax; these quotients must be adjusted depending on which deviations the administration could reward or punish.

3.3. Practical ends. These coefficients can be zero, because the contribution of said consumption is so low that is dismissed, according to the cost of its measure. E.g. the quantity of organic wastes of an electric train.

The adjusted coefficients are between 0 and 1.

Hence, the ecologic parameter (or “ecocoms”, in %), for “n” magnitudes of power consumption or wastes, is calculated applying the formula:

$$Ecocoms(\%) = 1/n \sum_{i=1}^n \left(Cpd_i \left(1 - \frac{E_i}{p \cdot C_i} \right) \right) \times 100$$

Wherein n is the number of power sources or waste variables to be measured (with adjustment coefficient different from zero) and p the people who enjoys the comfort of the unit to be measured.

Interpretation of the Results

The result is a percentage that when is close to zero the performance is desirable, but if it is negative and far away from zero, the performance of this unit is not respectful and the distance to zero is the degree of the separation from the desirable performance, and therefore it can be penalised and the penalization can be measured. Lastly, if it is positive the performance is excellent and the separation from zero is the measure of its environmental excellence.

The device for measuring power consumptions and the respectful performance, according to the present invention, can be used for the calculation of an ecologic parameter, which can be used as basis for the application of called ecotaxes by the administration.

What is claimed is:

1. A device for measuring power consumption and performance with respect to the environment of a power-consuming unit comprising
 - a data introduction module, which receives at least one power consumption value, measured by a measurement apparatus of the power-consuming unit;
 - an input device for inputting waste production data;
 - a display screen; and
 - a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to
 - (a) receive the at least one power consumption value from the data introduction module,
 - (b) receive the waste production data,
 - (c) calculate an ecological parameter based on the at least one power consumption value and the waste production data, and
 - (d) operate the display screen to display the calculated ecological parameter,wherein the calculated ecological parameter is an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value.
2. The device of claim 1 further comprising a means for introducing values of waste production.
3. The device of claim 1 further comprising an input module of a data bus in a domotic network.
4. The device of claim 1 further comprising USB input for a serial data bus.

7

5. The device of claim 1 wherein the at least one power consumption value includes at least two power consumption values selected from the group of:

- a water flow input from a corresponding first water flow meter;
- a combustible gas and liquid flow input from a second combustible gas and liquid flow meter;
- an electric power measurement input from a meter or analyser of electric mains; and
- a waste weight measurement input from a scale for weighing wastes.

6. The device of claim 1 wherein the at least one power consumption value includes a fuel flow input from a corresponding flow meter from the motor of an automobile;

- the waste production data corresponds to one of tire rubber wastes, motor oil wastes, coolant liquid wastes, closed circuit liquid wastes and metal wastes, and
- the fuel flow input and the waste production data are used to calculate the ecological parameter corresponding to the automobile.

7. The device of claim 6 wherein the at least one power consumption value includes an exhaust gas flow input from a corresponding flow meter of exhaust gases of a combustion system of the automobile.

8. The device of claim 1 further comprising a shell, which encloses the different components of the device, and in whose external part is the input device and the display screen.

9. A method of determining an ecological parameter by processor, comprising:

- receiving a first power consumption value of a power consuming unit,
- receiving a waste production data value,
- determining an ecological parameter based on the first power consumption value and the waste production data value, and
- outputting the determined ecological parameter for display on a display screen.

8

10. The method of claim 9, wherein the first power consumption value corresponds to one of water flow, combustible gas flow, and electric power flow.

11. The method of claim 10, wherein the waste production data corresponds to waste weight.

12. The method of claim 9, wherein the first power consumption value corresponds to one of fuel flow and exhaust gas flow.

13. The method of claim 12, wherein the waste production data corresponds to one of rubber wastes, oil waste, coolant liquid wastes, and metal.

14. The method of claim 12, further comprising generating a positive ecological parameter when a user expends less than a predetermined standard quantity of power consumed in a time period.

15. The method of claim 9, further comprising generating a negative ecological parameter when a user expends more than a predetermined standard quantity of power consumed in a time period.

16. The method of claim 9, wherein the ecological parameter is determined as a percentage based on an algorithm of the form

$$\text{Parameter}(\%) = 1/n \sum_{i=1}^n \left(Cpd \left(1 - \frac{Ei}{p \cdot Ct} \right) \right) \times 100$$

wherein “Ei” is a power quantity consumed in a time period,
“Ct” is a predetermined standard quantity of power consumed in the time period,
“Cpd” is a coefficient corresponding to the predetermined standard quantity of power consumed in the time period,
“n” is a sum of a number of measured power sources and waste variables, and
“p” is a number of users of the measured power sources and waste variables.

* * * * *



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 5994

SERIAL NUMBER 13/054,355	FILING or 371(c) DATE 01/14/2011 RULE	CLASS 702	GROUP ART UNIT 2862	ATTORNEY DOCKET NO. 53777-215226		
APPLICANTS INVENTORS Alberto Maso Portabella, Cabrera de Mar, SPAIN; ** CONTINUING DATA ***** This application is a 371 of PCT/IB2009/053135 07/20/2009 ** FOREIGN APPLICATIONS ***** SPAIN P200802159 07/18/2008 ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 02/18/2011						
Foreign Priority claimed ☒ Yes ☐ No 35 USC 119(a-d) conditions met ☒ Yes ☐ No Verified and Acknowledged <u>/JOHN H LE/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY SPAIN	SHEETS DRAWINGS 1	TOTAL CLAIMS 16	INDEPENDENT CLAIMS <u>3</u> 2
ADDRESS Barnes & Thornburg LLP (IN) 11 S. Meridian Street Indianapolis, IN 46204 UNITED STATES						
TITLE DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT						
FILING FEE RECEIVED 490	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit			



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 5994

SERIAL NUMBER 13/054,355	FILING or 371(c) DATE 01/14/2011 RULE	CLASS 702	GROUP ART UNIT 2862	ATTORNEY DOCKET NO. 53777-215226		
APPLICANTS INVENTORS Alberto Maso Portabella, Cabrera de Mar, SPAIN; ** CONTINUING DATA ***** This application is a 371 of PCT/IB2009/053135 07/20/2009 ** FOREIGN APPLICATIONS ***** ~~SPAIN P200802159 07/18/2008~~ ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 02/18/2011						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/JOHN H LE/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY SPAIN	SHEETS DRAWINGS 1	TOTAL CLAIMS 16	INDEPENDENT CLAIMS ~~3~~ 2
ADDRESS Barnes & Thornburg LLP (IN) 11 S. Meridian Street Indianapolis, IN 46204 UNITED STATES						
TITLE DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT						
FILING FEE RECEIVED 490	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

Electronic Acknowledgement Receipt	
EFS ID:	9237704
Application Number:	13054355
International Application Number:	PCT/IB09/53135
Confirmation Number:	5994
Title of Invention:	DEVICE FOR MEASURING CONSUMPTION AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT
First Named Inventor/Applicant Name:	Alberto MASO PORTABELLA
Customer Number:	23643
Filer:	Jeffrey T.G. Kelsey/Ernest Carlson
Filer Authorized By:	Jeffrey T.G. Kelsey
Attorney Docket Number:	53777-215226
Receipt Date:	14-JAN-2011
Filing Date:	
Time Stamp:	16:26:22
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 490
RAM confirmation Number	3579
Deposit Account	100435
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. 1.492 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2152261111_20110114161131.pdf	993319 bf8114864c336e7df1e37b87239bfdec18c21d01	yes	20
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal of New Application		1	3	
	Documents submitted with 371 Applications		4	18	
	Oath or Declaration filed		19	20	
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Filed (SB/08)	updated_IDS.pdf	611997 1147d9e5153e400019550a01c4c0ce0c71991bb0	no	4
Warnings:					
Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
3	Foreign Reference	WO02067152A1.pdf	1883498 5e947d098b7bf8a9881fff140d58ffbc1085c58e	no	39
Warnings:					
Information:					
4	NPL Documents	ISR.PDF	126964 e1a8734fc3cf626408692486290d7c397c66ac8a	no	4
Warnings:					
Information:					
5	Preliminary Amendment	2152262222_20110114161203.pdf	267750 468a2df86bd7094796d8056ee5cf6bd451a8df03	no	9
Warnings:					
Information:					

6	Application Data Sheet	ADS.pdf	1031756	no	4
			aa7f362a32709fa052dce5c5167574f351f23caf		
Warnings:					
Information:					
7	Fee Worksheet (PTO-875)	fee-info.pdf	33449	no	2
			21152ae1fff5bde1ad46301a2e04e9c04082da96		
Warnings:					
Information:					
Total Files Size (in bytes):			4948733		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371		ATTORNEY'S DOCKET NUMBER 53777-215226
		U.S. APPLICATION NO. (If known, see 37 CFR 1.5)
INTERNATIONAL APPLICATION NO. PCT/IB2009/053135	INTERNATIONAL FILING DATE 20 July 2009 (20.07.2009)	PRIORITY DATE CLAIMED 18 July 2008 (18.07.2008)
TITLE OF INVENTION DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE		
APPLICANT(S) FOR DO/EO/US MASO PORTABELLA, Alberto		ENVIRONMENT
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
1. ☒ This is a FIRST submission of items concerning a submission under 35 U.S.C. 371.		
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a submission under 35 U.S.C. 371.		
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.		
4. ☐ The US has been elected (Article 31).		
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))		
a. ☐ is attached hereto (required only if not communicated by the International Bureau).		
b. ☒ has been communicated by the International Bureau.		
c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).		
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).		
a. ☒ is attached hereto.		
b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).		
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))		
a. ☐ are attached hereto (required only if not communicated by the International Bureau).		
b. ☐ have been communicated by the International Bureau.		
c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.		
d. ☐ have not been made and will not be made.		
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).		
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).		
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).		
Items 11 to 20 below concern document(s) or information included:		
11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.		
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.		
13. ☒ A preliminary amendment.		
14. ☒ An Application Data Sheet under 37 CFR 1.76.		
15. ☐ A substitute specification.		
16. ☐ A power of attorney and/or change of address letter.		
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.3 and 37 CFR 1.821- 1.825.		
18. ☐ A second copy of the published International Application under 35 U.S.C. 154(d)(4).		
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).		

This collection of information is required by 37 CFR 1.414 and 1.491-1.492. The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 15 minutes to complete, including gathering information, preparing, and submitting the completed form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

PTO-1390 (Rev. 09-08)
Approved for use through 2/28/2010. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)		INTERNATIONAL APPLICATION NO. PCT/IB2009/053135		ATTORNEY'S DOCKET NUMBER 53777-215226	
20. Other items or information:					
The following fees have been submitted				CALCULATIONS PTO USE ONLY	
21. ☒ Basic national fee (37 CFR 1.492(a))..... \$330				\$ 330.00	
22. ☒ Examination fee (37 CFR 1.492(c)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... \$0 All other situations.....\$220				\$ 220.00	
23. ☒ Search fee (37 CFR 1.492(b)) If the written opinion of the ISA/US or the International preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... \$0 Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority.....\$100 International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB..... \$430 All other situations.....\$540				\$ 430.00	
TOTAL OF 21, 22 and 23 =				980.00	
☐ Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) in an electronic medium or computer program listing in an electronic medium) (37 CFR 1.492(j)). The fee is \$270 for each additional 50 sheets of paper or fraction thereof.					
Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof (round up to a whole number)	RATE		
- 100 =	/50 =		x \$270	\$	
Surcharge of \$130.00 for furnishing any of the search fee, examination fee, or the oath or declaration after the date of commencement of the national stage (37 CFR 1.492(h)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$	
Total claims	16 - 20 =		x \$ 52	\$	
Independent claims	3 - 3 =		x \$220	\$	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$390	\$	
TOTAL OF ABOVE CALCULATIONS =				\$ 980.00	
☒ Applicant claims small entity status. See 37 CFR 1.27. Fees above are reduced by ½.				490.00	
SUBTOTAL =				\$ 490.00	
Processing fee of \$130.00 for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)). +				\$	
TOTAL NATIONAL FEE =				\$ 490.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				\$	
TOTAL FEES ENCLOSED =				\$ 490.00	
				Amount to be refunded:	\$
				Amount to be charged	\$

- a. ☐ A check in the amount of \$ _____ to cover the above fees is enclosed.
- b. ☒ Please charge my Deposit Account No. 10-0435 in the amount of \$ 490.00 to cover the above fees.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 10-0435.
- d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038. The PTO-2038 should only be mailed or faxed to the USPTO. However, when paying the basic national fee, the PTO-2038 may NOT be faxed to the USPTO.

ADVISORY: If filing by EFS-Web, do **NOT** attach the PTO-2038 form as a PDF along with your EFS-Web submission. Please be advised that this is **not** recommended and by doing so your **credit card information may be displayed via PAIR**. To protect your information, it is recommended paying fees online by using the electronic payment method.

NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the International Application to pending status.

SEND ALL CORRESPONDENCE TO:

ADDISON, Bradford G.
BARNES & THORNBURG LLP
11 South Meridian Street
Indianapolis, IN 46204
US


SIGNATURE

Jeffrey T.G. KELSEY
NAME

63,696
REGISTRATION NUMBER

DEVICE FOR MEASURING POWER CONSUMPTIONS AND
THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT
OF AN POWER-CONSUMING UNIT

5 Technical field of the invention

The invention refers to a device for measuring power consumptions and the respectful performance with the environment, from the measured power consumptions and from
10 the residue production, in a power-consuming unit, a comfort unit (houses, communities, hotels and restaurants, spare time spaces, sport spaces, private and public motor vehicles, and goods vehicles, etc.) or a production unit.

The measurement of this respectful performance
15 or not will be carried out by what we call "ecological parameter", from the measurements of power consumptions (direct consumptions) and of residues and wastes generated (indirect consumptions).

20 Background of the invention

A lot of kinds of programmable logic controllers (PLC) are known, in which, from state variables, the outputs of a system are determined (e.g. electrical or
25 pneumatic, etc.) or another kinds of devices that, from inputs, calculate the values of parameters of interest. Examples of these devices can be the known analysers of the electric mains that, from voltage, current intensity and imbalance signals, calculate the electric power consumed by
30 an installation.

However, in the current art no device or apparatus that calculates ecological parameters or magnitudes are known, from power consumption and waste production data in installations, if we define such
35 parameters or magnitudes as a deviation of an optimal work

point, defined by an authority. E.g. in which the emissions of CO_x or NO_x are the minimum possible according to its use.

The present invention has the objective to
5 provide an apparatus that fulfils this gap in the current art.

Description of the invention

10 To this end, the object of the present invention is a new measuring device of power consumptions which calculates ecological parameters from the measured power consumptions and from data of waste production, that it is characterised in that it comprises:

15 a module for introducing data, provided with at least an input of a value of power consumption of a magnitude, measured in a corresponding measure apparatus of the power-consuming unit;

a keyboard for introducing data and for
20 selecting menus, in particular data of waste production of the power-consuming unit;

computing means that receive the data from the module for introducing data and from the keyboard, and which are provided with a processor that incorporates an
25 algorithm for calculating an ecological parameter from the measured consumptions of power and from the introduced data; and

a display screen, communicated with the computing means, to display the calculated ecological
30 parameter,

said ecological parameter being calculated as an adjusted mean of the sum of the deviations of each value of power consumption measured according to a reference value.

According to another feature of the present
35 invention, the device comprises means for introducing

values of waste production.

In preferred variants, the device can comprise an input module of a data bus of a domotic network and/or an USB input for a serial data bus.

5 In an embodiment of domestic or industrial application, the device comprises at least:

an input of water flow, from a corresponding first water flow meter;

10 an input of combustible gas or liquid flow, from a second flow meter of combustible gases or liquids;

an input for measuring the electric power, from a counter or analyser of the electric mains; and

an input for measuring the waste weight from a waste weighting scales.

15 In an alternative embodiment, for calculating the ecological parameter corresponding to the automobile, the device can comprise at least:

an input of fuel flow, from a corresponding fuel flow meter of the motor of an automobile; and

20 means for introducing the production of wastes of the automobile, selected among: tire rubber wastes, motor oil wastes, coolant liquid wastes, and liquid wastes from closed circuits, not being limitative, by the keyboard of the device.

25 The device can be provided also with an input for exhaust gases flow, from a corresponding flow meter of exhaust gases of the combustion system of the power-consuming unit, e.g. the motor exhaust; and a gas analyser for measuring the emission levels of gases and particles.

30 The device compares the result obtained with the admitted levels by the current regulations. The incorrect combustion and the subsequent excess of gas (CO₂ and NO_x) and particle emission is not a user or producer question, because they do not influence on it, but the direct responsible is the
35 manufacturer of the apparatus or combustion chamber.

However, additionally, the repair of said anomaly it is a question of the user or producer. This does not affect only to explosion motors and domestic boilers, but also to production and transformation centres.

5 Preferably, the device comprises a shell, which encloses the several components of the device, and in whose external part it is the keyboard and the screen.

Brief description of the drawings

10

In the attached drawings some embodiments of the device object of the present invention are shown, only as a non-limitative example. In said drawings:

15 Fig. 1 is a diagrammatical frontal elevation view, that shows a device according to the present invention, with its particular connections;

Fig. 2 is a block diagram that shows the internal composition of the device of Fig. 1; and

20 Fig. 3 is a diagrammatical view that shows an alternative embodiment of the invention, to be applied to automobiles.

Detailed description of the drawings

25 In said drawings it can be seen the constitution and way of the device for measuring power consumptions and for calculating ecological parameters from the measured power consumptions, directly and indirectly.

30 The function of the device of the invention is to measure the respectful performance or behaviour with the environment of a "power-consuming unit". The "power-consuming unit" object of the measure of the possible different power manifestations consumed can be: a house, community (hotel, sports centre, residence, sport spaces, 35 shops, department stores, leisure halls, office buildings

and studies, administration centres, etc.), transformation centres, garages, warehouses, motor vehicles or transportation means, private or public.

The basis of the operation will consist in the
5 comparison between the basic actual power flow required by the user for their comfort with the normal consumptions of the current regulations (e.g. UNE, ISO standards, etc.) and/or those recommended by official administrations of the place and/or statistic data of normal power consumptions
10 and wastes (hereinafter "typical consumptions" including flows of power consumptions and wastes by person or by own unit of a preset population).

For this comparison, the proposed system will calculate an ecological parameter as an adjusted mean of
15 the sum of deviations of each value of power consumption measured with respect to its corresponding reference value.

To this end, as seen in Figs. 1 and 2, the device 1 of the present invention is constituted by an apparatus that has a carcass or shell 2 that includes the
20 following elements:

a module for introducing data 3, provided with inputs of power consumption values E1, E2, E3, E4, of magnitudes, measured with corresponding measure apparatuses C1, C2, C3, C4;

25 a keyboard 6 for introducing data and selecting menus, in particular data of the waste production;

computing means 4, which receive the data from the module for introducing data 3 and the keyboard 6, and which are provided with a processor that includes a
30 calculation algorithm for an ecological parameter from the measured power consumptions and from the introduced data; and

a display screen 5, communicated with said computing means 4, to display the calculated ecological
35 parameter.

The apparatus is provided with an electrical source 8, as it can be seen in Fig. 1.

To introduce values of the waste production one of the inputs E4, digital or analogical, can be used, from a weight apparatus, or they can be introduced manually through a keyboard 6.

The device 1 can be complemented with an input module 90 for a data bus 9 of a domotic network, and an USB input 70 for a serial data bus 7, or equivalent means.

10 In Fig. 1 a device particularly devised for special application in buildings (houses, hotel, sports centre, residence, sport spaces, shops, department stores, leisure halls, office buildings and studies, administration centres, transformation centres, garages, warehouses, etc.) is shown. The shell 2 comprises at least the following inputs:

an input for the water flow E1 from a corresponding first water flow meter C1;

an input for the flow of combustible gases or liquids E2, from the second flow meter of combustible gases or liquids C2;

an input for measuring electric power E3, from a meter or analyser of electric mains C3; and

an input for measuring the weight of the wastes E4 from a scale for weighting wastes C4, through the corresponding ports.

The number of inputs will be according to the complexity of the installation. E.g. an industry can be provided with several devices of this kind, each associated with a corresponding section or unit of factory, warehouse, office, etc.

In Fig. 3 is shown an embodiment particularly devised for automobiles, in which the device comprises an input for fuel flow E6, from a flow meter C6 of fuel, associated with the fuel deposit 15; and an input of

exhaust gases flow E5, from a corresponding flow meter C5 of exhaust gases from the exhaust system 14 of the motor 13 of an automobile 12. In this case, by the keyboard the flows of production of wastes of the automobile are introduced manually, e.g. rubber wastes from tires, oil wastes for the motor, coolant liquid wastes, liquid wastes from closed circuits and metal wastes.

The device has an input 10 to collect, optionally, the information from a gas analyser 11 (Fig. 3), to measure the emission levels of gases and particles. The device 1 compares the result obtained with the levels admitted by the current regulations.

The algorithm of the computing means 4 calculates the total basic power flow obtained by the evaluation of the flows of the measured power statements E1, E2, E3, E4, E5, E6, etc. referred to the number of people which use the unit to be measured in each trip. The calculation algorithm integrates all the trips of a time period to be defined or the accumulated total.

Each flow has an incidence in the environment: the water consumption reverts in its exploitation, the fuel consumption is associated to the direct emissions of CO₂, NO_x, ..., the electric consumption to the indirect emissions of CO₂, NO_x, ..., and the waste production with indirect environmental impact, by the quantity of paper, glass, organic material, plastics, oils and greases, rubbers, metals, ... expressed in kg that the unit consumes per time unit and please who enjoy the comfort of said unit, to be compared with preset consumptions and wastes. These data, once treated by the algorithm, give as result an ecologic parameter (here denoted as "ecocom"), which is the measure of the conduct that respects our environment, to provide integral or combined or individual "ecocoms" of the comfort or production unit.

Regarding the presentation of the results, from

said comparison the actual percentage of power consumption with respect to the preset consumption is obtained, indicating if the performance is respectful (equal to zero or higher) or abusive when it is negative. Both deviations
5 are measured as a percentage. The percent unit of each flow is called positive "ecocom", if the result is respectful or negative if it is not. The algorithm of all the flows provides the integral "ecocom" of the unit. As there can be difficulties to receive all the flows, the algorithm of the
10 ecometer could provide only "ecocoms" of water exploitation and/or direct gases emission and/or indirect gases emission and/or waste production. It is also possible to measure only those flows the public administration considers suitable to pay ecotaxes, evaluating a specific pack (which
15 can be called "administrative ecocom").

The results are presented in a permanent way in a screen 5, indicating the periods of time on which they are based: the day, week, month accumulations, etc. or others, such as those consumed by trip in the case of
20 vehicles. To know better the power exploitation, by a menu the "ecocoms" can be displayed (day, week, month, ...) of exploitation of the different power sources in the screen or to pass to other successive ones with the direct or indirect emissions or waste production.

25 As stated previously, if the consumption of only one or several flows are calculated for installation difficulties, the permanent screen shows that they are individual "ecocoms" by power source or waste, combined or integral.

30 Regarding the installation of different measuring apparatus C1, C2, C3, C4, C5, C6, etc., the water flow meter C1 is placed downstream the company meter and upstream the home key, with the possibility to emit impulses or analogical or digital or light signals. The
35 same applies to C2, flow meter for combustible gases or

liquids, to C3, electric measuring equipment in the general board of the unit, to C5, in the case of exhaust gases, and to C6, in the case of fuel flow of an automobile. The same can be said to the flow of waste production E4, which will
 5 be from a scale C4. The emission of information can be wireless or wired. In the case that there is no installation, by the keyboard 6 the flow data can be introduced manually.

10 Algorithm for calculating the ecologic parameter

It results from the adjusted arithmetic mean of all the quotients between the absolute value of actual flows (E1, E2, E3, E4, E5, ...) that enter in the power-
 15 consuming unit object of the measure of the different possible power statements, with respect to their flows or corresponding reference values. The absolute value of the actual flows is taken because the input power consumption has a sign opposed to a waste, which indirectly is
 20 associated to another external power consumption; therefore, as the contributions of each factor is the interesting part, all are taken in flow absolute value, no the quotient of flows, not being compensated to each other.

It is defined:

25 1- Flow of an actual input power statement (E1, E2, E3, E4, E5, E6 ..., generally Ei): As the power quantity consumed by the time unit of that power statement, by user of the unit to be measured. E.g. the drinkable consumed in a home is a power flow because it is obtained from the
 30 nature with transportation, purification cost ...; these power costs are environmental costs associated with that consumed water. The combustible liquid and gas flow consumed is another actual input power flow associated with the direct emissions of CO2 and others to the atmosphere.
 35 The electricity consumption is another power flow

associated with the indirect emissions of CO2 and other not desired gases. The wastes are also indicative of the environmental impact and they indicate indirectly a power expense. E.g. it is also an input power flow the quantity
 5 of glass we waste for identical reasons, but not those that we buy and remains for the development of the activity in the unit. Also with the paper, the organic material, the containers, the spare parts from repairs, etc.

2- Preset flows (Ct): They would be the average
 10 power consumption desired or recommended by the public administration of the zone where the activity of each unit to be measured is developed. If there is no environmental policy defined by the administration, standard consumptions or statistic data of consumptions are taken, inputs as
 15 consumption and outputs of wastes per resident or per production unit.

3- Adjustment coefficient (Cpd): Each coefficient designs a deviation percentage with respect to the preset consumption of consumed power statement. But not
 20 all have the same importance according to:

3.1. Habits regarding the consumptions of the unit. In certain regions there are power statements that have an important weight due to the proximity to the resource, subsidized prices or no other sources.. In these
 25 situations it must take into account the suitable specific weight that the administration determines or the statistical data. In the case of a motor vehicle, the water consumption will be dismissed, but not the fuel liquids or gases consumptions, the oil and grease wastes and rubber
 30 and metal wastes.

3.2. The power policies of the zone. According to the administration of the place and attending if to the environment conduct is associated a tax; these quotients must be adjusted depending on which deviations the
 35 administration could reward or punish.

3.3. Practical ends. These coefficients can be zero, because the contribution of said consumption is so low that is dismissed, according to the cost of its measure. E.g. the quantity of organic wastes of an electric
5 train.

The adjusted coefficients are between 0 and 1.

Hence, the ecologic parameter (or "ecocoms", in %), for "n" magnitudes of power consumption or wastes, is calculated applying the formula:
10

$$Ecocoms(\%) = 1/n \sum_{i=1}^n (Cpdx(1 - \frac{Ei}{p \cdot Ct}) \times 100$$

Wherein n is the number of power sources or waste variables to be measured (with adjustment coefficient different from
15 zero) and p the people who enjoys the comfort of the unit to be measured.

Interpretation of the results

20 The result is a percentage that when is close to zero the performance is desirable, but if it is negative and far away from zero, the performance of this unit is not respectful and the distance to zero is the degree of the separation from the desirable performance, and therefore it
25 can be penalised and the penalization can be measured. Lastly, if it is positive the performance is excellent and the separation from zero is the measure of its environmental excellence.

The device for measuring power consumptions and
30 the respectful performance, according to the present invention, can be used for the calculation of an ecologic parameter, which can be used as basis for the application of called ecotaxes by the administration.

C L A I M S

1. Device for measuring power consumptions and respectful performance with the environment of a power-consuming unit, characterised in that it comprises:

a data introduction module (3), which is provided with at least an input of a power consumption value (E1, E2, E3, E4, E5, E6) of a magnitude, measured in a corresponding measurement apparatus (C1, C2, C3, C4, C5, C6) of the power-consuming unit;

a keyboard (6) for introducing data, particularly data of waste production in the power-consuming unit;

computing means (4) that receive the data from the data introduction module (3) and the keyboard (6), and which is provided with a processor that includes a calculation algorithm of an ecologic parameter, indicative of the respectful performance with the environment of the power-consuming unit, from the measured power consumptions and the introduced data; and

a display screen (5), communicated with the computing means (4), to display the calculated ecologic parameter,

said calculated ecological parameter being an adjusted mean of the sum of the deviations of each value of measured power consumption with respect to a reference value.

2. Device according to claim 1, characterised in that it comprises means for introducing values of waste production.

3. Device according to claim 1, characterised in that it comprises an input module (90) of a data bus (9) in a domotic network.

4. Device according to claim 1, characterised in that it comprises an USB input (70) for a serial data bus

(7).

5. Device according to anyone of the previous claims, characterised in that it comprises at least:

a water flow input (E1), from a corresponding
5 first water flow meter (C1);

a combustible gas and liquid flow input (E2),
from a second combustible gas and liquid flow meter (C2);

an electric power measurement input (E3), from a
meter or analyser of electric mains (C3); and

10 a waste weight measurement input (E4) from a
scale for weighting wastes (C4).

6. Device according to anyone of claims 1-4,
characterised in that it comprises at least:

a fuel flow input (E6), from a corresponding
15 flow meter (C6) of fuel from the motor (13) of an
automobile (12); and

means for introducing the waste production of
the automobile, selected among: tire rubber wastes, motor
oil wastes, coolant liquid wastes, closed circuit liquid
20 wastes and metal wastes,

to calculate the ecological parameter
corresponding to the automobile.

7. Device according to anyone of the previous
claims, characterised in that it also comprises an input
25 for exhaust gas flow (E5), from a corresponding flow meter
(C5) of exhaust gases of a combustion system of the power-
consuming unit; and a gas analyser (11) for measuring the
emission levels of gases and particles of said combustion
system.

30 8. Device according to anyone of the previous
claims, characterised in that it comprises a shell (2),
which encloses the different components of the device, and
in whose external part is the keyboard (6) and the screen
(5).

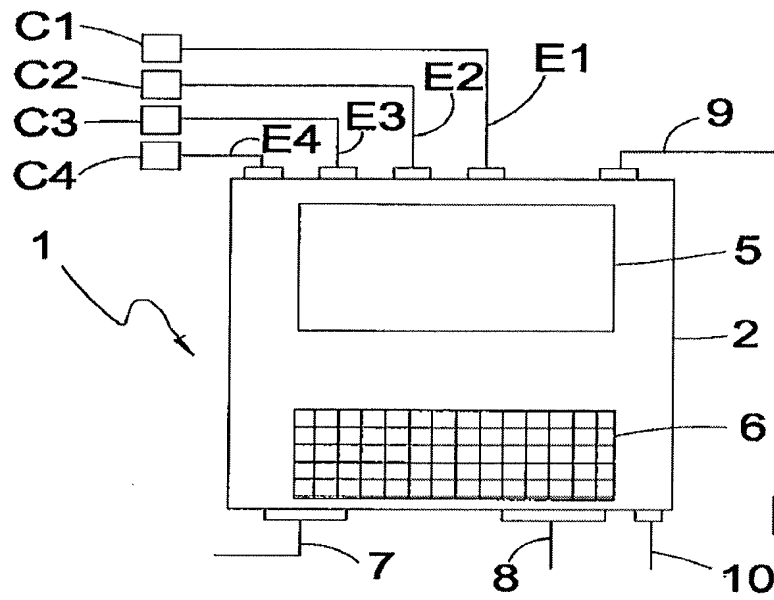


FIG. 1

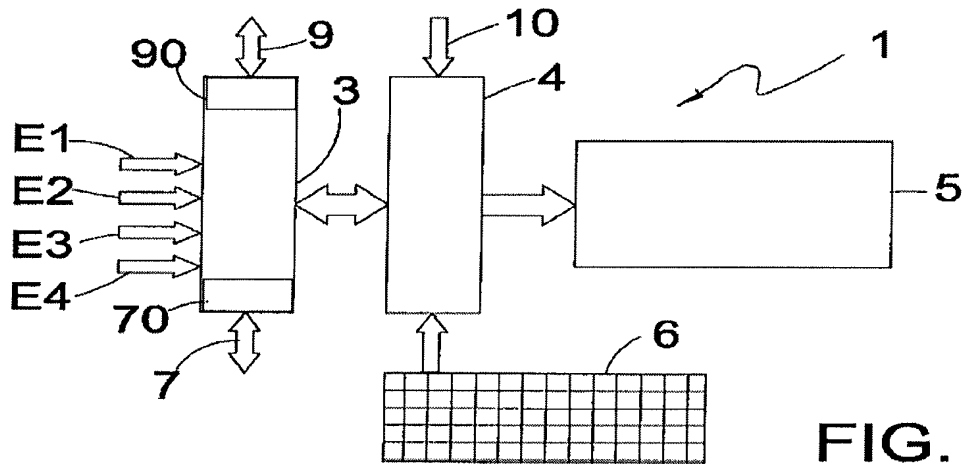


FIG. 2

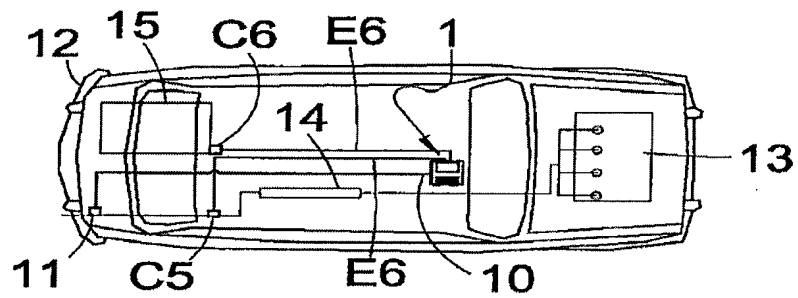


FIG. 3

A B S T R A C T

Device for measuring power consumptions and respectful performance with the environment of a power-consuming unit. It comprises a data introduction module (3), which is provided with at least an input of a power consumption value (E1, E2, E3, E4, E5, E6) of a magnitude, measured in a corresponding measurement apparatus (C1, C2, C3, C4, C5, C6) of the power-consuming unit; a keyboard (6) for introducing data, particularly data of waste production in the power-consuming unit; computing means (4) that receive the data from the data introduction module (3) and the keyboard (6), and which is provided with a processor that includes a calculation algorithm of an ecologic parameter, indicative of the respectful performance with the environment of the power-consuming unit, from the measured power consumptions and the introduced data; and a display screen (5), communicated with the computing means (4). The ecological parameter is calculated as an adjusted mean of the sum of the deviations of each value of measured power consumption with respect to a reference value.

Fig. 1

(12) SOLICITUD INTERNACIONAL PUBLICADA EN VIRTUD DEL TRATADO DE COOPERACIÓN EN MATERIA DE PATENTES (PCT)

(19) Organización Mundial de la Propiedad
Intelectual
Oficina internacional



(10) Número de Publicación Internacional
WO 2010/007601 A2

(43) Fecha de publicación internacional
21 de enero de 2010 (21.01.2010)

PCT

- (51) Clasificación Internacional de Patentes: Sin clasificar
- (21) Número de la solicitud internacional: PCT/IB2009/053135
- (22) Fecha de presentación internacional: 20 de julio de 2009 (20.07.2009)
- (25) Idioma de presentación: español
- (26) Idioma de publicación: español
- (30) Datos relativos a la prioridad: P200802159 18 de julio de 2008 (18.07.2008) ES
- (71) Solicitante e
- (72) Inventor: MASO PORTABELLA, Alberto [ES/ES]; C/ Mossen Cinto Verdaguer N° 8, 2° 2ª, E-08349 Cabrera de Mar (ES).
- (74) Mandatario: PONTI SALES, Adelaida; C. Consell de Cent, 322, E-08007 Barcelona (ES).
- (81) Estados designados (a menos que se indique otra cosa, para toda clase de protección nacional admisible): 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, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Estados designados (a menos que se indique otra cosa, para toda clase de protección regional admisible): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), euroasiática (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europea (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, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

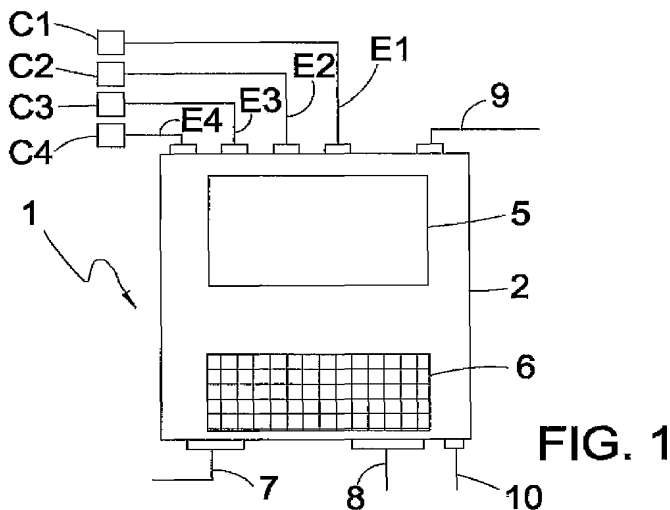
Declaraciones según la Regla 4.17:

- sobre la identidad del inventor (Regla 4.17(i))
- sobre el derecho del solicitante para solicitar y que le sea concedida una patente (Regla 4.17(ii))
- sobre la calidad de inventor (Regla 4.17(iv))

[Continúa en la página siguiente]

(54) Title: DEVICE FOR MEASURING THE ENERGY CONSUMPTION AND ENVIRONMENTALLY FRIENDLY PERFORMANCE OF AN ENERGY-CONSUMING UNIT

(54) Título: DISPOSITIVO PARA LA MEDICIÓN DE CONSUMOS ENERGÉTICOS Y DEL COMPORTAMIENTO RESPETUOSO CON EL MEDIO AMBIENTE DE UNA UNIDAD CONSUMIDORA DE ENERGÍA



(57) Abstract: The invention relates to a device for measuring the energy consumption and environmentally friendly performance of an energy-consuming unit. The device comprises: a data input module (3) provided with at least one energy consumption value input (E1, E2, E3, E4, E5, E6) having a magnitude measured in a corresponding measuring apparatus (C1, C2, C3, C4, C5, C6) of the energy-consuming unit; a data input keypad (6); computation means (4) which receive data from the data input module and the keypad and are provided with a processor including an algorithm for calculating an ecological parameter indicative of the environmentally friendly performance of the energy-consuming unit on the basis of the measured energy consumption values and the input data; and a display screen which is connected to the computation means. The ecological parameter is calculated as a weighted average of the sum of the deviations of each measured energy consumption value in relation to a reference value.

(57) Resumen:

[Continúa en la página siguiente]

(12) SOLICITUD INTERNACIONAL PUBLICADA EN VIRTUD DEL TRATADO DE COOPERACIÓN MATERIA DE PATENTES (PCT)

(19) Organización Mundial de la Propiedad
Intelectual
Oficina internacional



(43) Fecha de publicación internacional
21 de enero de 2010 (21.01.2010)

PCT

(10) Número de Publicación Internacional
WO 2010/007601 A2

- (51) Clasificación Internacional de Patentes: Sin clasificar
- (21) Número de la solicitud internacional: PCT/IB2009/053135
- (22) Fecha de presentación internacional: 20 de julio de 2009 (20.07.2009)
- (25) Idioma de presentación: español
- (26) Idioma de publicación: español
- (30) Datos relativos a la prioridad: P200802159 18 de julio de 2008 (18.07.2008) ES
- (71) Solicitante: e
- (72) Inventor: MASO PORTABELLA, Alberto [ES/ES]; C/ Mossen Cinto Verdaguer Nº 8, 2º 2ª, E-08349 Cabrera de Mar (ES).
- (74) Mandatario: PONTI SALES, Adelaida; C. Consell de Cent, 322, E-08007 Barcelona (ES).
- (81) Estados designados (a menos que se indique otra cosa, para toda clase de protección nacional admisible): 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, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Estados designados (a menos que se indique otra cosa, para toda clase de protección regional admisible): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), euroasiática (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europea (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, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

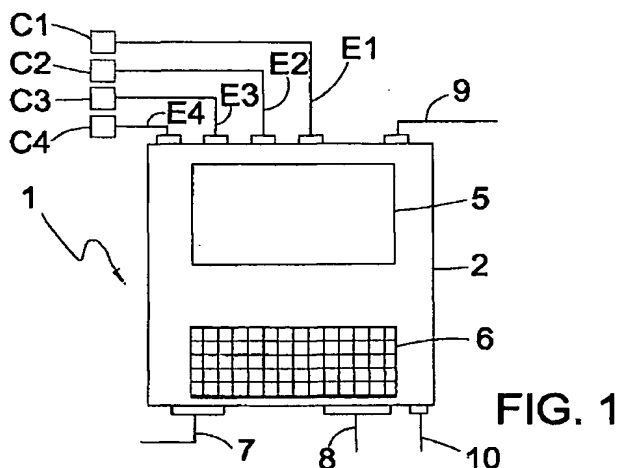
Declaraciones según la Regla 4.17:

- sobre la identidad del inventor (Regla 4.17(i))
- sobre el derecho del solicitante para solicitar y que le sea concedida una patente (Regla 4.17(ii))
- sobre la calidad de inventor (Regla 4.17(iv))

[Continúa en la página siguiente]

(54) Title: DEVICE FOR MEASURING THE ENERGY CONSUMPTION AND ENVIRONMENTALLY FRIENDLY PERFORMANCE OF AN ENERGY-CONSUMING UNIT

(54) Título: DISPOSITIVO PARA LA MEDICIÓN DE CONSUMOS ENERGÉTICOS Y DEL COMPORTAMIENTO RESPETUOSO CON EL MEDIO AMBIENTE DE UNA UNIDAD CONSUMIDORA DE ENERGÍA



(57) Abstract: The invention relates to a device for measuring the energy consumption and environmentally friendly performance of an energy-consuming unit. The device comprises: a data input module (3) provided with at least one energy consumption value input (E1, E2, E3, E4, E5, E6) having a magnitude measured in a corresponding measuring apparatus (C1, C2, C3, C4, C5, C6) of the energy-consuming unit; a data input keypad (6); computation means (4) which receive data from the data input module and the keypad and are provided with a processor including an algorithm for calculating an ecological parameter indicative of the environmentally friendly performance of the energy-consuming unit on the basis of the measured energy consumption values and the input data; and a display screen which is connected to the computation means. The ecological parameter is calculated as a weighted average of the sum of the deviations of each measured energy consumption value in relation to a reference value.

(57) Resumen:

[Continúa en la página siguiente]

WO 2010/007601 A2

Publicada:
— *sin informe de búsqueda internacional, será publicada nuevamente cuando se reciba dicho informe (Regla 48.2(g))*

Dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente de una unidad consumidora de energía. Comprende un módulo de introducción de datos (3), que está dotado a su vez por lo menos de una entrada de un valor de consumo energético (E1, E2, E3, E4, E5, E6) de una magnitud, medido en un correspondiente aparato de medida (C1, C2, C3, C4, C5, C6) de la unidad consumidora de energía; un teclado (6) de introducción de datos, medios de computación (4) que reciben los datos procedente del módulo de introducción de datos y del teclado, y que están provistos de un procesador que incorpora un algoritmo de cálculo de un parámetro ecológico, indicativa del comportamiento respetuoso con el medio ambiente de la unidad consumidora de energía, a partir los consumos energéticos medidos y de los datos introducidos; y una pantalla de visualización, comunicada con los medios de computación. El parámetro ecológico se calcula como una media ponderada de la suma de desviaciones de cada valor de consumo energético medido con respecto a un valor de referencia.

DESCRIPCION

“Dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente de una unidad consumidora de energía”

5

Sector técnico de la invención

La invención se refiere a un dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente, a partir de los consumos energéticos medidos y de la producción de residuos, en una unidad consumidora de energía, ya sea una unidad de confort (viviendas, colectividades, hostelería y restauración, espacios de ocio, espacios deportivos, vehículos motorizados tanto privados como públicos, y de mercancías, etc.) o una unidad de producción.

La medición de este comportamiento respetuoso o no se hará a través de lo que denominaremos “parámetro ecológico”, a partir de las mediciones de consumos energéticos (consumos directos) y de la producción de deshechos o residuos que genera (consumos indirectos).

Antecedentes de la invención

Actualmente son conocidos muchos tipos de controladores lógicos programables (PLC), en que, a partir de una variables de estado, se determinan las salidas de un sistema (por ejemplo eléctrico, o neumático, etc.), u otros tipos de dispositivos que, a partir de unas entradas, calculan los valores de unos parámetros de interés. Ejemplos de estos dispositivos pueden ser los conocidos analizadores de red eléctrica, que, a partir de señales de voltaje, intensidad de corriente y desfase, calculan la energía eléctrica consumida por ua instalación.

Sin embargo, no se conocen en la técnica actual, dispositivos o aparatos que calculen parámetros o magnitudes ecológicas a partir de datos de consumo energético y de producción de residuos en instalaciones, si definimos tales parámetros o magnitudes como una desviación de un punto de trabajo óptimo, definido por una autoridad. Por ejemplo en que las emisiones de CO_x ó NO_x sean las mínimas posibles ateniendo a su utilización.

La presente invención tiene por finalidad proporcionar un aparato que llene este vacío detectado en la técnica actual

Explicación de la invención

- 5 A tal finalidad, el objeto de la presente invención es un novedoso dispositivo de medición de consumos energéticos y que calcula parámetros ecológicos a partir de los consumos energéticos medidos y de datos de producción de residuos que en su esencia se caracteriza porque comprende
- 10 un módulo de introducción de datos, que está dotado a su vez por lo menos de una entrada de un valor de consumo energético de una magnitud, medido en un correspondiente aparato de medida de la unidad consumidora de energía;
- un teclado de introducción de datos y de selección de menús, en particular de datos de producción de residuos de la unidad consumidora de energía;
- 15 unos medios de computación que reciben los datos procedente del módulo de introducción de datos y del teclado, y que están provistos de un procesador que incorpora un algoritmo de cálculo de un parámetro ecológico a partir los consumos energéticos medidos y de los datos introducidos; y
- una pantalla de visualización, comunicada con los medios de computación,
- 20 para dar a visualizar el parámetro ecológico calculado,
- siendo dicho parámetro ecológico calculado como una media ponderada de la suma de desviaciones de cada valor de consumo energético medido con respecto a un valor de referencia.
- 25 Según otra característica de la presente invención, el dispositivo comprende medios para la introducción de valores de producción de residuos.

 En variantes preferidas, el dispositivo puede comprender un módulo de entrada de un bus de datos de una red domótica y/o una entrada USB para un bus de

30 datos serie.

 En una realización de aplicación doméstica o industrial el dispositivo comprende por lo menos:

 una entrada de caudal de agua, procedente de un correspondiente primer

caudalímetro de agua;

una entrada de caudal de gases o líquidos combustibles, procedente de un segundo caudalímetro de gases o líquidos combustibles;

una entrada de medida de potencia eléctrica, procedente de un contador o
5 analizador de red eléctrica; y

una entrada de medida de peso de residuos procedente de una báscula de pesaje de residuos

En una realización alternativa, para el cálculo del parámetro ecológico correspondiente al vehículo automóvil, el dispositivo puede comprender por lo menos:
10

una entrada de caudal de combustible, procedente de un correspondiente caudalímetro de combustible del motor de un vehículo automóvil; y

unos medios de introducción de la producción de residuos del vehículo automóvil, seleccionados de entre: residuos de goma de neumáticos, residuos de
15 aceite del motor, residuos de líquido refrigerante, y residuos de líquidos de circuitos cerrados, sin ser éstos limitativos, mediante el teclado del dispositivo.

El dispositivo puede contar adicionalmente con una entrada de caudal de gases de escape, procedente de un correspondiente caudalímetro de gases de escape del sistema de combustión de la unidad consumidora de energía, por ejemplo
20 escape del motor; y un analizador de gases para la medición de los niveles de emisión de gases y partículas. El dispositivo compara el resultado obtenido con los niveles admitidos por la normativa vigente. La mala combustión y el consecuente exceso de emisión de gases (CO_2 y NO_x) y partículas no es una cuestión de los usuarios o productores, pues no inciden en ella, sino que el responsable directo es el
25 fabricante del aparato o cámara de combustión. No obstante, de forma adicional, la reparación de dicha anomalía sí que compete al usuario o productor. Esto afecta no sólo a motores de explosión y calderas domésticas, sino también a centros de producción y transformación.

30

Preferiblemente, el dispositivo comprende una carcasa, que encierra los diferentes componentes del dispositivo, y en cuya parte exterior se muestra el teclado y la pantalla.

Breve descripción de los dibujos

En los dibujos adjuntos se ilustra, a título de ejemplo no limitativo, formas de realización del dispositivo objeto de la presente invención. En dichos dibujos:

5 la Fig. 1 es una vista esquemática en alzado frontal, que muestra un dispositivo según la presente invención, con sus conexiones particulares;

 la Fig. 2 es un diagrama de bloques que ilustra la composición interna del dispositivo de la Fig. 1; y

10

 la Fig. 3 es una vista esquemática, que ilustra un modo alternativo de realización de la invención, de aplicación en automoción.

15

Descripción detallada de los dibujos

En dichos dibujos puede verse que la constitución y modo del dispositivo para la medición de consumos energéticos y para el cálculo de parámetros ecológicos a partir de los consumos energéticos medidos, tanto directos como indirectos.

20

 La función del dispositivo de la invención es medir el comportamiento o la conducta respetuosa con el medio ambiente de una "unidad consumidora de energía". La "unidad consumidora de energía" objeto de medida de las diferentes manifestaciones energéticas consumidas posibles puede ser: una vivienda, colectividad (hotel, polideportivo, residencia, espacios deportivos, comercios, grandes almacenes, salas de ocio, edificios de oficinas y despachos, centros de la administración...), centros de transformación, talleres, almacenes, vehículos motorizados o medios de transporte ya sean particulares como públicos.

25

30

 El fundamento de la operativa consistirá en la comparación del flujo energético básico real requerido por los usuarios para su confort por persona con los consumos normales de la normativa vigente amparada (por ejemplo en normas UNE, ISO, etc.) y/o los recomendados por las administraciones oficiales del lugar y/o datos estadísticos de consumos energéticos y residuos normales (a partir de ahora

“consumos tipo” englobando tanto flujos de consumos energéticos como residuos por persona o por unidad propia de una población determinada).

5 Para esta comparación, el sistema que se propone calculará un parámetro ecológico como una media ponderada de la suma de desviaciones de cada valor de consumo energético medido con respecto a su correspondiente valor de referencia.

10 Para ello, según puede verse en las Figs. 1 y 2, el dispositivo 1 de la presente invención está constituido por un aparato que tiene un cajeadado o carcasa 2, que incorpora los siguientes elementos:

15 un módulo de introducción de datos 3, que está dotado de entradas de valores de consumo energético E1, E2, E3, E4, de magnitudes, medidos en sendos y correspondientes aparato de medida C1, C2, C3, C4;

un teclado 6 de introducción de datos y de selección de menús, en particular de datos de producción de residuos;

20 unos medios de computación 4, que reciben los datos procedente del módulo de introducción de datos 3 y del teclado 6, y que están provistos de un procesador que incorpora un algoritmo de cálculo de un parámetro ecológico a partir los consumos energéticos medidos y de los datos introducidos; y

25 una pantalla de visualización 5, comunicada con los medios de computación (4), para dar a visualizar el parámetro ecológico calculado,

El aparato está dotado de una alimentación eléctrica 8, según puede verse en la Fig. 1.

30 Para la introducción de valores de producción de residuos se puede utilizar una de las entradas E4, digital o analógica, procedente de una báscula, o bien se puede introducir manualmente el o los valores a través del teclado 6

El dispositivo 1 puede complementarse con un módulo de entrada 90 de un

- 6 -

bus de datos 9 de una red domótica, y una entrada USB 70 para un bus de datos serie 7, o unos medios equivalentes.

En la Fig. 1 se muestra un dispositivo particularmente pensado para aplicación especial en edificación (vivienda, hotel, polideportivo, residencia, espacios deportivos, comercios, grandes almacenes, salas de ocio, edificios de oficinas y despachos, centros de la administración, centros de transformación, talleres, almacenes, etc.. La carcasa 2 comprende al menos las siguientes entradas.

una entrada de caudal de agua E1, procedente de un correspondiente primer caudalímetro de agua C1;

una entrada de caudal de gases o líquidos combustibles E2, procedente de un segundo caudalímetro de gases o líquidos combustibles C2;

una entrada de medida de potencia eléctrica E3, procedente de un contador o analizador de red eléctrica C3; y

una entrada de medida de peso de residuos E4 procedente de una báscula de pesaje de residuos C4,

a través de los correspondientes puertos.

El número de entradas estará adecuado a la complejidad de la instalación. Por ejemplo, una industria puede disponer de varios dispositivos de este tipo, cada uno de ellos asociado a una correspondiente sección o unidad de fábrica, almacenes, oficinas, etc.

En la Fig. 3 se muestra una realización particularmente ideada para la automoción, en que el dispositivo cuenta con una entrada de caudal de combustible E6, procedente de un caudalímetro C6 de combustible, asociado al depósito de combustible 15; y una entrada de caudal de gases de escape E5, procedente de un correspondiente caudalímetro C5 de gases de escape del sistema de escape 14 del motor 13 de un vehículo automóvil 12. En este caso, los flujos de producción de residuos del vehículo automóvil se introducen manualmente por teclado, por ejemplo, residuos de goma de neumáticos, residuos de aceite del motor, residuos de líquido refrigerante, residuos de líquidos de circuitos cerrados y deshechos de metales.

- 7 -

El dispositivo tiene una entrada 10 para que, de forma opcional, se recoja la información procedente de un analizador de gases 11 (Fig. 3), para la medición de los niveles de emisión de gases y partículas. El dispositivo 1 compara el resultado
5 obtenido con los niveles admitidos por la normativa vigente.

El algoritmo de de los medios de computación 4 calcula el flujo energético básico total se obtiene mediante evaluación los flujos de las manifestaciones energéticas medidas E1, E2, E3, E4, E5, E6, etc., referido el número de personas que
10 disfrutan de la unidad a medir en cada trayecto. El algoritmo de cálculo integra todos los trayectos de un periodo de tiempo en tiempo a definir o el total acumulado

Cada flujo tiene una incidencia en el medio ambiente: el consumo de agua revierte en su aprovechamiento, el consumo de combustibles se asocia a las emisiones directas de CO₂, NOx ..., el consumo eléctrico de red a las emisiones indirectas de CO₂, NOx... y la producción de residuos con el impacto medioambiental indirecto, mediante la cantidad de papel, vidrio, materia orgánica, plásticos, aceites y grasas, cauchos, metales... expresada en kg que desecha la unidad por unidad
15 de tiempo y personas que disfrutan del confort de dicha unidad, para compararlo con consumos y residuos tipo. Estos datos, una vez tratados por el algoritmo, dan como resultado un parámetro ecológico (que aquí denominamos "ecocom"), que es la medida de la conducta respetuosa con nuestro medio ambiente, para dar "ecocoms" integrales o combinados o individuales de la unidad de confort o de producción.
20

25

En cuanto a la presentación de los resultados, de dicha comparación se obtiene el porcentaje de consumo energético real respecto a los consumos tipo, indicando si el comportamiento es respetuoso (igual a cero o superior o abusivo cuando es negativo. Ambas desviaciones se miden de forma porcentual. La unidad porcentual de cada flujo se denomina "ecocom" positivos, si el resultado es respetuoso
30 o negativos si no lo es. El algoritmo de todos los flujos nos da el "ecocom" integral de la unidad. Pudiendo darse dificultades para recibir todos los flujos, el algoritmo del ecómetro puede dar únicamente "ecocoms" de aprovechamiento de agua y/o emisión de gases directos y/o emisión de gases indirectos y/o producción de resi-

duos. También se pueden medir solo aquellos flujos que considere oportuno la administración pública a efectos de tributar *ecotasas*, evaluando un paquete específico (que se puede denomina “*ecocom administrativo*”).

- 5 Los resultados se presentan de forma permanente el en una pantalla 5, indicando en base a que periodos de tiempo se evalúa: el acumulado del día, de la semana, el mes... u otros como los consumidos por trayecto en el caso de vehículos. A efectos de conocer mejor el aprovechamiento energético, mediante un menú se puede visualizar los “ecocoms” (día, semana, mes..) de aprovechamiento de las
- 10 diferentes fuentes de energía en la pantalla o pasar a otra sucesivas con las emisiones directas, indirectas o producción de residuos.

- Como se ha mencionado anteriormente si por dificultades de instalación sólo se calcula el consumo de uno o varios flujos, la pantalla permanente indica que se
- 15 trata de “ecocoms” individuales por fuente energética o de residuo, combinados o integrales.

- En cuanto a la instalación de los diferentes aparatos de medida C1, C2 C3, C4, C5, C6, etc., el caudalímetro de agua C1, se sitúa aguas abajo del contador de
- 20 compañía y aguas arriba de la llave de vivienda, con la posibilidad de emitir impulsos o señal analógica o digital o luminosa. Lo mismo se aplica para C2, caudalímetro para gases o líquidos combustibles, para C3, equipo de medida eléctrico en el cuadro general de la unidad, para C5, en el caso de los gases de escape, y para C6, en el caso del caudal de combustible de un vehículo automóvil. Lo mismo cabe
- 25 decir para el flujo de producción de residuos E4 que procederá de una báscula C4. La emisión de información puede ser a su vez, alámbrica o inalámbrica. En el caso de que no exista la instalación los datos de flujos se pueden introducir manualmente mediante el teclado 6.

- 30 Algoritmo para el cálculo del parámetro ecológico.

 Resulta de la media aritmética ponderada de todos los cocientes entre el valor absoluto de los flujos reales (E1, E2, E3, E4, E5, ...) entrantes en la unidad consumidora de energía” objeto de medida de las diferentes manifestaciones energéticas posibles, respecto a sus flujos o valores de referencia correspondientes. Se

- 9 -

toma el valor absoluto de los flujos reales debido a que el consumo entrante de energía es de signo contrario a un residuo, que indirectamente se asocia a otro consumo energético exterior; por eso, como interesa las contribuciones de cada factor, a efectos de que no se compensen entre ellas se toman todos en valor abso-
5 luto del flujo, no del cociente de flujos.

Se define:

1.- Flujo de una manifestación energética real entrante (E1, E2, E3, E4, E5, E6..., en general E_i): Como la cantidad de energía consumida por unidad de tiempo de esa manifestación energética, por usuario de la unidad que se mide. Así por ejemplo el agua potable consumida en una vivienda es un flujo energético por que se detrae de la naturaleza con un coste de transporte, de potabilización ... ; estos costes energéticos son costes medio ambientales que van asociados a esa agua consumida. El flujo de líquidos y gases combustibles consumidos es otro flujo energético entrante real asociado a las emisiones directas de CO₂ y otros a la atmósfera. El consumo de electricidad es otro flujo energético asociado a las emisiones indirectas de CO₂ y otros gases no deseados. Igualmente con los residuos, también son indicadores del impacto medio ambiental e indicadores indirectos de un gasto energético. Así por ejemplo también es un flujo energético entrante la cantidad de vidrio que desechamos por idénticas razones, pero no el que adquirimos y permanece para desarrollo de la actividad en la unidad. Igualmente con el papel, la materia orgánica, los envases, los recambios procedentes de reparaciones, etc.

2.- Flujos tipo (C_t): Sería el consumo energético medio deseado o recomendable por la administración pública de la zona donde se desarrolla la actividad de cada unidad a medir. En su defecto, caso de no existir políticas medioambientales definidas por la administración se toman consumos y normalizados o datos estadísticos de consumos, tanto entrantes como consumo como salientes de residuo por
30 habitante o por unidad de producción.

3.- Coeficiente de ponderación (C_{pd}): Cada cociente designa un porcentual de desviación respecto al consumo tipo de manifestación energética consumida. Pero no todos tienen la misma importancia atendiendo a:

- 3.1.- La costumbres en cuanto a consumos de la unidad. En ciertas regiones hay manifestaciones energéticas que poseen un peso importante por la proximidad del recurso, por precios subvencionados o por inexistencia de otras fuentes.... En estas situaciones hay que darle el peso específico adecuado que marque la administración o en su defecto los datos estadísticos. En el caso de un vehículo motorizado será despreciable el consumo de agua, pero no el de líquidos ó gases combustibles, el de residuos de aceites y grasas o el de residuos de cauchos, gomas y metales.
- 3.2.- Las políticas energéticas de la zona. Según la administración del lugar y atendiendo si a la medida de la conducta medioambiental se le asocia una tasa o tributo; hay que ponderar estos cocientes dependiendo lo que quiera primar o castigar la administración dichas desviaciones.
- 3.3.- Fines prácticos: Estos coeficientes pueden ser cero, por que la contribución de dicho consumo sea tan bajo que conviene despreciarlo, dado el coste que posee su medida. Por ejemplo la cantidad de residuos orgánicos de un ferrocarril eléctrico.

Los coeficientes ponderados están acotados entre 0 y 1.

Así, el parámetro ecológico (ó "ecocoms", en %), para "n" magnitudes de consumo energético o de residuos, se calcula aplicando la fórmula:

$$\text{Ecocoms (\%)} = \frac{1}{n} \sum_{i=1}^n (C_{pd} \times (1 - \frac{E_i}{p \cdot C_t}) \times 100.$$

De donde n es el número de fuentes de energía o variables de residuo medibles (con coeficiente de ponderación distinto de cero) y p la población que disfruta del confort de la unidad a medir.

Interpretación de los resultados.

El resultado es un tanto por ciento que en tanto se aproxima a cero el comportamiento es el deseable, si por el contrario es negativo y se aparta de cero, la

conducta de esa unidad no es respetuosa y la distancia al cero es el grado de lo que se aparta de la conducta deseada, por lo cual se puede penalizar y medir tal penalización. Por último, si es positivo la conducta es excelente y lo que se aparta del cero es la medida de su excelencia medioambiental.

5

El dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente, según la presente invención, puede utilizarse para el cálculo de un parámetro ecológico que puede servir de base para la aplicación de las denominadas *ecotasas* por parte de la administración.

10

REIVINDICACIONES

1.- Dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente de una unidad consumidora de energía,
5 caracterizado porque comprende

un módulo de introducción de datos (3), que está dotado a su vez por lo menos de una entrada de un valor de consumo energético (E1, E2, E3, E4, E5, E6) de una magnitud, medido en un correspondiente aparato de medida (C1, C2, C3, C4,
10 C5, C6) de la unidad consumidora de energía;

un teclado (6) de introducción de datos, en particular de datos de producción de residuos de la unidad consumidora de energía;

unos medios de computación (4) que reciben los datos procedente del módulo de introducción de datos (3) y del teclado (6), y que están provistos de un procesador que incorpora un algoritmo de cálculo de un parámetro ecológico, indicativa
15 del comportamiento respetuoso con el medio ambiente de la unidad consumidora de energía, a partir los consumos energéticos medidos y de los datos introducidos;
y

una pantalla de visualización (5), comunicada con los medios de computación (4), para dar a visualizar el parámetro ecológico calculado,
20

siendo dicho parámetro ecológico calculado como una media ponderada de la suma de desviaciones de cada valor de consumo energético medido con respecto a un valor de referencia.

25 2.- Dispositivo según la reivindicación 1, caracterizado porque comprende medios para la introducción de valores de producción de residuos.

3.- Dispositivo según la reivindicación 1, caracterizado porque comprende un módulo de entrada (90) de un bus de datos (9) de una red domótica.
30

4.- Dispositivo según la reivindicación 1, caracterizado porque comprende una entrada USB (70) para un bus de datos serie (7).

5.- Dispositivo según una cualquiera de las reivindicaciones anteriores, ca-

racterizado porque comprende por lo menos:

una entrada de caudal de agua (E1), procedente de un correspondiente primer caudalímetro de agua (C1);

5 una entrada de caudal de gases o líquidos combustibles (E2), procedente de un segundo caudalímetro de gases o líquidos combustibles (C2);

una entrada de medida de potencia eléctrica (E3), procedente de un contador o analizador de red eléctrica (C3); y

una entrada de medida de peso de residuos (E4) procedente de una báscula de pesaje de residuos (C4)

10

6.- Dispositivo según una cualquiera de las reivindicaciones 1 a 4, caracterizado porque comprende por lo menos:

15 una entrada de caudal de combustible (E6), procedente de un correspondiente caudalímetro (C6) de combustible del motor (13) de un vehículo automóvil (12); y

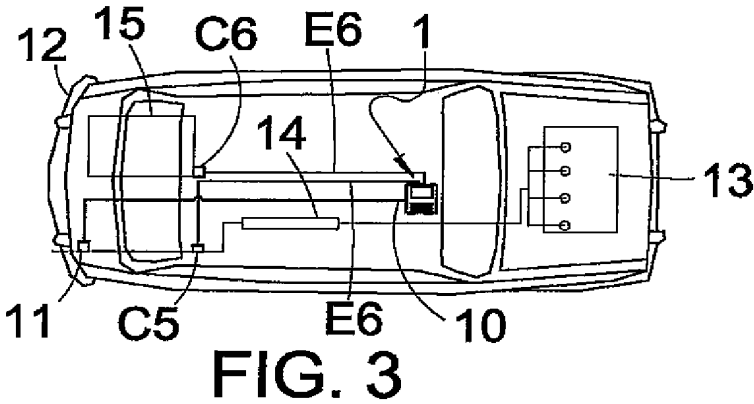
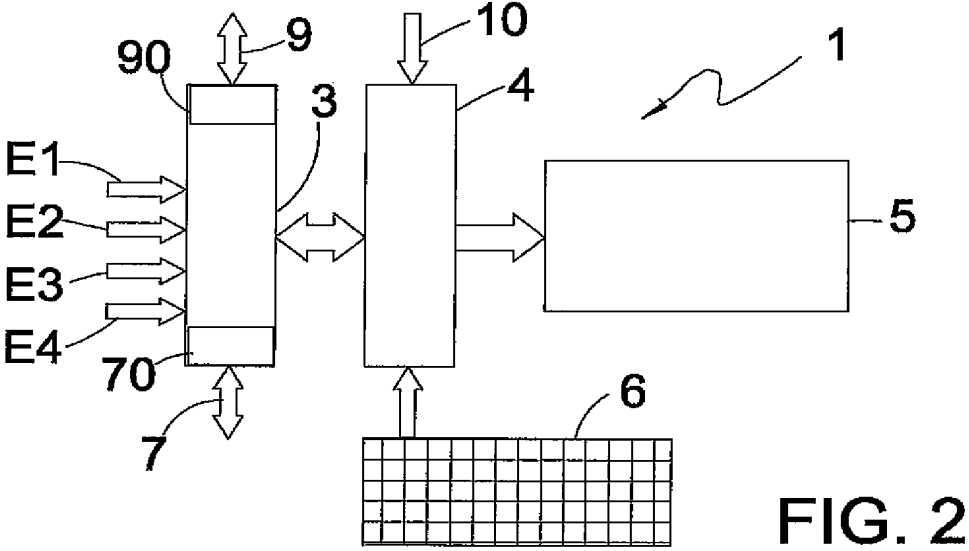
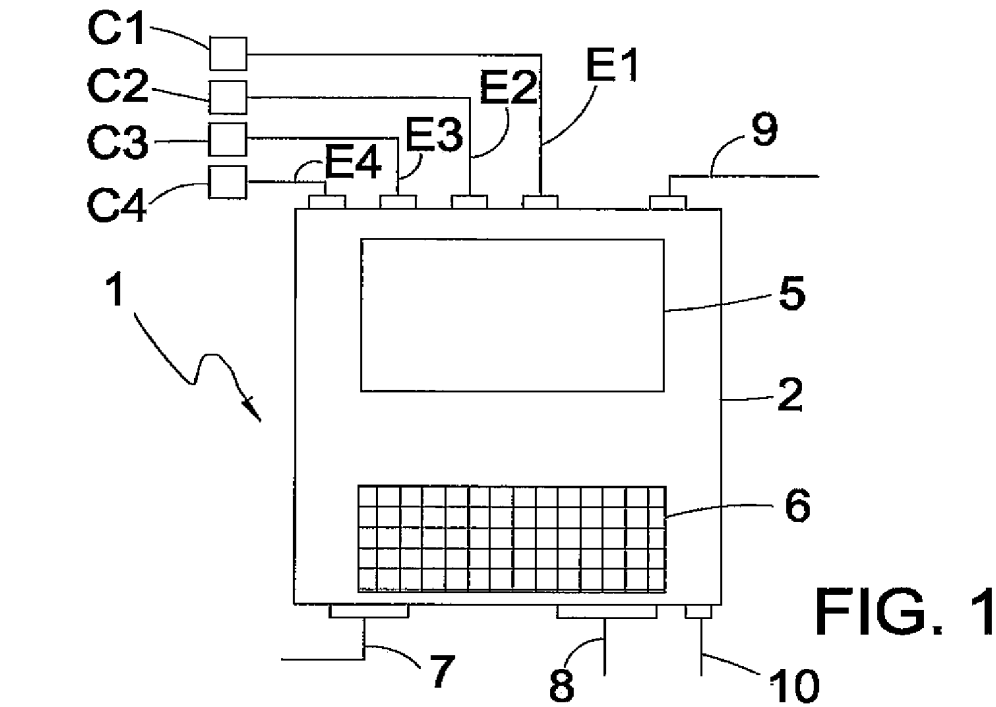
unos medios de introducción de la producción de residuos del vehículo automóvil, seleccionados de entre: residuos de goma de neumáticos, residuos de aceite del motor, residuos de líquido refrigerante, residuos de líquidos de circuitos cerrados y residuos metálicos,

20 para el cálculo del parámetro ecológico correspondiente al vehículo automóvil

7.- Dispositivo según una cualquiera de las reivindicaciones anteriores, caracterizado porque comprende además una entrada de caudal de gases de escape (E5), procedente de un correspondiente caudalímetro (C5) de gases de escape de un sistema de combustión de la unidad consumidora de energía; y un analizador de gases (11) para la medición de los niveles de emisión de gases y partículas de dicho sistema de combustión.

30 8.- Dispositivo según una cualquiera de las reivindicaciones anteriores, caracterizado porque comprende una carcasa (2), que encierra los diferentes componentes del dispositivo, y en cuya parte exterior se muestra el teclado (6) y la pantalla (5).

1/1



(12) SOLICITUD INTERNACIONAL PUBLICADA EN VIRTUD DEL TRATADO DE COOPERACIÓN EN MATERIA DE PATENTES (PCT)

(19) Organización Mundial de la Propiedad
Intelectual
Oficina internacional



(43) Fecha de publicación internacional
21 de enero de 2010 (21.01.2010)

PCT

(10) Número de Publicación Internacional
WO 2010/007601 A3

- (51) Clasificación Internacional de Patentes:
G06Q 50/00 (2006.01)
- (21) Número de la solicitud internacional:
PCT/IB2009/053135
- (22) Fecha de presentación internacional:
20 de julio de 2009 (20.07.2009)
- (25) Idioma de presentación: español
- (26) Idioma de publicación: español
- (30) Datos relativos a la prioridad:
P200802159 18 de julio de 2008 (18.07.2008) ES
- (72) Inventor; e
- (71) Solicitante : **MASO PORTABELLA, Alberto** [ES/ES];
C/Mossen Cinto Verdaguer Nº 8, 2º 2ª, E-08349 Cabrera
de Mar (ES).
- (74) Mandatario: **PONTI SALES, Adelaida**; C. Consell de
Cent, 322, E-08007 Barcelona (ES).
- (81) Estados designados (a menos que se indique otra cosa,
para toda clase de protección nacional admisible): 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, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM,
ZW.

- (84) Estados designados (a menos que se indique otra cosa,
para toda clase de protección regional admisible):
ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL,
SZ, TZ, UG, ZM, ZW), euroasiática (AM, AZ, BY, KG,
KZ, MD, RU, TJ, TM), europea (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,
SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaraciones según la Regla 4.17:

- sobre la identidad del inventor (Regla 4.17(i))
- sobre el derecho del solicitante para solicitar y que le sea
concedida una patente (Regla 4.17(ii))
- sobre la calidad de inventor (Regla 4.17(iv))

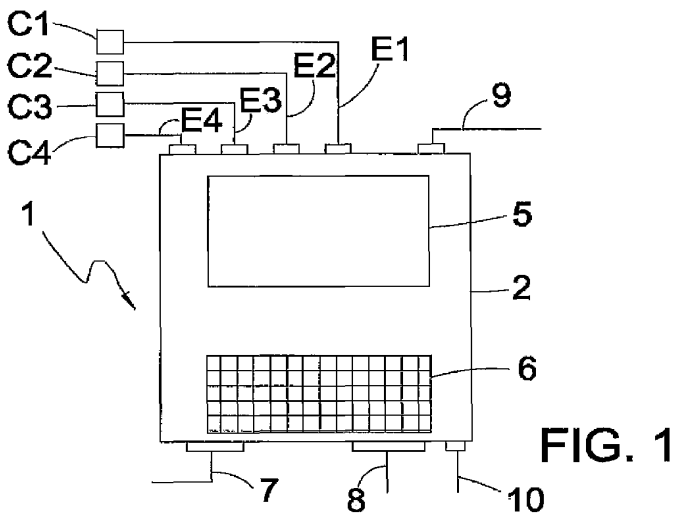
Publicada:

- con informe de búsqueda internacional (Art. 21(3))

[Continúa en la página siguiente]

(54) Title: DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT

(54) Título : DISPOSITIVO PARA LA MEDICIÓN DE CONSUMOS Y DEL COMPORTAMIENTO RESPETUOSO CON EL MEDIO AMBIENTE



(57) Abstract: The invention relates to a device for measuring the energy consumption and environmentally friendly performance of an energy-consuming unit. The device comprises: a data input module (3) provided with at least one energy consumption value input (E1, E2, E3, E4, E5, E6) having a magnitude measured in a corresponding measuring apparatus (C1, C2, C3, C4, C5, C6) of the energy-consuming unit; a data input keypad (6); computation means (4) which receive data from the data input module and the keypad and are provided with a processor including an algorithm for calculating an ecological parameter indicative of the environmentally friendly performance of the energy-consuming unit on the basis of the measured energy consumption values and the input data; and a display screen which is connected to the computation means. The ecological parameter is calculated as a weighted average of the sum of the deviations of each measured energy consumption value in relation to a reference value.

(57) Resumen:

[Continúa en la página siguiente]

— antes de la expiración del plazo para modificar las reivindicaciones y para ser republicada si se reciben modificaciones (Regla 48.2(h))

(88) Fecha de publicación del informe de búsqueda internacional:

4 de noviembre de 2010

Dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente de una unidad consumidora de energía. Comprende un módulo de introducción de datos (3), que está dotado a su vez por lo menos de una entrada de un valor de consumo energético (E1, E2, E3, E4, E5, E6) de una magnitud, medido en un correspondiente aparato de medida (C1, C2, C3, C4, C5, C6) de la unidad consumidora de energía; un teclado (6) de introducción de datos, medios de computación (4) que reciben los datos procedente del módulo de introducción de datos y del teclado, y que están provistos de un procesador que incorpora un algoritmo de cálculo de un parámetro ecológico, indicativa del comportamiento respetuoso con el medio ambiente de la unidad consumidora de energía, a partir los consumos energéticos medidos y de los datos introducidos; y una pantalla de visualización, comunicada con los medios de computación. El parámetro ecológico se calcula como una media ponderada de la suma de desviaciones de cada valor de consumo energético medido con respecto a un valor de referencia.

PCT

Copia papel (NO para presentación)

VIII-4-1	Declaración: Calidad de inventor (sólo para la designación de los Estados Unidos de América) Declaración sobre la calidad de inventor (Reglas 4.17.iv) y 51bis.1.a)iv)) para la designación de los Estados Unidos de América:	Por este medio declaro que considero que soy el original, primer y único inventor (si hay un solo inventor indicado a continuación) o uno de los primeros inventores conjuntos (si se mencionan varios inventores a continuación) de la materia objeto de la reivindicación y para la cual se solicita una patente. Esta declaración se refiere a la solicitud internacional de que forma parte (si se presenta la declaración con la solicitud). Esta declaración se refiere a la solicitud internacional N° PCT/ (si se presenta la declaración según la Regla 26ter). Por este medio declaro que mi residencia, dirección postal y ciudadanía son los que se indican a continuación al lado de mi nombre. Por este medio declaro que he revisado y entiendo el contenido de la solicitud internacional que antecede, incluso las reivindicaciones de tal solicitud. He identificado en el petitorio de esa solicitud, conforme a la Regla 4.10, toda reivindicación de prioridad de una solicitud extranjera, y he identificado abajo, bajo el epígrafe "Solicitudes anteriores", mediante el número de solicitud, el país o el Miembro de la Organización Mundial del Comercio, el día, el mes y el año de presentación toda solicitud de patente o de certificado de inventor presentada en un país distinto de los Estados de América, incluida toda solicitud internacional PCT que designe al menos un país distinto de los Estados Unidos de América, cuya fecha de presentación sea anterior a la de la solicitud extranjera cuya prioridad se reivindica.
VIII-4-1-1	Solicitudes anteriores:	

PCT

Copia papel (NO para presentación)

		Por este medio reconozco el deber de divulgar información conocida por mí que fuere esencial con respecto a la patentabilidad según se define en el Título 37 del Código de Regulaciones Federales § 1.56, incluyendo lo relativo a las solicitudes de continuación en parte, la información esencial que se haya hecho accesible entre la fecha de presentación de la solicitud anterior y la fecha de presentación internacional PCT de la solicitud de continuación en parte. Por este medio manifiesto que todas las declaraciones hechas en la presente en base a mis propios conocimientos son verdaderas y que considero que son verdaderas todas las declaraciones hechas en base al mejor saber y entender; adicionalmente, manifiesto que dichas declaraciones se hicieron con el conocimiento de que las declaraciones falsas intencionales y similares son punibles por multa o encarcelamiento o ambas, conforme a la Sección 1001 del Título 18 del Código de Estados Unidos y que dichas declaraciones falsas intencionales pueden poner en peligro la validez de la solicitud o de cualquier patente concedida en virtud de la misma.
VIII-4-1-1-1	Nombre (APELLIDOS, Nombre)	MASO PORTABELLA, Alberto
VIII-4-1-1-2	Domicilio: (ciudad y estado (de los Estados Unidos de América), en su caso, o país)	Cabrera de Mar, España
VIII-4-1-1-3	Dirección postal:	C/Mossen Cinto Verdaguer N° 8, 2° 2ª 08349 Cabrera de Mar España
VIII-4-1-1-4	Ciudadanía:	ES
VIII-4-1-1-5	Firma del inventor: (La firma debe ser la del inventor, no la del mandatorio)	/Alberto MASO PORTABELLA/
VIII-4-1-1-6	Fecha:	20 Julio 2009 (20.07.2009)

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number		
Filing Date		
First Named Inventor	MASO PORTABELLA, Alberto	
Art Unit		
Examiner Name		
Attorney Docket Number	53777-215226	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

- ☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).
- OR
- ☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).
- ☐ See attached certification statement.
- ☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- ☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jeffrey T.G. KELSEY/	Date (YYYY-MM-DD)	2010-01-14
Name/Print	Jeffrey T.G. KELSEY	Registration Number	63696

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		
	First Named Inventor	MASO PORTABELLA, Alberto	
	Art Unit		
	Examiner Name		
	Attorney Docket Number		53777-215226

U.S.PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S.PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² i	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	WO2002/067152	WO		2002-08-29	CRC FOR SUSTAINABLE TOURISM PT		☐
If you wish to add additional Foreign Patent Document citation information please click the Add button								Add
NON-PATENT LITERATURE DOCUMENTS							Remove	
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		
	First Named Inventor	MASO PORTABELLA, Alberto	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	53777-215226	

	1	PCT International Search Report completed for PCT/IB2009/053135 2010-08-24	☐
If you wish to add additional non-patent literature document citation information please click the Add button Add			
EXAMINER SIGNATURE			
Examiner Signature			Date Considered
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P24849PC00	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/IB2009/053135	International filing date (day/month/year) 20/07/2009	(Earliest) Priority Date (day/month/year) 18/07/2008
Applicant MASO PORTABELLA, ALBERTO		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed
☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (See Box No. II)

3. ☐ Unity of invention is lacking (see Box No III)

4. With regard to the title,

- ☐ the text is approved as submitted by the applicant
☒ the text has been established by this Authority to read as follows:

DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT

5. With regard to the abstract,

- ☒ the text is approved as submitted by the applicant
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No. 1
☒ as suggested by the applicant
☐ as selected by this Authority, because the applicant failed to suggest a figure
☐ as selected by this Authority, because this figure better characterizes the invention
b. ☐ none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2009/053135

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06Q50/00

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)
G07C G06Q G01R

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/067152 A1 (CRC FOR SUSTAINABLE TOURISM PT [AU]; NESS JAMES NEIL [AU]; DE LACY TER) 29 August 2002 (2002-08-29) abstract; figures 1-5 page 6, line 25 - page 9, line 15 -----	1-8
X	ANONYMOUS: "Windmill Software Ltd.: Interfacing a vehicle's On Board Diagnostics"[Online] June 2007 (2007-06), XP002597888 Internet Retrieved from the Internet: URL: http://www.windmill.co.uk/obd.html > [retrieved on 2010-08-23] the whole document ----- -/--	1-8

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

24 August 2010

Date of mailing of the international search report

20/09/2010

Name and mailing address of the ISA/
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Ernst, Monika

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2009/053135

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ANONYMOUS: "Umwelt, Wirtschaft, Soziales: Wege der Zukunftsfähigkeit; Sustainable Value Report 2001/2002"[Online] September 2001 (2001-09), pages 52-55, XP002597890 INTERNET Retrieved from the Internet: URL: http://www.bmwgroup.com/publikationen/d/2002/pdf/sustainable_value_report_de.pdf > [retrieved on 2010-08-23] page 54 - page 55 -----	1-8

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No
PCT/IB2009/053135

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 02067152	A1	29-08-2002 US 2004117240 A1	17-06-2004

BARNES & THORNBURG LLP

11 South Meridian Street
Indianapolis, Indiana
46204
(317) 236-1313(317)
231-7433 Fax

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Customer No.	23643	}	
		}	
Confirmation No.:	Unknown	}	
		}	
Application No.:	Unknown (U.S. National Phase of PCT/IB2009/053135)	}	
		}	
Invention:	DEVICE FOR MEASURING CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT	}	<u>ELECTRONICALLY</u>
		}	<u>SUBMITTED</u>
		}	January 14, 2011
Inventors:	MASO PORTABELLA, Alberto	}	
		}	
Filed:	Herewith	}	
		}	
Attorney		}	
Docket:	53777-215226	}	
		}	
Examiner:	Unknown	}	
		}	

FIRST PRELIMINARY AMENDMENT

Mail Stop PCT DO/EO/US
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Prior to the examination of the above-identified national patent application submitted herewith, Applicant requests entry of the following:

Amendments to the Abstract, which begin on page 2 of this paper.

Amendments to the Specification, which begins on page 3 of this paper.

Amendments to the Claims, which begins on page 4 of this paper.

Remarks, which begin on page 8 of this paper.

53777-215226

In the Abstract

Please accept the abstract submitted herewith on a separate sheet in fulfillment of the requirement for an abstract.

53777-215226

In the Specification:

On page 1 please amend the title as follows:

~~DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL~~
~~PERFORMANCE WITH THE ENVIRONMENT~~
DEVICE FOR MEASURING POWER CONSUMPTION AND
PERFORMANCE WITH RESPECT TO THE ENVIRONMENT
OF A POWER-CONSUMING UNIT

On page 1 after the title please add the following header and paragraph as follows:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a U.S. national counterpart application of International Application Serial No. PCT/IB2009/053135 filed July 20, 2009, which claims priority to Spanish Patent Application No. P200802159 filed July 18, 2008. The disclosures of PCT/IB2009/053135 and P200802159 are each hereby incorporated herein by reference.

In the Claims:

Please amend the claims as follows:

CLAIMSWHAT IS CLAIMED IS:

1. (Currently amended) ~~Device~~ A device for measuring power ~~consumptions~~ consumption and ~~respectful~~ performance with respect to the environment of a power-consuming unit, ~~characterised in that it comprises:~~ comprising

a data introduction module, which ~~is provided with~~ receives at least one ~~an~~ input of a power consumption value of a magnitude, measured ~~in~~ by a corresponding measurement apparatus of the power-consuming unit;

an keyboard input device for ~~introducing~~ inputting data, particularly data of waste production data ~~in the power-consuming unit~~;

a display screen; and

~~computing means that receive the data from the data introduction module and the keyboard, and which is provided with a processor that includes a calculation algorithm of an ecologic parameter, indicative of the respectful performance with the environment of the power-consuming unit, from the measured power consumptions and the introduced data~~

a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to

(a) receive the at least one power consumption value from the data introduction module,

(b) receive the waste production data,

(c) calculate an ecological parameter based on the at least one power consumption value and the waste production data, and

(d) operate the display screen to display the calculated ecological parameter,

~~a display screen, communicated with the computing means, to display the calculated ecologic parameter,~~

said wherein the calculated ecological parameter is being an adjusted mean of the sum of the deviations of each value of measured the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value.

2. (Currently amended) ~~Device according to claim 1, characterised in that it comprises~~ The device of claim 1 further comprising a means for introducing values of waste production.

3. (Currently amended) ~~Device according to claim 1, characterised in that it comprises~~ The device of claim 1 further comprising an input module of a data bus in a domotic network.

4. (Currently amended) ~~Device according to claim 1, characterised in that it comprises~~ The device of claim 1 further comprising an USB input for a serial data bus.

5. (Currently amended) ~~Device according to anyone of the previous claims, characterised in that it comprises~~ The device of claim 1 wherein the at least one power consumption value includes at least two power consumption values selected from the group of: at least:

a water flow input[[,]] from a corresponding first water flow meter;

a combustible gas and liquid flow input[[,]] from a second combustible gas and liquid flow meter;

an electric power measurement input[[,]] from a meter or analyser of electric mains; and

a waste weight measurement input from a scale for weighting wastes.

6. (Currently amended) ~~Device according to anyone of claims 1-4, characterised in that it comprises at least:~~ The device of claim 1 wherein the at least one power consumption value includes a fuel flow input[[,]] from a corresponding flow meter of fuel from the motor of an automobile; and

~~means for introducing the waste production data corresponds to one of of the automobile, selected among:~~ tire rubber wastes, motor oil wastes, coolant liquid wastes, closed circuit liquid wastes and metal wastes, and

the fuel flow input and the waste production data are used to calculate the ecological parameter corresponding to the automobile.

7. (Currently amended) ~~Device according to anyone of the previous claims, characterised in that it also comprises~~ The device of claim 6 wherein the at least one power consumption value includes an input for exhaust gas flow input [[,]] from a corresponding flow meter of exhaust gases of a combustion system of the automobile power-consuming unit; and a gas analyser for measuring the emission levels of gases and particles of said combustion system.

8. (Currently amended) ~~Device according to anyone of the previous claims, characterised in that it comprises~~ The device of claim 1 further comprising a shell, which encloses the different components of the device, and in whose external part is the keyboard and the screen input device and the display screen.

9. (New) A method of determining an ecological parameter, comprising:
receiving a first power consumption value of the power consuming unit,
receiving a waste production data value,
determining an ecological parameter based on the first power composition value and the waste production data value, and
outputting the determined ecological parameter for display on a display screen.

10. (New) The method of claim 9, wherein the first power consumption value corresponds to one of water flow, combustible gas flow, and electric power flow.

11. (New) The method of claim 10, wherein the waste production data corresponds to waste weight.

12. (New) The method of claim 9, wherein the first power consumption value corresponds to one of fuel flow and exhaust gas flow.

13. (New) The method of claim 12, wherein the waste production data corresponds to one of rubber wastes, oil waste, coolant liquid wastes, and metal.

14. (New) The method of claim 9, further comprising generating a negative ecological parameter when a user expends more than a predetermined standard quantity of power consumed in a time period.

15. (New) The method of claim 12, further comprising generating a positive ecological parameter when a user expends less than a predetermined standard quantity of power consumed in a time period.

16. (New) A method of determining an ecological parameter as a percentage, comprising:

determining an ecological parameter based on an algorithm of the form

$$Parameter(\%) = 1 / n \sum_{i=1}^n (Cpdx(1 - \frac{Ei}{p \cdot Ct}) \times 100$$

wherein “Ei” is a power quantity consumed in a time period,

“Ct” is a predetermined standard quantity of power consumed in the time period,

“Cpd” is a coefficient corresponding to the predetermined standard quantity of power consumed in the time period,

“n” is a sum of a number of measured power sources and waste variables, and

“p” is a number of users of the measured power sources and waste variables.

53777-215226

REMARKS

Applicant respectfully requests consideration of this Preliminary Amendment in the above-identified patent application. The specification has been amended herein to indicate the relationship of the subject application to previously filed applications. Claims 1-8 are amended to delete multiple dependent claims and to place them in somewhat better form for examination. Claims 9-16 have been added. No amendment made herein is believed to go beyond the disclosure in the international application as originally filed.

Respectfully submitted,
Barnes & Thornburg LLP

A handwritten signature in black ink, appearing to read 'J.T.G. Kelsey', with a long horizontal flourish extending to the right.

Jeffrey T.G. KELSEY
Attorney Reg. No. 63,696

JTK/ezc/1148162
Indianapolis, Indiana 46204
(317-236-1313)

ABSTRACT

A device for measuring power consumption and performance relative to the environment of a power-consuming unit is disclosed. The device includes a data introduction module, a keyboard for inputting data of waste production in the power-consuming unit, a computing device, and a display screen. The computing device receives the data from the data introduction module and the keyboard. The computing device is also provided with a processor that includes a calculation algorithm of an ecological parameter indicative of the performance relative to the environment of the power-consuming unit. The ecological parameter is calculated as an adjusted mean of the sum of the deviations of each power consumption value with respect to a reference value.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	53777-215226
		Application Number	
Title of Invention	DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Alberto		MASO PORTABELLA		
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Cabrera de Mar	Country Of Residence ⁱ	ES		
Citizenship under 37 CFR 1.41(b) ⁱ		ES			
Mailing Address of Applicant:					
Address 1		C. Mossen Cinto Verdaguer 8, 2n. 2a.			
Address 2					
City	Cabrera de Mar	State/Province			
Postal Code	E-08349	Country ⁱ	ES		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	23643		
Email Address	INDOCKET@BTLAW.COM	Add Email	Remove Email

Application Information:

Title of the Invention	DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT		
Attorney Docket Number	53777-215226	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	1	Suggested Figure for Publication (if any)	1

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	53777-215226
	Application Number	
Title of Invention	DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	23643		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	a 371 of international	PCT/IB2009/053135	2009-07-20

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Add

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove

Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
P 200802159	ES	2010-07-18	☒ Yes ☐ No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Add

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1	Remove
------------	-------------------

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	53777-215226
		Application Number	
Title of Invention	DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT		

If the Assignee is an Organization check here. ☐				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information:				
Address 1				
Address 2				
City			State/Province	
Country i			Postal Code	
Phone Number			Fax Number	
Email Address				
Additional Assignee Data may be generated within this form by selecting the Add button. Add				

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.					
Signature	/Jeffrey T.G. KELSEY/			Date (YYYY-MM-DD)	2011-01-14
First Name	Jeffrey T.G.	Last Name	KELSEY	Registration Number	63696

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2009/053135

A. CLASSIFICATION OF SUBJECT MATTER INV. G06Q50/00		
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) G07C G06Q G01R		
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 practical, search terms used) EP0-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/067152 A1 (CRC FOR SUSTAINABLE TOURISM PT [AU]; NESS JAMES NEIL [AU]; DE LACY TER) 29 August 2002 (2002-08-29) abstract; figures 1-5 page 6, line 25 - page 9, line 15	1-8
X	ANONYMOUS: "Windmill Software Ltd.: Interfacing a vehicle's On Board Diagnostics"[Online] June 2007 (2007-06), XP002597888 Internet Retrieved from the Internet: URL:http://www.windmill.co.uk/obd.html> [retrieved on 2010-08-23] the whole document ----- -/--	1-8
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "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 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
Date of the actual completion of the international search 24 August 2010		Date of mailing of the international search report 20/09/2010
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Ernst, Monika

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2009/053135

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ANONYMOUS: "Umwelt, Wirtschaft, Soziales: Wege der Zukunftsfähigkeit; Sustainable Value Report 2001/2002"[Online] September 2001 (2001-09), pages 52-55, XP002597890 INTERNET Retrieved from the Internet: URL: http://www.bmwgroup.com/publikationen/d/2002/pdf/sustainable_value_report_de.pdf > [retrieved on 2010-08-23] page 54 - page 55 -----	1-8

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No
PCT/IB2009/053135

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
WO 02067152	A1	29-08-2002	US 2004117240 A1	17-06-2004

INFORME DE BUSQUEDA INTERNACIONAL

Solicitud internacional N°

PCT/IB2009/053135

A. CLASIFICACIÓN DEL OBJETO DE LA SOLICITUD

CIP G06Q50/00

De acuerdo con la Clasificación Internacional de Patentes (CIP) o según la clasificación nacional y CIP.

B. SECTORES COMPRENDIDOS POR LA BÚSQUEDA

Documentación mínima buscada (sistema de clasificación seguido de los símbolos de clasificación)

G07C G06Q G01R

Otra documentación consultada, además de la documentación mínima, en la medida en que tales documentos formen parte de los sectores comprendidos por la búsqueda

Bases de datos electrónicas consultadas durante la búsqueda internacional (nombre de la base de datos y, si es posible, términos de búsqueda utilizados) EP0-Internal

C. DOCUMENTOS CONSIDERADOS RELEVANTES

Categoría*	Documentos citados, con indicación, si procede, de las partes relevantes	Relevante para las reivindicaciones N°
X	WO 02/067152 A1 (CRC FOR SUSTAINABLE TOURISM PT [AU]; NESS JAMES NEIL [AU]; DE LACY TER) 20 de agosoto de 2002 (2002-08-29) resumen, figuras 1-5 página 6, línea 25 - página 9, línea 15	1-8
X	----- ANONYMOUS: "Windmill Software Ltd.: Interfacing a vehicle's On Board Diagnostics"[Online] June 2007 (2007-06), XP002597888 Internet Retrieved from the Internet: URL:http://www.windmill.co.uk/obd.html> [retrieved on 2010-08-23] todo el documento ----- -/--	1-8

☒ En la continuación del Recuadro C se relacionan otros documentos	☒ Los documentos de familias de patentes se indican en el Anexo
* Categorías especiales de documentos citados: “A” documento que define el estado general de la técnica no considerado como particularmente relevante. “E” solicitud de patente o patente anterior pero publicada en la fecha de presentación internacional o en fecha posterior. “L” documento que puede plantear dudas sobre una reivindicación de prioridad o que se cita para determinar la fecha de publicación de otra cita o por una razón especial (como la indicada). “O” documento que se refiere a una divulgación oral, a una utilización, a una exposición o a cualquier otro medio. “P” documento publicado antes de la fecha de presentación internacional pero con posterioridad a la fecha de prioridad reivindicada.	“T” documento ulterior publicado con posterioridad a la fecha de presentación internacional o de prioridad que no pertenece al estado de la técnica pertinente pero que se cita por permitir la comprensión del principio o teoría que constituye la base de la invención. “X” documento particularmente relevante; la invención reivindicada no puede considerarse nueva o que implique una actividad inventiva por referencia al documento aisladamente considerado. “Y” documento particularmente relevante; la invención reivindicada no puede considerarse que implique una actividad inventiva cuando el documento se asocia a otro u otros documentos de la misma naturaleza, cuya combinación resulta evidente para un experto en la materia. “&” documento que forma parte de la misma familia de patentes.
Fecha en que se ha concluido efectivamente la búsqueda internacional 24 de agosto de 2010	Fecha de expedición del informe de búsqueda internacional 20 de septiembre de 2010
Nombre y dirección postal de la Administración encargada de la búsqueda internacional European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Funcionario autorizado Ernst, Monika
N° de fax	N° de teléfono

INFORME DE BÚSQUEDA INTERNACIONAL

Solicitud internacional N°

PCT/IB2009/053135

C (continuación). DOCUMENTOS CONSIDERADOS RELEVANTES		
Categoría*	Documentos citados, con indicación, si procede, de las partes relevantes	Relevante para las reivindicaciones N°
A	ANONYMOUS: "Umwelt, Wirtschaft, Soziales: Wege der Zukunftsfähigkeit; Sustainable Value Report 2001/2002"[Online] September 2001 (2001-09), pages 52-55, XP002597890 INTERNET Retrieved from the Internet: URL: http://www.bmwgroup.com/publikationen/d/2002/pdf/sustainable_value_report_de.pdf > [retrieved on 2010-08-23] página 54 - página 55 -----	1-8

Formulario PCT/ISA 210 (continuación de la segunda hoja) (Julio 2008)

INFORME DE BUSQUEDA INTERNACIONAL

Información relativa a miembros de familias de patentes

Solicitud internacional N°

PCT/IB2009/053135

WO 02067152 A1 29-08-2002 US 2004117240 A1 17-06-2004

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		DEVICE FOR MEASURING CONSUMPTION AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT		
First Named Inventor/Applicant Name:		Alberto MASO PORTABELLA		
Filer:		Jeffrey T.G. Kelsey/Ernest Carlson		
Attorney Docket Number:		53777-215226		
Filed as Small Entity				
U.S. National Stage under 35 USC 371 Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Basic National Stage Fee	2631	1	165	165
Natl Stage Search Fee - Report provided	2642	1	215	215
Natl Stage Exam Fee - all other cases	2633	1	110	110
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				490

Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/IB2009/053135

International filing date: 20 July 2009 (20.07.2009)

Document type: Certified copy of priority document

Document details: Country/Office: ES
Number: P200802159
Filing date: 18 July 2008 (18.07.2008)

Date of receipt at the International Bureau: 01 September 2009 (01.09.2009)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



World Intellectual Property Organization (WIPO) - Geneva, Switzerland
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse



1B09/53135

CERTIFICADO OFICIAL

Por la presente certifico que los documentos adjuntos son copia exacta de la solicitud de PATENTE DE INVENCION número P 200802159 , que tiene fecha de presentación en este Organismo el 2008-07-18.

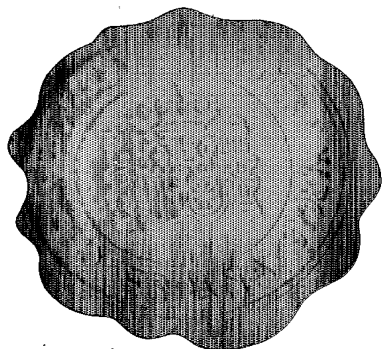
INDICACIÓN DE PRIORIDAD: El código del país con el número de su solicitud de prioridad, que ha de utilizarse para la presentación de solicitudes en otros países en virtud del Convenio de París, es: ES 200802159.

Madrid, 21 de Agosto de 2009

El Director del Departamento de Patentes
e Información Tecnológica

P.D.

ANA MARÍA REDONDO MÍNGUEZ



INSTANCIA DE SOLICITUD

(1) MODALIDAD: ☒ PATENTE DE INVENCION ☐ MODELO DE UTILIDAD		NUMERO DE SOLICITUD P200802159	
(2) TIPO DE SOLICITUD: ☐ ADICION A LA PATENTE ☐ SOLICITUD DIVISIONAL ☐ CAMBIO DE MODALIDAD ☐ TRANSFORMACION SOLICITUD PATENTE EUROPEA ☐ PCT: ENTRADA FASE NACIONAL		(3) EXP. PRINCIPAL O DE ORIGEN: MODALIDAD Nº SOLICITUD FECHA SOLICITUD	
(5) SOLICITANTE (S): APELLIDOS O DENOMINACION SOCIAL MASO PORTABELLA		NOMBRE ALBERTO	
		NACIONALIDAD ESPAÑOLA	
		CÓDIGO PAÍS ES	
		DNICIF 46.116.058-T	
		CNAE 	
		PYME 	
(6) DATOS DEL PRIMER SOLICITANTE: DOMICILIO C/ MOSSEN CINTO VERDAGUER Nº 8, 2º 2ª LOCALIDAD CABRERA DE MAR PROVINCIA BARCELONA PAÍS RESIDENCIA ESPAÑA NACIONALIDAD ESPAÑOLA		TELÉFONO FAX CORREO ELECTRÓNICO CÓDIGO POSTAL 08349 CÓDIGO PAÍS ES CÓDIGO PAÍS ES	
(7) INVENTOR (ES): MASO PORTABELLA		NOMBRE ALBERTO	
		NACIONALIDAD ESPAÑOLA	
		CÓDIGO PAÍS ES	
(8) ☒ EL SOLICITANTE ES EL INVENTOR ☐ EL SOLICITANTE NO ES EL INVENTOR O ÚNICO INVENTOR		(9) MODO DE OBTENCIÓN DEL DERECHO: ☐ INVENC. LABORAL ☐ CONTRATO ☐ SUCESIÓN	
(10) TÍTULO DE LA INVENCION: DISPOSITIVO PARA LA MEDICION DE CONSUMOS ENERGETICOS Y DEL COMPORTAMIENTO RESPETUOSO CON EL MEDIO AMBIENTE DE UNA UNIDAD CONSUMIDORA DE ENERGIA			
(11) EFECTUADO DEPÓSITO DE MATERIA BIOLÓGICA: ☐ SI ☐ NO			
(12) EXPOSICIONES OFICIALES: LUGAR FECHA			
(13) DECLARACIONES DE PRIORIDAD: PAÍS DE ORIGEN		CÓDIGO PAÍS NÚMERO FECHA	
(14) EL SOLICITANTE SE ACOGE AL APLAZAMIENTO DE PAGO DE TASAS PREVISTO EN EL ART. 162. LEY 11/86 DE PATENTES ☐			
(15) AGENTE /REPRESENTANTE: NOMBRE Y DIRECCIÓN POSTAL COMPLETA. (SI AGENTE P.I., NOMBRE Y CÓDIGO) (RELLENÉSE, ÚNICAMENTE POR PROFESIONALES) IGNACIO M. BARROSO SANCHEZ-LAFUENTE C/ BALMES 92, 2º 1ª 08008 BARCELONA TELF.: 93 496 09 87			
(16) RELACIÓN DE DOCUMENTOS QUE SE ACOMPAÑAN: ☒ DESCRIPCIÓN Nº DE PÁGINAS: 12 ☒ Nº DE REIVINDICACIONES: 8 ☒ DIBUJOS, Nº DE PÁGINAS: 1 ☐ LISTA DE SECUENCIAS Nº DE PÁGINAS: ☒ RESUMEN ☐ DOCUMENTO DE PRIORIDAD ☐ TRADUCCIÓN DEL DOCUMENTO DE PRIORIDAD		FIRMA DEL SOLICITANTE O REPRESENTANTE (VER COMUNICACIÓN)	
NOTIFICACIÓN SOBRE LA TASA DE CONCESIÓN: Se le notifica que esta solicitud se considerará retirada si no procede al pago de la tasa de concesión; para el pago de esta tasa dispone de tres meses a contar desde la publicación del anuncio de la concesión en el BOPI, más los diez días que establece el art. 81 del R.D. 2245/1986.		FIRMA DEL FUNCIONARIO	



MINISTERIO
DE INDUSTRIA, TURISMO
Y COMERCIO

EJEMPLAR ORIGINAL



Oficina Española
de Patentes y Marcas

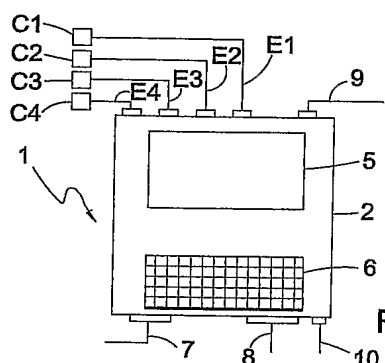
12

SOLICITUD DE PATENTE DE INVENCION

21	NÚMERO DE SOLICITUD
P200802150	
22	FECHA DE PRESENTACIÓN
62	PATENTE DE LA QUE ES DIVISORIA

31	NÚMERO	DATOS DE PRIORIDAD	32	FECHA	33	PAÍS
71	SOLICITANTE (S)					
MASO PORTABELLA, ALBERTO						
DOMICILIO C/ Mossen Cinto Verdaguer nº 8, 2º 2ª						NACIONALIDAD ESPAÑOLA
08349 Cabrera de Mar (Barcelona)						

72	INVENTOR (ES)	MASO PORTABELLA, ALBERTO
----	---------------	--------------------------

51	Int. Cl.	GRÁFICO (SÓLO PARA INTERPRETAR RESUMEN) 
54	TÍTULO DE LA INVENCION	
DISPOSITIVO PARA LA MEDICION DE CONSUMOS ENERGETICOS Y DEL COMPORTAMIENTO RESPETUOSO CON EL MEDIO AMBIENTE DE UNA UNIDAD CONSUMIDORA DE ENERGIA		

57	RESUMEN
"Dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente de una unidad consumidora de energía" Dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente de una unidad consumidora de energía. Comprende un módulo de introducción de datos (3), que está dotado a su vez por lo menos de una entrada de un valor de consumo energético (E1, E2, E3, E4, E5, E6) de una magnitud, medido en un correspondiente aparato de medida (C1, C2, C3, C4, C5, C6) de la unidad consumidora de energía; un teclado (6) de introducción de datos, medios de computación (4) que reciben los datos procedente del módulo de introducción de datos y del teclado, y que están provistos de un procesador que incorpora un algoritmo de cálculo de un parámetro ecológico, indicativa del comportamiento respetuoso con el medio ambiente de la unidad consumidora de energía, a partir los consumos energéticos medidos y de los datos introducidos; y una pantalla de visualización, comunicada con los medios de computación. El parámetro ecológico se calcula como una media ponderada de la suma de desviaciones de cada valor de consumo energético medido con respecto a un valor de referencia.	

DESCRIPCION

“Dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente de una unidad consumidora de energía”

5

Sector técnico de la invención

La invención se refiere a un dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente, a partir de los consumos energéticos medidos y de la producción de residuos, en una unidad consumidora de energía, ya sea una unidad de confort (viviendas, colectividades, hostelería y restauración, espacios de ocio, espacios deportivos, vehículos motorizados tanto privados como públicos, y de mercancías, etc.) o una unidad de producción.

La medición de este comportamiento respetuoso o no se hará a través de lo que denominaremos “parámetro ecológico”, a partir de las mediciones de consumos energéticos (consumos directos) y de la producción de deshechos o residuos que genera (consumos indirectos).

Antecedentes de la invención

Actualmente son conocidos muchos tipos de controladores lógicos programables (PLC), en que, a partir de una variables de estado, se determinan las salidas de un sistema (por ejemplo eléctrico, o neumático, etc.), u otros tipos de dispositivos que, a partir de unas entradas, calculan los valores de unos parámetros de interés. Ejemplos de estos dispositivos pueden ser los conocidos analizadores de red eléctrica, que, a partir de señales de voltaje, intensidad de corriente y desfase, calculan la energía eléctrica consumida por ua instalación.

Sin embargo, no se conocen en la técnica actual, dispositivos o aparatos que calculen parámetros o magnitudes ecológicas a partir de datos de consumo energético y de producción de residuos en instalaciones, si definimos tales parámetros o magnitudes como una desviación de un punto de trabajo óptimo, definido por una autoridad. Por ejemplo en que las emisiones de COx ó NOx sean las mínimas posibles ateniendo a su utilización.

La presente invención tiene por finalidad proporcionar un aparato que llene este vacío detectado en la técnica actual

Explicación de la invención

- 5 A tal finalidad, el objeto de la presente invención es un novedoso dispositivo de medición de consumos energéticos y que calcula parámetros ecológicos a partir de los consumos energéticos medidos y de datos de producción de residuos que en su esencia se caracteriza porque comprende
- 10 un módulo de introducción de datos, que está dotado a su vez por lo menos de una entrada de un valor de consumo energético de una magnitud, medido en un correspondiente aparato de medida de la unidad consumidora de energía;
- un teclado de introducción de datos y de selección de menús, en particular de datos de producción de residuos de la unidad consumidora de energía;
- 15 unos medios de computación que reciben los datos procedente del módulo de introducción de datos y del teclado, y que están provistos de un procesador que incorpora un algoritmo de cálculo de un parámetro ecológico a partir los consumos energéticos medidos y de los datos introducidos; y
- una pantalla de visualización, comunicada con los medios de computación,
- 20 para dar a visualizar el parámetro ecológico calculado,
- siendo dicho parámetro ecológico calculado como una media ponderada de la suma de desviaciones de cada valor de consumo energético medido con respecto a un valor de referencia.
- 25 Según otra característica de la presente invención, el dispositivo comprende medios para la introducción de valores de producción de residuos.
- En variantes preferidas, el dispositivo puede comprender un módulo de entrada de un bus de datos de una red domótica y/o una entrada USB para un bus de
- 30 datos serie.
- En una realización de aplicación doméstica o industrial el dispositivo comprende por lo menos:
- una entrada de caudal de agua, procedente de un correspondiente primer

caudalímetro de agua;

una entrada de caudal de gases o líquidos combustibles, procedente de un segundo caudalímetro de gases o líquidos combustibles;

una entrada de medida de potencia eléctrica, procedente de un contador o
5 analizador de red eléctrica; y

una entrada de medida de peso de residuos procedente de una báscula de pesaje de residuos

En una realización alternativa, para el cálculo del parámetro ecológico correspondiente al vehículo automóvil, el dispositivo puede comprender por lo menos:
10

una entrada de caudal de combustible, procedente de un correspondiente caudalímetro de combustible del motor de un vehículo automóvil; y

unos medios de introducción de la producción de residuos del vehículo automóvil, seleccionados de entre: residuos de goma de neumáticos, residuos de
15 aceite del motor, residuos de líquido refrigerante, y residuos de líquidos de circuitos cerrados, sin ser éstos limitativos, mediante el teclado del dispositivo.

El dispositivo puede contar adicionalmente con una entrada de caudal de gases de escape, procedente de un correspondiente caudalímetro de gases de escape del sistema de combustión de la unidad consumidora de energía, por ejemplo
20 escape del motor; y un analizador de gases para la medición de los niveles de emisión de gases y partículas. El dispositivo compara el resultado obtenido con los niveles admitidos por la normativa vigente. La mala combustión y el consecuente exceso de emisión de gases (CO_2 y NO_x) y partículas no es una cuestión de los usuarios o productores, pues no inciden en ella, sino que el responsable directo es el
25 fabricante del aparato o cámara de combustión. No obstante, de forma adicional, la reparación de dicha anomalía sí que compete al usuario o productor. Esto afecta no sólo a motores de explosión y calderas domésticas, sino también a centros de producción y transformación.

30

Preferiblemente, el dispositivo comprende una carcasa, que encierra los diferentes componentes del dispositivo, y en cuya parte exterior se muestra el teclado y la pantalla.

Breve descripción de los dibujos

En los dibujos adjuntos se ilustra, a título de ejemplo no limitativo, formas de realización del dispositivo objeto de la presente invención. En dichos dibujos:

5 la Fig. 1 es una vista esquemática en alzado frontal, que muestra un dispositivo según la presente invención, con sus conexiones particulares;

 la Fig. 2 es un diagrama de bloques que ilustra la composición interna del dispositivo de la Fig. 1; y

10 la Fig. 3 es una vista esquemática, que ilustra un modo alternativo de realización de la invención, de aplicación en automoción.

15 Descripción detallada de los dibujos

 En dichos dibujos puede verse que la constitución y modo del dispositivo para la medición de consumos energéticos y para el cálculo de parámetros ecológicos a partir de los consumos energéticos medidos, tanto directos como indirectos.

20 La función del dispositivo de la invención es medir el comportamiento o la conducta respetuosa con el medio ambiente de una "unidad consumidora de energía". La "unidad consumidora de energía" objeto de medida de las diferentes manifestaciones energéticas consumidas posibles puede ser: una vivienda, colectividad

25 (hotel, polideportivo, residencia, espacios deportivos, comercios, grandes almacenes, salas de ocio, edificios de oficinas y despachos, centros de la administración...), centros de transformación, talleres, almacenes, vehículos motorizados o medios de transporte ya sean particulares como públicos.

30 El fundamento de la operativa consistirá en la comparación del flujo energético básico real requerido por los usuarios para su confort por persona con los consumos normales de la normativa vigente amparada (por ejemplo en normas UNE, ISO, etc.) y/o los recomendados por las administraciones oficiales del lugar y/o datos estadísticos de consumos energéticos y residuos normales (a partir de ahora

“consumos tipo” englobando tanto flujos de consumos energéticos como residuos por persona o por unidad propia de una población determinada).

5 Para esta comparación, el sistema que se propone calculará un parámetro ecológico como una media ponderada de la suma de desviaciones de cada valor de consumo energético medido con respecto a su correspondiente valor de referencia.

10 Para ello, según puede verse en las Figs. 1 y 2, el dispositivo 1 de la presente invención está constituido por un aparato que tiene un cajero o carcasa 2, que incorpora los siguientes elementos:

15 un módulo de introducción de datos 3, que está dotado de entradas de valores de consumo energético E1, E2, E3, E4, de magnitudes, medidos en sendos y correspondientes aparato de medida C1, C2, C3, C4;

un teclado 6 de introducción de datos y de selección de menús, en particular de datos de producción de residuos;

20 unos medios de computación 4, que reciben los datos procedente del módulo de introducción de datos 3 y del teclado 6, y que están provistos de un procesador que incorpora un algoritmo de cálculo de un parámetro ecológico a partir los consumos energéticos medidos y de los datos introducidos; y

25 una pantalla de visualización 5, comunicada con los medios de computación (4), para dar a visualizar el parámetro ecológico calculado,

El aparato está dotado de una alimentación eléctrica 8, según puede verse en la Fig. 1.

30 Para la introducción de valores de producción de residuos se puede utilizar una de las entradas E4, digital o analógica, procedente de una báscula, o bien se puede introducir manualmente el o los valores a través del teclado 6

El dispositivo 1 puede complementarse con un módulo de entrada 90 de un

bus de datos 9 de una red domótica, y una entrada USB 70 para un bus de datos serie 7, o unos medios equivalentes.

5 En la Fig. 1 se muestra un dispositivo particularmente pensado para aplicación especial en edificación (vivienda, hotel, polideportivo, residencia, espacios deportivos, comercios, grandes almacenes, salas de ocio, edificios de oficinas y despachos, centros de la administración, centros de transformación, talleres, almacenes, etc.. La carcasa 2 comprende al menos las siguientes entradas.

10 una entrada de caudal de agua E1, procedente de un correspondiente primer caudalímetro de agua C1;

una entrada de caudal de gases o líquidos combustibles E2, procedente de un segundo caudalímetro de gases o líquidos combustibles C2;

una entrada de medida de potencia eléctrica E3, procedente de un contador o analizador de red eléctrica C3; y

15 una entrada de medida de peso de residuos E4 procedente de una báscula de pesaje de residuos C4,

a través de los correspondientes puertos.

20 El número de entradas estará adecuado a la complejidad de la instalación. Por ejemplo, una industria puede disponer de varios dispositivos de este tipo, cada uno de ellos asociado a una correspondiente sección o unidad de fábrica, almacenes, oficinas, etc.

25 En la Fig. 3 se muestra una realización particularmente ideada para la automoción, en que el dispositivo cuenta con una entrada de caudal de combustible E6, procedente de un caudalímetro C6 de combustible, asociado al depósito de combustible 15; y una entrada de caudal de gases de escape E5, procedente de un correspondiente caudalímetro C5 de gases de escape del sistema de escape 14 del
30 motor 13 de un vehículo automóvil 12. En este caso, los flujos de producción de residuos del vehículo automóvil se introducen manualmente por teclado, por ejemplo, residuos de goma de neumáticos, residuos de aceite del motor, residuos de líquido refrigerante, residuos de líquidos de circuitos cerrados y deshechos de metales.

El dispositivo tiene una entrada 10 para que, de forma opcional, se recoja la información procedente de un analizador de gases 11 (Fig. 3), para la medición de los niveles de emisión de gases y partículas. El dispositivo 1 compara el resultado
5 obtenido con los niveles admitidos por la normativa vigente.

El algoritmo de de los medios de computación 4 calcula el flujo energético básico total se obtiene mediante evaluación los flujos de las manifestaciones energéticas medidas E1, E2, E3, E4, E5, E6, etc., referido el número de personas que
10 disfrutan de la unidad a medir en cada trayecto. El algoritmo de cálculo integra todos los trayectos de un periodo de tiempo en tiempo a definir o el total acumulado

Cada flujo tiene una incidencia en el medio ambiente: el consumo de agua revierte en su aprovechamiento, el consumo de combustibles se asocia a las emisiones directas de CO₂, NOx ..., el consumo eléctrico de red a las emisiones indirectas de CO₂, NOx... y la producción de residuos con el impacto medioambiental indirecto, mediante la cantidad de papel, vidrio, materia orgánica, plásticos, aceites y grasas, cauchos, metales... expresada en kg que desecha la unidad por unidad
15 de tiempo y personas que disfrutan del confort de dicha unidad, para compararlo con consumos y residuos tipo. Estos datos, una vez tratados por el algoritmo, dan como resultado un parámetro ecológico (que aquí denominamos "ecocom"), que es la medida de la conducta respetuosa con nuestro medio ambiente, para dar "ecocoms" integrales o combinados o individuales de la unidad de confort o de producción.
20

25 En cuanto a la presentación de los resultados, de dicha comparación se obtiene el porcentaje de consumo energético real respecto a los consumos tipo, indicando si el comportamiento es respetuoso (igual a cero o superior o abusivo cuando es negativo. Ambas desviaciones se miden de forma porcentual. La unidad porcentual de cada flujo se denomina "ecocom" positivos, si el resultado es respetuoso
30 o negativos si no lo es. El algoritmo de todos los flujos nos da el "ecocom" integral de la unidad. Pudiendo darse dificultades para recibir todos los flujos, el algoritmo del ecómetro puede dar únicamente "ecocoms" de aprovechamiento de agua y/o emisión de gases directos y/o emisión de gases indirectos y/o producción de resi-

duos. También se pueden medir solo aquellos flujos que considere oportuno la administración pública a efectos de tributar *ecotasas*, evaluando un paquete específico (que se puede denominar "*ecocom administrativo*").

- 5 Los resultados se presentan de forma permanente en una pantalla 5, indicando en base a que periodos de tiempo se evalúa: el acumulado del día, de la semana, el mes... u otros como los consumidos por trayecto en el caso de vehículos. A efectos de conocer mejor el aprovechamiento energético, mediante un menú se puede visualizar los "ecocoms" (día, semana, mes..) de aprovechamiento de las
- 10 diferentes fuentes de energía en la pantalla o pasar a otras sucesivas con las emisiones directas, indirectas o producción de residuos.

Como se ha mencionado anteriormente si por dificultades de instalación sólo se calcula el consumo de uno o varios flujos, la pantalla permanente indica que se

15 trata de "ecocoms" individuales por fuente energética o de residuo, combinados o integrales.

En cuanto a la instalación de los diferentes aparatos de medida C1, C2 C3, C4, C5, C6, etc., el caudalímetro de agua C1, se sitúa aguas abajo del contador de

20 compañía y aguas arriba de la llave de vivienda, con la posibilidad de emitir impulsos o señal analógica o digital o luminosa. Lo mismo se aplica para C2, caudalímetro para gases o líquidos combustibles, para C3, equipo de medida eléctrico en el cuadro general de la unidad, para C5, en el caso de los gases de escape, y para C6, en el caso del caudal de combustible de un vehículo automóvil. Lo mismo cabe

25 decir para el flujo de producción de residuos E4 que procederá de una báscula C4. La emisión de información puede ser a su vez, alámbrica o inalámbrica. En el caso de que no exista la instalación los datos de flujos se pueden introducir manualmente mediante el teclado 6.

30 Algoritmo para el cálculo del parámetro ecológico.

Resulta de la media aritmética ponderada de todos los cocientes entre el valor absoluto de los flujos reales (E1, E2, E3, E4, E5, ...) entrantes en la unidad consumidora de energía" objeto de medida de las diferentes manifestaciones energéticas posibles, respecto a sus flujos o valores de referencia correspondientes. Se

toma el valor absoluto de los flujos reales debido a que el consumo entrante de energía es de signo contrario a un residuo, que indirectamente se asocia a otro consumo energético exterior; por eso, como interesa las contribuciones de cada factor, a efectos de que no se compensen entre ellas se toman todos en valor absoluto del flujo, no del cociente de flujos.

Se define:

10 1.- Flujo de una manifestación energética real entrante (E1, E2, E3, E4, E5, E6..., en general E_i): Como la cantidad de energía consumida por unidad de tiempo de esa manifestación energética, por usuario de la unidad que se mide. Así por ejemplo el agua potable consumida en una vivienda es un flujo energético por que se detrae de la naturaleza con un coste de transporte, de potabilización ... ; estos costes energéticos son costes medio ambientales que van asociados a esa agua consumida. El flujo de líquidos y gases combustibles consumidos es otro flujo energético entrante real asociado a las emisiones directas de CO₂ y otros a la atmósfera. El consumo de electricidad es otro flujo energético asociado a las emisiones indirectas de CO₂ y otros gases no deseados. Igualmente con los residuos, también son indicadores del impacto medio ambiental e indicadores indirectos de un gasto energético. Así por ejemplo también es un flujo energético entrante la cantidad de vidrio que desecharnos por idénticas razones, pero no el que adquirimos y permanece para desarrollo de la actividad en la unidad. Igualmente con el papel, la materia orgánica, los envases, los recambios procedentes de reparaciones, etc.

25 2.- Flujos tipo (C_t): Sería el consumo energético medio deseado o recomendable por la administración pública de la zona donde se desarrolla la actividad de cada unidad a medir. En su defecto, caso de no existir políticas medioambientales definidas por la administración se toman consumos y normalizados o datos estadísticos de consumos, tanto entrantes como consumo como salientes de residuo por habitante o por unidad de producción.

30 3.- Coeficiente de ponderación (C_{pd}): Cada cociente designa un porcentual de desviación respecto al consumo tipo de manifestación energética consumida. Pero no todos tienen la misma importancia atendiendo a:

5 3.1.- La costumbres en cuanto a consumos de la unidad. En ciertas regiones hay manifestaciones energéticas que poseen un peso importante por la proximidad del recurso, por precios subvencionados o por inexistencia de otras fuentes.... En estas situaciones hay que darle el peso específico adecuado que marque la administración o en su defecto los datos estadísticos. En el caso de un vehículo motorizado será despreciable el consumo de agua, pero no el de líquidos ó gases combustibles, el de residuos de aceites y grasas o el de residuos de cauchos, gomas y metales.

10 3.2.- Las políticas energéticas de la zona. Según la administración del lugar y atendiendo si a la medida de la conducta medioambiental se le asocia una tasa o tributo; hay que ponderar estos cocientes dependiendo lo que quiera primar o castigar la administración dichas desviaciones.

15 3.3.- Fines prácticos: Estos coeficientes pueden ser cero, por que la contribución de dicho consumo sea tan bajo que conviene despreciarlo, dado el coste que posee su medida. Por ejemplo la cantidad de residuos orgánicos de un ferrocarril eléctrico.

20 Los coeficientes ponderados están acotados entre 0 y 1.

Así, el parámetro ecológico (ó "ecocoms", en %), para "n" magnitudes de consumo energético o de residuos, se calcula aplicando la fórmula:

25
$$E_{ecocoms}(\%) = 1/n \sum_{i=1}^n (C_{pd} \times (1 - \frac{E_i}{p \cdot C_t}) \times 100.$$

30 De donde n es el número de fuentes de energía o variables de residuo medibles (con coeficiente de ponderación distinto de cero) y p la población que disfruta del confort de la unidad a medir.

Interpretación de los resultados.

35 El resultado es un tanto por ciento que en tanto se aproxima a cero el comportamiento es el deseable, si por el contrario es negativo y se aparta de cero, la

conducta de esa unidad no es respetuosa y la distancia al cero es el grado de lo que se aparta de la conducta deseada, por lo cual se puede penalizar y medir tal penalización. Por último, si es positivo la conducta es excelente y lo que se aparta del cero es la medida de su excelencia medioambiental.

5

El dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente, según la presente invención, puede utilizarse para el cálculo de un parámetro ecológico que puede servir de base para la aplicación de las denominadas *ecotasas* por parte de la administración.

10

REIVINDICACIONES

1.- Dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente de una unidad consumidora de energía,
5 caracterizado porque comprende

un módulo de introducción de datos (3), que está dotado a su vez por lo menos de una entrada de un valor de consumo energético (E1, E2, E3, E4, E5, E6) de una magnitud, medido en un correspondiente aparato de medida (C1, C2, C3, C4,
10 C5, C6) de la unidad consumidora de energía;

un teclado (6) de introducción de datos, en particular de datos de producción de residuos de la unidad consumidora de energía;

unos medios de computación (4) que reciben los datos procedente del módulo de introducción de datos (3) y del teclado (6), y que están provistos de un procesador que incorpora un algoritmo de cálculo de un parámetro ecológico, indicativa
15 del comportamiento respetuoso con el medio ambiente de la unidad consumidora de energía, a partir los consumos energéticos medidos y de los datos introducidos;
y

una pantalla de visualización (5), comunicada con los medios de computación (4), para dar a visualizar el parámetro ecológico calculado,
20

siendo dicho parámetro ecológico calculado como una media ponderada de la suma de desviaciones de cada valor de consumo energético medido con respecto a un valor de referencia.

25 2.- Dispositivo según la reivindicación 1, caracterizado porque comprende medios para la introducción de valores de producción de residuos.

3.- Dispositivo según la reivindicación 1, caracterizado porque comprende un módulo de entrada (90) de un bus de datos (9) de una red domótica.
30

4.- Dispositivo según la reivindicación 1, caracterizado porque comprende una entrada USB (70) para un bus de datos serie (7).

5.- Dispositivo según una cualquiera de las reivindicaciones anteriores, ca-

racterizado porque comprende por lo menos:

una entrada de caudal de agua (E1), procedente de un correspondiente primer caudalímetro de agua (C1);

una entrada de caudal de gases o líquidos combustibles (E2), procedente de un segundo caudalímetro de gases o líquidos combustibles (C2);

una entrada de medida de potencia eléctrica (E3), procedente de un contador o analizador de red eléctrica (C3); y

una entrada de medida de peso de residuos (E4) procedente de una báscula de pesaje de residuos (C4)

10

6.- Dispositivo según una cualquiera de las reivindicaciones 1 a 4, caracterizado porque comprende por lo menos:

una entrada de caudal de combustible (E6), procedente de un correspondiente caudalímetro (C6) de combustible del motor (13) de un vehículo automóvil (12); y

15

unos medios de introducción de la producción de residuos del vehículo automóvil, seleccionados de entre: residuos de goma de neumáticos, residuos de aceite del motor, residuos de líquido refrigerante, residuos de líquidos de circuitos cerrados y residuos metálicos,

20

para el cálculo del parámetro ecológico correspondiente al vehículo automóvil

25

7.- Dispositivo según una cualquiera de las reivindicaciones anteriores, caracterizado porque comprende además una entrada de caudal de gases de escape (E5), procedente de un correspondiente caudalímetro (C5) de gases de escape de un sistema de combustión de la unidad consumidora de energía; y un analizador de gases (11) para la medición de los niveles de emisión de gases y partículas de dicho sistema de combustión.

30

8.- Dispositivo según una cualquiera de las reivindicaciones anteriores, caracterizado porque comprende una carcasa (2), que encierra los diferentes componentes del dispositivo, y en cuya parte exterior se muestra el teclado (6) y la pantalla (5).

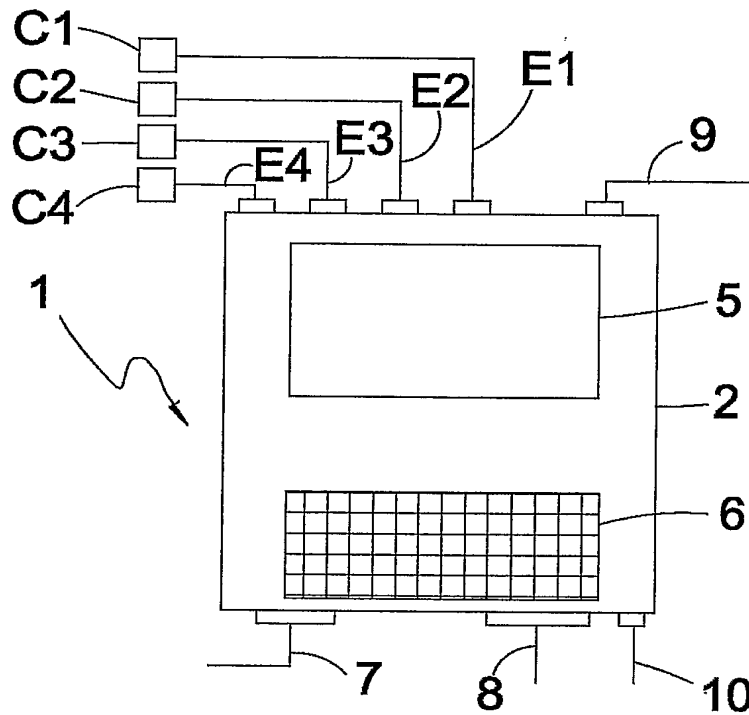


FIG. 1

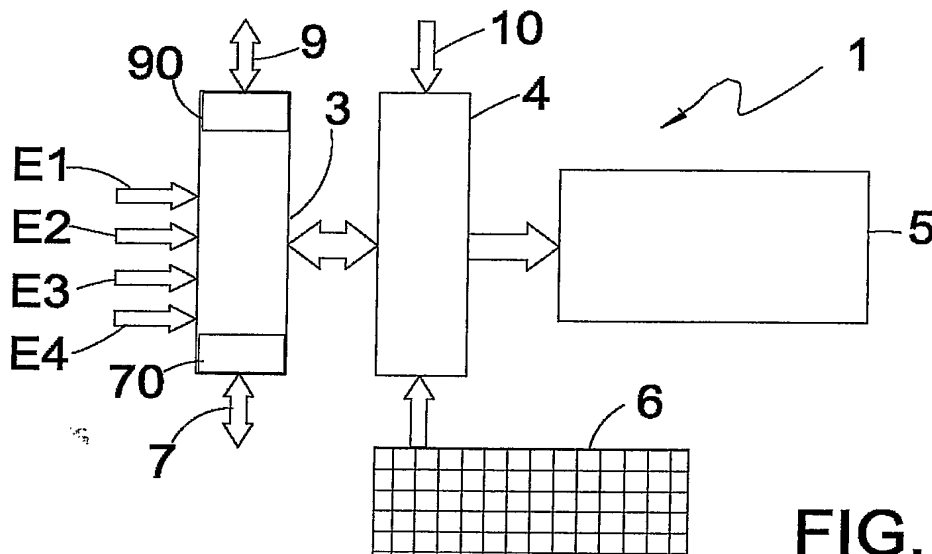


FIG. 2

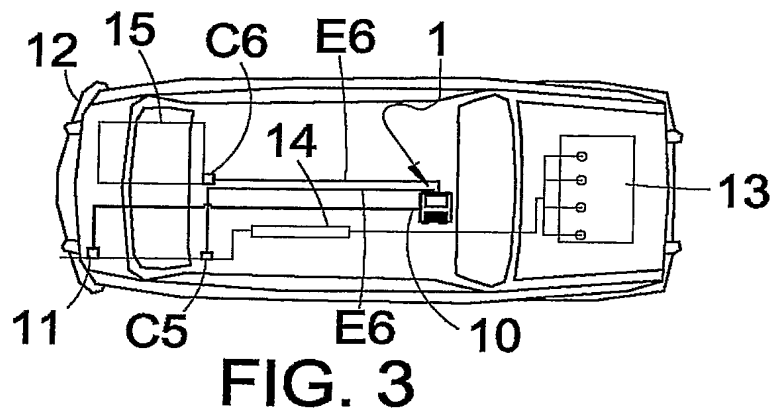


FIG. 3

RESUMEN

“Dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente de una unidad consumidora de energía”

5

Dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente de una unidad consumidora de energía. Comprende un módulo de introducción de datos (3), que está dotado a su vez por lo menos de una entrada de un valor de consumo energético (E1, E2, E3, E4, E5, E6) de una magnitud, medido en un correspondiente aparato de medida (C1, C2, C3, C4, C5, C6) de la unidad consumidora de energía; un teclado (6) de introducción de datos, medios de computación (4) que reciben los datos procedente del módulo de introducción de datos y del teclado, y que están provistos de un procesador que incorpora un algoritmo de cálculo de un parámetro ecológico, indicativa del comportamiento respetuoso con el medio ambiente de la unidad consumidora de energía, a partir los consumos energéticos medidos y de los datos introducidos; y una pantalla de visualización, comunicada con los medios de computación. El parámetro ecológico se calcula como una media ponderada de la suma de desviaciones de cada valor de consumo energético medido con respecto a un valor de referencia.

20

FIG. 1

PCT

Copia papel (NO para presentación)

VIII-1-1	Declaración: Identidad del inventor Declaración sobre la identidad del inventor (Reglas 4.17.i) y 51bis.1.a)ii):	respecto de esta solicitud internacional
	Nombre (APELLIDOS, Nombre) Dirección	MASO PORTABELLA, Alberto de C/Mossen Cinto Verdaguer N° 8, 2° 2ª 08349 España es el inventor del objeto para el que se solicita protección mediante esta solicitud internacional

PCT

Copia papel (NO para presentación)

VIII-2-1	Declaración: Derecho para solicitar y que sea concedida una patente Declaración sobre el derecho del solicitante, en la fecha de presentación internacional, para solicitar y que le sea concedida una patente (Reglas 4.17.ii) y 51bis.1.a)ii)), en caso de que no proceda la declaración según la Regla 4.17.iv): Nombre (APELLIDOS, Nombre)	respecto de esta solicitud internacional MASO PORTABELLA, Alberto tiene derecho a solicitar y a que le sea concedida una patente en virtud de lo siguiente:
VIII-2-1(i))		MASO PORTABELLA, Alberto de C/Mossen Cinto Verdaguer N° 8, 2° 2ª 08349 Cabrera de Mar España es el inventor del objeto para el que se solicita protección mediante esta solicitud internacional

PCT

Copia papel (NO para presentación)

VIII-4-1	Declaración: Calidad de inventor (sólo para la designación de los Estados Unidos de América) Declaración sobre la calidad de inventor (Reglas 4.17.iv) y 51bis.1.a)iv)) para la designación de los Estados Unidos de América:	Por este medio declaro que considero que soy el original, primer y único inventor (si hay un solo inventor indicado a continuación) o uno de los primeros inventores conjuntos (si se mencionan varios inventores a continuación) de la materia objeto de la reivindicación y para la cual se solicita una patente. Esta declaración se refiere a la solicitud internacional de que forma parte (si se presenta la declaración con la solicitud). Esta declaración se refiere a la solicitud internacional N° PCT/ (si se presenta la declaración según la Regla 26ter). Por este medio declaro que mi residencia, dirección postal y ciudadanía son los que se indican a continuación al lado de mi nombre. Por este medio declaro que he revisado y entiendo el contenido de la solicitud internacional que antecede, incluso las reivindicaciones de tal solicitud. He identificado en el petitorio de esa solicitud, conforme a la Regla 4.10, toda reivindicación de prioridad de una solicitud extranjera, y he identificado abajo, bajo el epígrafe "Solicitudes anteriores", mediante el número de solicitud, el país o el Miembro de la Organización Mundial del Comercio, el día, el mes y el año de presentación toda solicitud de patente o de certificado de inventor presentada en un país distinto de los Estados de América, incluida toda solicitud internacional PCT que designe al menos un país distinto de los Estados Unidos de América, cuya fecha de presentación sea anterior a la de la solicitud extranjera cuya prioridad se reivindica.
VIII-4-1-1	Solicitudes anteriores:	

PCT

Copia papel (NO para presentación)

		Por este medio reconozco el deber de divulgar información conocida por mí que fuere esencial con respecto a la patentabilidad según se define en el Título 37 del Código de Regulaciones Federales § 1.56, incluyendo lo relativo a las solicitudes de continuación en parte, la información esencial que se haya hecho accesible entre la fecha de presentación de la solicitud anterior y la fecha de presentación internacional PCT de la solicitud de continuación en parte. Por este medio manifiesto que todas las declaraciones hechas en la presente en base a mis propios conocimientos son verdaderas y que considero que son verdaderas todas las declaraciones hechas en base al mejor saber y entender; adicionalmente, manifiesto que dichas declaraciones se hicieron con el conocimiento de que las declaraciones falsas intencionales y similares son punibles por multa o encarcelamiento o ambas, conforme a la Sección 1001 del Título 18 del Código de Estados Unidos y que dichas declaraciones falsas intencionales pueden poner en peligro la validez de la solicitud o de cualquier patente concedida en virtud de la misma.
VIII-4-1-1-1	Nombre (APELLIDOS, Nombre)	MASO PORTABELLA, Alberto
VIII-4-1-1-2	Domicilio: (ciudad y estado (de los Estados Unidos de América), en su caso, o país)	Cabrera de Mar, España
VIII-4-1-1-3	Dirección postal:	C/Mossen Cinto Verdaguer N° 8, 2° 2ª 08349 Cabrera de Mar España
VIII-4-1-1-4	Ciudadanía:	ES
VIII-4-1-1-5	Firma del inventor: (La firma debe ser la del inventor, no la del mandatario)	/Alberto MASO PORTABELLA/
VIII-4-1-1-6	Fecha:	20 Julio 2009 (20.07.2009)



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
13/054,355	01/14/2011		490	53777-215226	16	3

CONFIRMATION NO. 5994

23643
BARNES & THORNBURG LLP
11 SOUTH MERIDIAN
INDIANAPOLIS, IN 46204

FILING RECEIPT



OC000000046106850

Date Mailed: 02/23/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Alberto Maso Portabella, Cabrera de Mar, SPAIN;

Power of Attorney: The patent practitioners associated with Customer Number 23643

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/IB2009/053135 07/20/2009

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)

SPAIN P200802159 07/18/2008

If Required, Foreign Filing License Granted: 02/18/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/054,355**

Projected Publication Date: 06/02/2011

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT

Preliminary Class

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
13/054,355	Alberto Maso Portabella	53777-215226
23643 BARNES & THORNBURG LLP 11 SOUTH MERIDIAN INDIANAPOLIS, IN 46204		
INTERNATIONAL APPLICATION NO. PCT/IB2009/053135		
I.A. FILING DATE		PRIORITY DATE
07/20/2009		07/18/2008

CONFIRMATION NO. 5994
371 ACCEPTANCE LETTER



Date Mailed: 02/23/2011

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office in its capacity as a Designated / Elected Office (37 CFR 1.495), has determined that the above identified international application has met the requirements of 35 U.S.C. 371, and is ACCEPTED for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above and the relevant dates are:

<u>01/14/2011</u>	<u>01/18/2011</u>
DATE OF RECEIPT OF 35 U.S.C. 371(c)(1), (c)(2) and (c)(4) REQUIREMENTS	DATE OF COMPLETION OF ALL 35 U.S.C. 371 REQUIREMENTS

A Filing Receipt (PTO-103X) will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE " FILING DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1), (c)(2) and (c)(4) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN ABOVE.** *The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363).* Once the Filing Receipt has been received, send all correspondence to the Group Art Unit designated thereon.

The following items have been received:

- Indication of Small Entity Status
- Copy of the International Application filed on 01/14/2011
- English Translation of the IA filed on 01/14/2011
- Copy of the International Search Report filed on 01/14/2011
- Preliminary Amendments filed on 01/14/2011
- Information Disclosure Statements filed on 01/14/2011
- Oath or Declaration filed on 01/14/2011
- Copy of references cited in ISR filed on 01/14/2011
- U.S. Basic National Fees filed on 01/14/2011
- Priority Documents filed on 01/14/2011

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

SHAKEEL AHMED

Telephone: (703) 756-1423



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/054,355	01/14/2011	Alberto Maso Portabella	53777-215226

CONFIRMATION NO. 5994

PUBLICATION NOTICE



OC000000048002477

23643
BARNES & THORNBURG LLP
11 SOUTH MERIDIAN
INDIANAPOLIS, IN 46204

Title:DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT

Publication No.US-2011-0130972-A1

Publication Date:06/02/2011

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Electronic Acknowledgement Receipt	
EFS ID:	10235501
Application Number:	13054355
International Application Number:	
Confirmation Number:	5994
Title of Invention:	DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT
First Named Inventor/Applicant Name:	Alberto Maso Portabella
Customer Number:	23643
Filer:	Bradford G. Addison/Ernest Carlson
Filer Authorized By:	Bradford G. Addison
Attorney Docket Number:	53777-215226
Receipt Date:	06-JUN-2011
Filing Date:	14-JAN-2011
Time Stamp:	10:17:19
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
------------------------	----

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	POA_20110606100628.pdf	79761	no	1
			ec23b9830a6c5435ea00db74120c78686813dab1		

Warnings:

Information:

Total Files Size (in bytes):	79761
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.	

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☒ Practitioners associated with the Customer Number: 23643

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone			Email

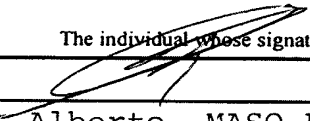
Assignee Name and Address:

Alberto MASO PORTABELLA
C. Mossen Cinto Verdaguér, 8, 2n. 2a.
E-08349 Cabrera de Mar ES

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	Feb 11, 2011
Name	Alberto MASO PORTABELLA	Telephone	
Title	Inventor		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/054,355	01/14/2011	Alberto Maso Portabella	53777-215226	5994
23643	7590	04/21/2014	EXAMINER	
Barnes & Thornburg LLP (IN)			LE, JOHN H	
11 S. Meridian Street			ART UNIT	
Indianapolis, IN 46204			PAPER NUMBER	
			2862	
			NOTIFICATION DATE	
			DELIVERY MODE	
			04/21/2014	
			ELECTRONIC	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

INDocket@btlaw.com

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Abstract

1. The abstract of the disclosure is objected to because of the form and legal phraseology often used in patent claims, such as "means" (line 8) should be avoided. (see MPEP section 608.01(b), form paragraph 6.16).

Claim Rejections - 35 USC § 112

2. The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 9 and 16 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claim 9 recites the limitation "the first power composition" in line 4. There is insufficient antecedent basis for this limitation in the claim.

As claim 16, a broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent

protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 16 recites the broad recitation of a method that comprising only one step which is the narrower statement of the range/limitation.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 9-16 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 9-15 are rejected under 35 U.S.C. 101 because the claimed invention is neither tied to a machine or apparatus, nor does it perform a transformation. As currently presented, the method steps in claim 9 recite method for (determining an ecological parameter), respectively and need not be performed by a specific machine. If these steps implicitly or explicitly do not require a machine to perform the steps, and if a

person can performing the process steps "receiving," "determining," and "outputting". Here it does fail, and must be fixed by adding the word "by a processor."

Based on recent Court decisions, it has been held that a § 101 process must (1) be tied to another statutory class (a particular machine or apparatus) or (2) transform underlying subject matter (such as an article or materials) to a different state or thing. Thus, to qualify as a § 101 statutory process, the claim should positively recite the other statutory class (the thing or product) to which it is tied, for example, by identifying the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example, by identifying the material that is being changed to a different state.

As such, claim 9 only recites method that include steps that could be purely mental and the claim does not in any way tie the process to another statutory class nor does the claim transform an article to a different state or thing. Such claims are therefore non-statutory under 35 U.S.C. 101.

Claims 10-15 do not remedy the deficiencies of the claims from which they depend, with respect to 35 USC 101.

Claim 16 appears to be non-statutory. It appears that they merely directed to a mathematical algorithm (MPEP 2106.02). Further, in order to be considered patent eligible under 35 USC 101, a claimed process must either result in a physical transformation or contain a sufficient tie to a machine, article of manufacture or a composition of matter. In re Comiskey, 84 USPQ2d 1670 (Fed. Cir. 2007). In this case, the claimed invention does not transform any subject matter and has no tie to any

machine, article of manufacture or a composition of matter. Such claim is therefore non-statutory under 35 U.S.C. 101.

Allowable Subject Matter

6. Claims 1-8 are allowed.
7. Claims 9-15 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 101 and overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art fails to teach the invention as claimed in independent claim 1, requiring in a device for measuring power consumption and performance with respect to the environment of a power-consuming unit , wherein a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to (a) receive the at least one power consumption value from the data introduction module, (b) receive the waste production data, (c) calculate an ecological parameter based on the at least one power consumption value and the waste production data, and (d) operate the display screen to display the calculated ecological parameter, wherein the calculated ecological parameter is an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value. It is these limitations as they are claimed in the combination with other limitations of claim,

which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Other Prior Art

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Ness et al. (US 2004/0117240 A1) disclose a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor (e.g. [0077]), cause the processor (end station 3) to (a) receive the at least one power consumption value from the data introduction module (e.g. [0094]-[0098], the system allows users of the end stations 3 to attempt to obtain environmental certification from the base station 1. The sustainability indicators are a measure of the operation of the entity in a particular environmental area. Thus for example, the sustainability indicators may include an indication of the amount of energy, such as electricity, consumed, or the amount of water consumed by the entity), (b) receive the waste production data (e.g. [0112]).

Contact Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN H. LE whose telephone number is (571) 272-2275. The examiner can normally be reached on M-Fri from 8:00am – 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sujoy K. Kundu can be reached on (571) 272-8586. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Application/Control Number: 13/054,355
Art Unit: 2862

Page 7

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John H Le/
Primary Examiner, Art Unit 2862
April 17, 2014

Notice of References Cited	Application/Control No. 13/054,355	Applicant(s)/Patent Under Reexamination MASO PORTABELLA, ALBERTO	
	Examiner JOHN H. LE	Art Unit 2862	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2004/0117240	06-2004	Ness et al.	705/010
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Receipt date: 01/14/2011

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

PTO/SB/08a (01-10)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number		13/054,355
Filing Date		01/14/2011
First Named Inventor	MASO PORTABELLA, Alberto	
Art Unit	2862	
Examiner Name	John Le	
Attorney Docket Number	53777-215226	

U.S.PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S.PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	WO2002/067152	WO		2002-08-29	CRC FOR SUSTAINABLE TOURISM PT		☐
If you wish to add additional Foreign Patent Document citation information please click the Add button								Add
NON-PATENT LITERATURE DOCUMENTS							Remove	
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. //J.L./

Receipt date: 01/14/2011 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13/054,355
	Filing Date		01/14/2011
	First Named Inventor	MASO PORTABELLA, Alberto	
	Art Unit		2862
	Examiner Name	John Le	
	Attorney Docket Number		53777-215226

	1	PCT International Search Report completed for PCT/IB2009/053135 2010-08-24	☐
If you wish to add additional non-patent literature document citation information please click the Add button Add			
EXAMINER SIGNATURE			
Examiner Signature	/John Le/		Date Considered 04/15/2014
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /J.L./

Electronic Acknowledgement Receipt	
EFS ID:	19592973
Application Number:	13054355
International Application Number:	
Confirmation Number:	5994
Title of Invention:	DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT
First Named Inventor/Applicant Name:	Alberto Maso Portabella
Customer Number:	23643
Filer:	Eric E. Williams/Garla Twyman
Filer Authorized By:	Eric E. Williams
Attorney Docket Number:	53777-215226
Receipt Date:	16-JUL-2014
Filing Date:	14-JAN-2011
Time Stamp:	11:58:38
Application Type:	U.S. National Stage under 35 USC 371

Payment information:					
Submitted with Payment			no		
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response_Under_37_C_F_R_1_111.pdf	35372	yes	8
			d55f0902bf8a0bdac9078c9edc7d14359918c523		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment/Req. Reconsideration-After Non-Final Reject	1	2
	Claims	3	5
	Applicant Arguments/Remarks Made in an Amendment	6	8
Warnings:			
Information:			
Total Files Size (in bytes):		35372	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			

BARNES & THORNBURG LLP

11 South Meridian Street
Indianapolis, Indiana 46204
(317) 236-1313
(317) 231-7433 Fax

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Customer No.:	23643	}	
		}	
Group:	2862	}	
		}	
Confirmation No.:	5994	}	
		}	
Application No.:	13/054,355	}	
		}	FILED ELECTRONICALLY
Invention:	DEVICE FOR MEASURING	}	
	CONSUMPTION AND	}	
	PERFORMANCE WITH	}	July 16, 2014
	RESPECT TO THE	}	
	ENVIRONMENT	}	
		}	
Inventor:	MASO PORTABELLA, Alberto	}	
		}	
Filed:	January 14, 2011	}	
		}	
Attorney Docket:	53777-215226	}	
		}	
Examiner:	Le, John H.	}	

RESPONSE UNDER 37 C.F.R. § 1.111

Mail Stop Amendment
Commissioner for Patents
P. O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

In response to the Office Action mailed April 21, 2014, Applicant request entry of the following amendments and consideration of the accompanying remarks.

Applicant believes that no fees are required with this response. However, if any fees are required, the Commissioner is hereby authorized to charge those fees to the

account of Barnes & Thornburg LLP, Deposit Account No. 10-0435, with reference to our matter 53777-215226.

Amendments to the Claims begin on page 3 of this paper.

Remarks begin on page 6 of this paper.

CLAIMS

A complete listing of the pending claims is provided pursuant to 37 C.F.R.

§ 1.121(c)(1). Please amend claims 9 and 16 as follows.

1. (Previously Presented) A device for measuring power consumption and performance with respect to the environment of a power-consuming unit comprising
 - a data introduction module, which receives at least one power consumption value, measured by a measurement apparatus of the power-consuming unit;
 - an input device for inputting waste production data;
 - a display screen; and
 - a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to
 - (a) receive the at least one power consumption value from the data introduction module,
 - (b) receive the waste production data,
 - (c) calculate an ecological parameter based on the at least one power consumption value and the waste production data, and
 - (d) operate the display screen to display the calculated ecological parameter, wherein the calculated ecological parameter is an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value.
2. (Previously Presented) The device of claim 1 further comprising a means for introducing values of waste production.
3. (Previously Presented) The device of claim 1 further comprising an input module of a data bus in a domotic network.
4. (Previously Presented) The device of claim 1 further comprising USB input for a serial data bus.
5. (Previously Presented) The device of claim 1 wherein the at least one power consumption value includes at least two power consumption values selected from the group of:
 - a water flow input from a corresponding first water flow meter;

a combustible gas and liquid flow input from a second combustible gas and liquid flow meter;

an electric power measurement input from a meter or analyser of electric mains; and

a waste weight measurement input from a scale for weighting wastes.

6. (Previously Presented) The device of claim 1 wherein the at least one power consumption value includes a fuel flow input from a corresponding flow meter from the motor of an automobile;

the waste production data corresponds to one of tire rubber wastes, motor oil wastes, coolant liquid wastes, closed circuit liquid wastes and metal wastes, and

the fuel flow input and the waste production data are used to calculate the ecological parameter corresponding to the automobile.

7. (Previously Presented) The device of claim 6 wherein the at least one power consumption value includes an exhaust gas flow input from a corresponding flow meter of exhaust gases of a combustion system of the automobile.

8. (Previously Presented) The device of claim 1 further comprising a shell, which encloses the different components of the device, and in whose external part is the input device and the display screen.

9. (Currently Amended) A method of determining an ecological parameter by a processor, comprising:

receiving a first power consumption value of the power consuming unit,

receiving a waste production data value,

determining an ecological parameter based on the first power ~~composition~~ consumption value and the waste production data value, and

outputting the determined ecological parameter for display on a display screen.

10. (Previously Presented) The method of claim 9, wherein the first power consumption value corresponds to one of water flow, combustible gas flow, and electric power flow.

11. (Previously Presented) The method of claim 10, wherein the waste production data corresponds to waste weight.

12. (Previously Presented) The method of claim 9, wherein the first power consumption value corresponds to one of fuel flow and exhaust gas flow.

13. (Previously Presented) The method of claim 12, wherein the waste production data corresponds to one of rubber wastes, oil waste, coolant liquid wastes, and metal.

14. (Previously Presented) The method of claim 9, further comprising generating a negative ecological parameter when a user expends more than a predetermined standard quantity of power consumed in a time period.

15. (Previously Presented) The method of claim 12, further comprising generating a positive ecological parameter when a user expends less than a predetermined standard quantity of power consumed in a time period.

16. (Currently Amended) [[A]] The method of claim 9, wherein the determining an ecological parameter is determined as a percentage, comprising:

~~determining an ecological parameter~~ based on an algorithm of the form

$$Parameter(\%) = 1/n \sum_{i=1}^n (Cpdx(1 - \frac{Ei}{p \cdot Ct}) \times 100$$

wherein “Ei” is a power quantity consumed in a time period,

“Ct” is a predetermined standard quantity of power consumed in the time period,

“Cpd” is a coefficient corresponding to the predetermined standard quantity of power consumed in the time period,

“n” is a sum of a number of measured power sources and waste variables, and

“p” is a number of users of the measured power sources and waste variables.

REMARKS

Claims 9 and 16 have been amended. Support for the amendments to claims 9 and 16 is found throughout the specification as filed, including the original claims.

Applicant acknowledges the Examiner's assertion on page 5 of the pending Office Action that pending claims 1-8 are allowed.

I. Objection to the Abstract

On page 2 of the pending Office Action, the Examiner has objected to the abstract of the captioned application. According to the Examiner, the abstract is objected to because its form includes "legal phraseology often used in patent claims, such as 'means' (line 8)."

For the Examiner's convenience, the abstract of the captioned application is as follows:

A device for measuring power consumption and performance relative to the environment of a power-consuming unit is disclosed. The device includes a data introduction module, a keyboard for inputting data of waste production in the power-consuming unit, a computing device, and a display screen. The computing device receives the data from the data introduction module and the keyboard. The computing device is also provided with a processor that includes a calculation algorithm of an ecological parameter indicative of the performance relative to the environment of the power-consuming unit. The ecological parameter is calculated as an *adjusted mean* of the sum of the deviations of each power consumption value with respect to a reference value.

(emphasis added).

Applicant respectfully traverses the Examiner's objection to the abstract. In particular, Applicant points out that the term "mean" as stated in the abstract is used according to its

mathematical definition (i.e., a quantity having a value intermediate between the values of other quantities, such as an average). Accordingly, the term “mean” as used in the abstract of the captioned application is not “legal phraseology often used in patent claims” as asserted by the Examiner. Instead, the term is simply used as a mathematical term synonym of “average.” Withdrawal of the objection to the abstract is respectfully requested.

II. Rejection of Claims 9 and 16 under 35 U.S.C. § 112, Second Paragraph (Indefiniteness)

The Examiner has rejected claims 9 and 16 under 35 U.S.C. § 112, second paragraph, asserting that the claims are indefinite. First, the Examiner contends that the recitation of the phrase “the first power composition” in claim 9 has insufficient antecedent basis. In response, Applicant has amended claim 9 to replace “the first power composition” with the phrase “the first power consumption.” Accordingly, claim 9 is not indefinite.

Second, the Examiner contends that claim 16 is indefinite because the claim includes the broad recitation of a method comprising only one step which is the narrower statement of the range/limitation. In response, Applicant has amended claim 16 to be dependent from independent claim 9. Accordingly, claim 16 is not indefinite.

In light of the amendments to claims 9 and 16, withdrawal of the rejection of claims 9 and 16 under 35 U.S.C. § 112, second paragraph, is respectfully requested.

III. Rejection of Claims 9-16 under 35 U.S.C. § 101

The Examiner has rejected claims 9-16 under 35 U.S.C. § 101, asserting that the claims are directed to non-statutory subject matter. With respect to independent claim 9, the Examiner indicates that the rejection under 35 U.S.C. § 101 could be overcome by amending the claim to specify that the method is performed “by a processor.” In response, Applicant has

amended independent claim 9 according to the Examiner's suggestion. Therefore, according to the Examiner's articulated reasoning, independent claim 9, as well as its dependent claims 10-15, is directed to statutory subject matter.

Furthermore, the Examiner asserts that claim 16 is directed to non-statutory subject matter because it is merely directed to a mathematical algorithm. In response, Applicant has amended claim 16 to make it depend from independent claim 9. Accordingly, the subject matter of amended claim 16 specifies how the method step of determining the ecological parameter is carried out due to its dependency from claim 9. Therefore, due to its dependence from amended independent claim 9, amended claim 16 is directed to statutory subject matter. Withdrawal of the rejection of claims 9-16 under 35 U.S.C. § 101 is respectfully requested.

CONCLUSION

The foregoing amendments and remarks are believed to fully respond to the Examiner's rejections. Applicant respectfully requests allowance of the claims, and passage of the application to issuance.

Respectfully submitted,
BARNES & THORNBURG LLP



Eric E. Williams
Attorney Reg. No. 61,302

EEW:glt
Indianapolis, Indiana
(317) 231-6410

Notice of Allowability	Application No. 13/054,355	Applicant(s) MASO PORTABELLA, ALBERTO	
	Examiner JOHN H. LE	Art Unit 2862	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed on 07/16/2014.
☐ A declaration(s)/affidavit(s) under 37 CFR 1.130(b) was/were filed on_____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-16. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:
a) ☐ All b) ☐ Some *c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)
1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☒ Examiner's Amendment/Comment
6. ☒ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/JOHN H LE/ Primary Examiner, Art Unit 2862	
--	--

The present application is being examined under the pre-AIA first to invent provisions.

Response to Amendment

1. Applicant's amendment filed on 07/16/2014 has been entered and carefully considered.

Claims 9 and 16 have been amended.

Examiner's Amendment

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In Claims:

9. (Currently Amended) A method of determining an ecological parameter by processor, comprising:

receiving a first power consumption value of ~~the~~ a power consuming unit,
receiving a waste production data value,
determining an ecological parameter based on the first power consumption value and the waste production data value, and
outputting the determined ecological parameter for display on a display screen.

Reasons for Allowance

3. Claims 1-16 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art fails to teach the invention as claimed in independent claim 1, requiring in a device for measuring power consumption and performance with respect to the environment of a power-consuming unit, wherein a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to (a) receive the at least one power consumption value from the data introduction module, (b) receive the waste production data, (c) calculate an ecological parameter based on the at least one power consumption value and the waste production data, and (d) operate the display screen to display the calculated ecological parameter, wherein the calculated ecological parameter is an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

The prior art fails to teach the invention as claimed in independent claim 9, requiring in a method of determining an ecological parameter by processor, wherein receiving a first power consumption value of a power consuming unit, receiving a waste production data value, determining an ecological parameter based on the first power consumption value and the waste production data value. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been

found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN H. LE whose telephone number is (571) 272-2275. The examiner can normally be reached on M-Fri from 8:00am – 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sujoy K. Kundu can be reached on (571) 272-8586. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John H Le/
Primary Examiner, Art Unit 2862
August 5, 2014



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

23643 7590 08/11/2014
Barnes & Thornburg LLP (IN)
11 S. Meridian Street
Indianapolis, IN 46204

EXAMINER

LE, JOHN H

ART UNIT PAPER NUMBER

2862

DATE MAILED: 08/11/2014

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

13/054,355 01/14/2011 Alberto Maso Portabella 53777-215226 5994

TITLE OF INVENTION: DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
-------------	---------------	---------------	---------------------	----------------------	------------------	----------

nonprovisional SMALL \$480 \$0 \$0 \$480 11/12/2014

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or **Fax** (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

23643 7590 08/11/2014
Barnes & Thornburg LLP (IN)
11 S. Meridian Street
Indianapolis, IN 46204

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

	(Depositor's name)
	(Signature)
	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/054,355	01/14/2011	Alberto Maso Portabella	53777-215226	5994

TITLE OF INVENTION: DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	11/12/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
LE, JOHN H	2862	702-019000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached. ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.	2. For printing on the patent front page, list (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 1 _____ 2 _____ 3 _____
--	--

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted: ☐ Issue Fee ☐ Publication Fee (No small entity discount permitted) ☐ Advance Order - # of Copies _____	4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above) ☐ A check is enclosed. ☐ Payment by credit card. Form PTO-2038 is attached. ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).
5. Change in Entity Status (from status indicated above) ☐ Applicant certifying micro entity status. See 37 CFR 1.29 ☐ Applicant asserting small entity status. See 37 CFR 1.27 ☐ Applicant changing to regular undiscounted fee status.	NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment. NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status. NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____
Typed or printed name _____ Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/054,355	01/14/2011	Alberto Maso Portabella	53777-215226	5994
23643	7590	08/11/2014	EXAMINER	
Barnes & Thornburg LLP (IN)			LE, JOHN H	
11 S. Meridian Street			ART UNIT	PAPER NUMBER
Indianapolis, IN 46204			2862	

DATE MAILED: 08/11/2014

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/054,355	01/14/2011	Alberto Maso Portabella	53777-215226	5994
23643	7590	09/19/2014	EXAMINER	
Barnes & Thornburg LLP (IN)			LE, JOHN H	
11 S. Meridian Street			ART UNIT	
Indianapolis, IN 46204			PAPER NUMBER	
			2862	
			NOTIFICATION DATE	
			DELIVERY MODE	
			09/19/2014	
			ELECTRONIC	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

INDocket@btlaw.com

Corrected Notice of Allowability	Application No. 13/054,355	Applicant(s) MASO PORTABELLA, ALBERTO	
	Examiner JOHN H. LE	Art Unit 2862	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed on 07/16/2014.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-16. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/oph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☒ All b) ☐ Some *c) ☐ None of the:

1. ☒ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)	5. ☐ Examiner's Amendment/Comment
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	7. ☐ Other _____
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____	

/JOHN H LE/
Primary Examiner, Art Unit 2862

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Priority

1. Receipt is acknowledged of certified copies of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

However, the filing date of the certified copy of foreign priority P200802159 is different with the filing date of the foreign priority in the Application Data Sheet.

Reasons for Allowance

2. Claims 1-16 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art fails to teach the invention as claimed in independent claim 1, requiring in a device for measuring power consumption and performance with respect to the environment of a power-consuming unit, wherein a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to (a) receive the at least one power consumption value from the data introduction module, (b) receive the waste production data, (c) calculate an ecological parameter based on the at least one power consumption value and the waste production data, and (d) operate the display screen to display the calculated ecological parameter, wherein the calculated ecological parameter is an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to

a reference value corresponding to the at least one power consumption value. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

The prior art fails to teach the invention as claimed in independent claim 9, requiring in a method of determining an ecological parameter by processor, wherein receiving a first power consumption value of a power consuming unit, receiving a waste production data value, determining an ecological parameter based on the first power consumption value and the waste production data value. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN H. LE whose telephone number is (571) 272-2275. The examiner can normally be reached on M-Fri from 8:00am – 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sujoy K. Kundu can be reached on (571) 272-8586. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John H Le/
Primary Examiner, Art Unit 2862
September 16, 2014

Electronic Acknowledgement Receipt	
EFS ID:	20335327
Application Number:	13054355
International Application Number:	
Confirmation Number:	5994
Title of Invention:	DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT
First Named Inventor/Applicant Name:	Alberto Maso Portabella
Customer Number:	23643
Filer:	Eric E. Williams/Garla Twyman
Filer Authorized By:	Eric E. Williams
Attorney Docket Number:	53777-215226
Receipt Date:	06-OCT-2014
Filing Date:	14-JAN-2011
Time Stamp:	14:18:49
Application Type:	U.S. National Stage under 35 USC 371

Payment information:					
Submitted with Payment			no		
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Corrected Notice of Allowance	Response_to_Corrected_Notice_of_Allowability.pdf	13755	no	2
			345af7d5cb5d2bd4578c111a8c0a8a2dd16a8881		
Warnings:					
Information:					

2	Application Data Sheet	Corrected_ADS.pdf	2257229 c292a411e6c41c412d267a0220fd6fad3dd9e77f	no	4
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
Total Files Size (in bytes):			2270984		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

BARNES & THORNBURG LLP

11 South Meridian Street
Indianapolis, Indiana 46204
(317) 236-1313
(317) 231-7433 Fax

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Customer No.:	23643	}	
		}	
Group:	2862	}	
		}	
Confirmation No.:	5994	}	
		}	
Application No.:	13/054,355	}	
		}	FILED ELECTRONICALLY
Invention:	DEVICE FOR MEASURING	}	
	CONSUMPTION AND	}	
	PERFORMANCE WITH	}	October 6, 2014
	RESPECT TO THE	}	
	ENVIRONMENT	}	
		}	
Inventor:	MASO PORTABELLA, Alberto	}	
		}	
Filed:	January 14, 2011	}	
		}	
Attorney Docket:	53777-215226	}	
		}	
Examiner:	Le, John H.	}	

RESPONSE TO CORRECTED NOTICE OF ALLOWABILITY

Mail Stop Publication
Commissioner for Patents
P. O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

A Corrected Notice of Allowability was mailed by the Office on September 19, 2014 regarding the captioned application. In the detailed action of the Corrected Notice of Allowability, the Examiner acknowledged receipt of certified copies of papers submitted under 35 U.S.C. § 119 for the captioned application. However, the Examiner indicated that the filing date on the certified copy of foreign priority (i.e., P200802159) was different than

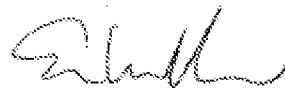
the filing date of the foreign priority listed on the Application Data Sheet (ADS) for the captioned application.

Applicants note that a Certified Copy of Foreign Priority Application was submitted to the Office on January 14, 2011 for the captioned application. The foreign priority application correctly indicated the filing date of the foreign priority as July 18, 2008. However, on the ADS submitted for the captioned application on January 14, 2011, the filing date of the foreign priority was incorrectly listed as July 18, 2010. Accordingly, Applicants submit herewith a Corrected ADS for the captioned application. The Corrected ADS specifies the filing date of the foreign priority application P200802159 is July 18, 2008.

Applicants respectfully point out that the filing date (July 18, 2008) of the foreign priority application P200802159 is correctly identified on the Filing Receipt of the captioned application, on the published application, and in the USPTO PAIR database. Accordingly, no further corrections regarding the filing date of the foreign priority appear to be necessary.

Applicants believe that no fees are required. However, if any fees are required, the Director is hereby authorized to charge any fees as necessary to the Barnes & Thornburg LLP Deposit Account No. 10 0435, with reference to matter 53777-215226.

Respectfully submitted,
BARNES & THORNBURG LLP



Eric E. Williams
Attorney Reg. No. 61,302

EEW:gl
Indianapolis, Indiana
(317) 231-6410

CORRECTED ADS

PTO/SB/14 (11-08)
Approved for use through 09/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	53777-215226
		Application Number	13/054,355
Title of Invention	DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Alberto		MASO PORTABELLA		
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Cabrera de Mar	Country Of Residence ⁱ	ES		
Citizenship under 37 CFR 1.41(b) ⁱ		ES			
Mailing Address of Applicant:					
Address 1		C. Mossen Cinto Verdaguer 8, 2n. 2a.			
Address 2					
City	Cabrera de Mar	State/Province			
Postal Code	E-08349	Country ⁱ	ES		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	23643		
Email Address	INDOCKET@BTLAW.COM	Add Email	Remove Email

Application Information:

Title of the Invention	DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT		
Attorney Docket Number	53777-215226	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	1	Suggested Figure for Publication (if any)	1

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	53777-215226
	Application Number	13/054,355
Title of Invention	DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	23643		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	a 371 of international	PCT/IB2009/053135	2009-07-20

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button. Add

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

			Remove
Application Number	Country i	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
P 200802159	ES	~~2010-07-18~~ 2008-07-18	☒ Yes ☐ No

Additional Foreign Priority Data may be generated within this form by selecting the Add button. Add

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1	Remove
------------	--------

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	53777-215226		
		Application Number	13/054,355		
Title of Invention	DEVICE FOR MEASURING CONSUMPTIONS AND THE RESPECTFUL PERFORMANCE WITH THE ENVIRONMENT				
If the Assignee is an Organization check here. ☐					
Prefix	Given Name	Middle Name	Family Name	Suffix	
Mailing Address Information:					
Address 1					
Address 2					
City			State/Province		
Country i			Postal Code		
Phone Number			Fax Number		
Email Address					
Additional Assignee Data may be generated within this form by selecting the Add button. Add					

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.					
Signature	~~Jeffrey T. G. KELSEY~~ Eric E. Williams			Date (YYYY-MM-DD)	~~2014-04-14~~ 2014-10-06
First Name	~~Jeffrey T. G.~~ Eric	Last Name	~~KELSEY~~ Williams	Registration Number	~~05090~~ 61302

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	20597733
Application Number:	13054355
International Application Number:	
Confirmation Number:	5994
Title of Invention:	DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT
First Named Inventor/Applicant Name:	Alberto Maso Portabella
Customer Number:	23643
Filer:	Eric E. Williams/Garla Twyman
Filer Authorized By:	Eric E. Williams
Attorney Docket Number:	53777-215226
Receipt Date:	04-NOV-2014
Filing Date:	14-JAN-2011
Time Stamp:	10:30:15
Application Type:	U.S. National Stage under 35 USC 371

Payment information:	
Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 480
RAM confirmation Number	8120
Deposit Account	100435
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. 1.492 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	Issue_Fee_Transmittal.pdf	152773	no	1
			8250a376638b56f12d9eb52d760a8e81f9def31a		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30478	no	2
			2be4897df2857103bde19564c0701468762cd713		
Warnings:					
Information:					
Total Files Size (in bytes):			183251		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. New Applications Under 35 U.S.C. 111 If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. National Stage of an International Application under 35 U.S.C. 371 If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. New International Application Filed with the USPTO as a Receiving Office If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or **Fax** (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23643 7590 08/11/2014
Barnes & Thornburg LLP (IN)
11 S. Meridian Street
Indianapolis, IN 46204

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/054,355	01/14/2011	Alberto Maso Portabella	53777-215226	5994

TITLE OF INVENTION: DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	11/12/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
LE, JOHN H	2862	702-019000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached. ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.	2. For printing on the patent front page, list (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.	1 <u>Barnes & Thornburg LLP</u> 2 _____ 3 _____
--	---	---

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted: ☒ Issue Fee ☐ Publication Fee (No small entity discount permitted) ☐ Advance Order - # of Copies _____	4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above) ☐ A check is enclosed. ☐ Payment by credit card. Form PTO-2038 is attached. ☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number <u>10-0435</u> (enclose an extra copy of this form).
---	---

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Eric E. Williams/ Date November 4, 2014
Typed or printed name Eric E. Williams Registration No. 61302

Electronic Patent Application Fee Transmittal				
Application Number:		13054355		
Filing Date:		14-Jan-2011		
Title of Invention:		DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT		
First Named Inventor/Applicant Name:		Alberto Maso Portabella		
Filer:		Eric E. Williams/Garla Twyman		
Attorney Docket Number:		53777-215226		
Filed as Small Entity				
U.S. National Stage under 35 USC 371 Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	2501	1	480	480
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				480



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/054,355	12/09/2014	8909482	53777-215226	5994
23643	7590	11/19/2014		
Barnes & Thornburg LLP (IN) 11 S. Meridian Street Indianapolis, IN 46204				

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 932 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Alberto Maso Portabella, Cabrera de Mar, SPAIN;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2018-07-23

Document Title - USPTO Communication Re: Maintenance Fee Reminder

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2019-01-14

Document Title - USPTO Communication Re: Expire Patent

**REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A
PATENT OR TRADEMARK (CON'D)**

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
6. US 6,347,680 B1	2/19/2002	MICHIGAN MOTOR TECHNOLOGIES LLC
7. US 6,561,166 B2	5/13/2003	MICHIGAN MOTOR TECHNOLOGIES LLC
8. US 6,988,031 B2	1/17/2006	MICHIGAN MOTOR TECHNOLOGIES LLC
9. US 6,612,287 B2	9/2/2003	MICHIGAN MOTOR TECHNOLOGIES LLC
10. US 7,487,761 B1	2/10/2009	MICHIGAN MOTOR TECHNOLOGIES LLC
11. US 6,644,115 B2	11/11/2003	MICHIGAN MOTOR TECHNOLOGIES LLC
12. US 6,581,574 B1	6/24/2003	MICHIGAN MOTOR TECHNOLOGIES LLC
13. US 6,609,497 B2	8/26/2003	MICHIGAN MOTOR TECHNOLOGIES LLC
14. US 6,571,157 B1	5/27/2003	MICHIGAN MOTOR TECHNOLOGIES LLC
15. US 6,736,122 B2	5/18/2004	MICHIGAN MOTOR TECHNOLOGIES LLC
16. US 6,757,149 B2	6/29/2004	MICHIGAN MOTOR TECHNOLOGIES LLC
17. US 7,116,081 B2	10/3/2006	MICHIGAN MOTOR TECHNOLOGIES LLC
18. US 8,909,482 B2	12/9/2014	MICHIGAN MOTOR TECHNOLOGIES LLC
19. US 6,557,540 B1	5/6/2003	MICHIGAN MOTOR TECHNOLOGIES LLC
20. US 6,345,604	2/12/2002	MICHIGAN MOTOR TECHNOLOGIES LLC

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2020-05-12

Document Title - USPTO Communication Re: Petition Requesting Trial

Electronic Acknowledgement Receipt	
EFS ID:	39442797
Application Number:	13054355
International Application Number:	
Confirmation Number:	5994
Title of Invention:	DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT
First Named Inventor/Applicant Name:	Alberto Maso Portabella
Customer Number:	23643
Filer:	Timothy Devlin/Pat Mathews
Filer Authorized By:	Timothy Devlin
Attorney Docket Number:	53777-215226
Receipt Date:	14-MAY-2020
Filing Date:	14-JAN-2011
Time Stamp:	14:50:38
Application Type:	U.S. National Stage under 35 USC 371

Payment information:					
Submitted with Payment			no		
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2020-05-14-USPN8909482-MMT-Transmittal-POA-as-filed.pdf	290441	yes	2
			4c5086b158b8a9884cb0c65c538d3cfd898be58b		

	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal Letter		1	1	
	Power of Attorney		2	2	
Warnings:					
Information:					
2	Assignee showing of ownership per 37 CFR 3.73	2020-05-14-USPN8909482-MMT-373c-Stmt.pdf	123737	no	3
			7ec67e4bd551f83481e9d8a6c9992caab40af0d4		
Warnings:					
Information:					
Total Files Size (in bytes):			414178		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE
REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	13/054,355
Filing Date	January 14, 2011
First Named Inventor	Alberto Maso Portabella
Title	DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT
Art Unit	2862
Examiner Name	LE, JOHN H
Attorney Docket Number	

SIGNATURE of Applicant or Patent Practitioner			
Signature	/Timothy Devlin/	Date (Optional)	2020-05-14
Name	Timothy Devlin	Registration Number	41706
Title (if Applicant is a juristic entity)	Attorney for Applicant		
Applicant Name (if Applicant is a juristic entity)	Michigan Motor Technologies LLC		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:



Practitioners associated with Customer Number:

163393

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number

Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:



The address associated with Customer Number:

163393

OR



Firm or individual name

Address

City

State

Zip

Country

Telephone

Email

Assignee name and address:
MICHIGAN MOTOR TECHNOLOGIES LLC
2380 ORCHARD LAKE ROAD, SUITE 100
SYLVAN LAKE, MICHIGAN 48320

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature *KC Brady*

Date 8/5/2019

Name Kevin Brady

Telephone 215 298 3164

Title Managing Member

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Michigan Motor Technologies LLC

Application No./Patent No.: Patent No.: 8,909,482 Filed/Issue Date: Issued: December 9, 2014

Titled: DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT

Michigan Motor Technologies LLC, a limited liability company

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

☐ The extent (by percentage) of its ownership interest is % . Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose one of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel , Frame , or for which a copy thereof is attached.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Alberto Maso Portabella To: Enrique Batalla-Farré, Antonio Cuevas-Cuadrado, Alejandro Planellas-Parera, José María Vidal-Puig

The document was recorded in the United States Patent and Trademark Office at Reel 046769 , Frame 0071 , or for which a copy thereof is attached.

2. From: Enrique Batalla-Farré, Antonio Cuevas-Cuadrado, Alejandro Planellas-Parera, José María Vidal-Puig To: Equitable IP Holdings, LLC

The document was recorded in the United States Patent and Trademark Office at Reel 048344 , Frame 0979 , or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: Equitable IP Holdings, LLC To: Mobile Automotive Technologies, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 048348, Frame 0432, or for which a copy thereof is attached.

4. From: To:

The document was recorded in the United States Patent and Trademark Office at
Reel, Frame, or for which a copy thereof is attached.

5. From: To:

The document was recorded in the United States Patent and Trademark Office at
Reel, Frame, or for which a copy thereof is attached.

6. From: To:

The document was recorded in the United States Patent and Trademark Office at
Reel, Frame, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.
[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Timothy Devlin/
Signature
Timothy Devlin
Printed or Typed Name

2020-05-14
Date
Reg. No. 41706
Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	39442919
Application Number:	13054355
Patent Number:	8909482
Confirmation Number:	5994
Petition Issued Date:	May 14,2020
Title of Invention:	DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT
First Named Inventor/Applicant Name:	Alberto Maso Portabella
Customer Number:	23643
Filer:	Timothy Devlin/Pat Mathews
Filer Authorized By:	Timothy Devlin
Attorney Docket Number:	53777-215226
Receipt Date:	14-MAY-2020
Filing Date:	14-JAN-2011
Time Stamp:	14:58:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 1800
RAM confirmation Number	E20205DE59197748
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition automatically granted by EFS	petition-request.pdf	32628	no	2
			a92ea752086b923c692c18e8e494ebf17069611a		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32053	no	2
			22c866ab8b691e8852d33be64e33646c7d03e0c8		
Warnings:					
Information:					
Total Files Size (in bytes):			64681		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. New Applications Under 35 U.S.C. 111 If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. National Stage of an International Application under 35 U.S.C. 371 If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. New International Application Filed with the USPTO as a Receiving Office If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))				
Patent Number	Issue Date	Application Number	Filing Date	Docket Number (if applicable)
8909482	09-Dec-2014	13054355	14-Jan-2011	
CAUTION: Maintenance fee (and surcharge, if any) payment must correctly identify: (1) the patent number and (2) the application number of the actual U.S. application leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).				
Applicants claims the following fee status:				
☒ Small Entity				
☐ Micro Entity				
☐ Regular Undiscounted				
Applicants selects the following :				
☒ 3 1/2		☐ 7 1/2		☐ 11 1/2
PETITION FEE The petition fee required by 37 CFR 1.17(m) (Fee Code 1558/2558) must be paid as a condition of accepting unintentionally delayed payment of the maintenance fee.				
MAINTENANCE FEE (37 CFR 1.20(e)-(g)) The appropriate maintenance fee must be submitted with this petition.				
STATEMENT THE UNDERSIGNED CERTIFIES THAT THE DELAY IN PAYMENT OF THE MAINTENANCE FEE TO THIS PATENT WAS UNINTENTIONAL				
PETITIONER(S) REQUEST THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT REINSTATED				
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES 37 CFR 1.378(c) states: "Any petition under this section must be signed in compliance with 37 CFR 1.33(b) ." I certify, in accordance with 37 CFR 1.4(d)(4) that I am				
☒ An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application. ☐ An attorney or agent registered to practice before the Patent and Trademark Office ☐ A sole patentee ☐ A joint patentee; I certify that I am authorized to sign this submission on behalf of all the other patentees as evidenced by the power of attorney in the application ☐ A joint patentee; all of whom are signing this e-petition ☐ The assignee of record of the entire interest that qualifies as an authorized party under 37 CFR 1.33(b)				

Attorney			
A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature			
Signature	/Timothy Devlin/		
Name	Timothy Devlin	Registration Number	41706

Electronic Patent Application Fee Transmittal				
Application Number:		13054355		
Filing Date:		14-Jan-2011		
Title of Invention:		DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT		
First Named Inventor/Applicant Name:		Alberto Maso Portabella		
Filer:		Timothy Devlin/Pat Mathews		
Attorney Docket Number:		53777-215226		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
MAINTENANCE FEE DUE AT 3.5 YEARS	2551	1	800	800
PET. DELAY PYMT MAINTAIN PATENT IN FORCE	2558	1	1000	1000
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1800



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

In re Patent No.	8909482	:
Issue Date:	December 9,2014	:
Application No.	13054355	:DECISION GRANTING PETITION
Filed:	January 14,2011	:UNDER 37 CFR 1.378(b)
Attorney Docket No.	53777-215226	:

This is a decision on the electronic petition, filed May 14,2020 ,under 37 CFR 1.378(b) to accept the unintentionally delayed payment of the 3.5 year maintenance fee for the above-identified patent.

The petition is **GRANTED**.

The maintenance fee is accepted, and the above-identified patent reinstated as of May 14,2020 . This decision also constitutes notice that the fee has been accepted. An electronic copy of the petition and this decision has been created as an entry in the Image File Wrapper. Nevertheless, petitioner should print and retain an independent copy.

Telephone inquiries related to this electronic decision should be directed to the Electronic Business Center at 1-866-217-9197.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/054,355	01/14/2011	Alberto Maso Portabella	53777-215226

CONFIRMATION NO. 5994

POA ACCEPTANCE LETTER



163393
Michigan Motor Tech
c/o Devlin Law Firm LLC
1526 Gilpin Ave.
Wilmington, DE 19806

Date Mailed: 05/19/2020

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/14/2020.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/zretta/



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/054,355	01/14/2011	Alberto Maso Portabella	53777-215226

23643
Barnes & Thornburg LLP (IN)
11 S. Meridian Street
Indianapolis, IN 46204

CONFIRMATION NO. 5994
POWER OF ATTORNEY NOTICE



Date Mailed: 05/19/2020

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/14/2020.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/zretta/

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VOLKSWAGEN GROUP OF AMERICA, INC.,
Petitioner,

v.

MICHIGAN MOTOR TECHNOLOGIES LLC,
Patent Owner.

IPR2020-00894
Patent 8,909,482 B2

Before NEIL T. POWELL, SCOTT B. HOWARD, and
SEAN P. O'HANLON, *Administrative Patent Judges*.

HOWARD, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

INTRODUCTION

A. Background and Summary

Volkswagen Group of America, Inc. (“Petitioner”) filed a Petition to institute an *inter partes* review of claims 1, 2, and 4–13 of U.S. Patent No. 8,909,482 B2 (Ex. 1001, “the ’482 patent”). Paper 2 (“Pet.”). Michigan Motor Technologies LLC (“Patent Owner”) filed a Patent Owner’s Preliminary Response. Paper 10 (“Prelim Resp.”).

We have authority, acting on the designation of the Director, to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). *Inter partes* review may not be instituted unless “the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2018). A decision to institute under 35 U.S.C. § 314 may not institute on fewer than all claims challenged in the Petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

After considering the Petition and the Preliminary Response, we determine, for the reasons set forth below, that Petitioner failed to demonstrate a reasonable likelihood that any of the challenged claims are unpatentable based on the grounds presented. Therefore, we do not institute *inter partes* review of any claims.

B. Real Parties in Interest

Petitioner identifies Volkswagen Group of America, Inc. and Volkswagen Aktiengesellschaft, which is the parent corporation of Volkswagen Group of America, Inc., as the real parties in interest. Pet. 3.

Patent Owner identifies Michigan Motor Technologies LLC as the real party in interest. Paper 3, 1 (Patent Owner's Mandatory Notices).

C. Related Matters

The parties state that the '482 patent was originally asserted in *Michigan Motor Technologies LLC v. Volkswagen AG*, Case No. 2:19-cv-10485 (E.D. Mich.). Pet. 3; Paper 3, 1. The parties further state that the '482 patent was not asserted in the Second Amended Complaint in that proceeding. Pet. 3; Paper 3, 1.

D. The '482 Patent

The '482 patent is entitled "Device for Measuring Power Consumption and Performance with Respect to the Environment of a Power-Consuming Unit" and is directed

to a device for measuring power consumptions and the respectful performance with the environment, from the measured power consumptions and from the residue production, in a power-consuming unit, a comfort unit (houses, communities, hotels and restaurants, spare time spaces, sport spaces, private and public motor vehicles, and goods vehicles, etc.) or a production unit.

Ex. 1001, code (54), 1:18–24. More specifically, the '482 patent is directed the calculation of an "ecological parameter" from the measurements of power consumptions (direct consumptions) and of residues and wastes generated (indirect consumptions)." *Id.* at 1:25–29.

According to the '482 patent,

The function of the device of the invention is to measure the respectful performance or behaviour with the environment of a "power-consuming unit". The "power-consuming unit" object of the measure of the possible different power manifestations consumed can be: a house, community (hotel, sports centre, residence, sport spaces, shops, department stores, leisure halls, office buildings and studies, administration centres, etc.),

transformation centres, garages, warehouses, motor vehicles or transportation means, private or public.

Ex. 1001, 3:3–12. The device operates by comparing “the basic actual power flow required by the user for their comfort with” a normal or typical consumption based on “current regulations (e.g. UNE, ISO standards, etc.) and/or those recommended by official administrations of the place and/or statistic data of normal power consumptions and wastes.” *Id.* at 3:13–21. The comparison is made by calculating “an ecological parameter as an adjusted mean of the sum of deviations of each value of power consumption measured with respect to its corresponding reference value.” *Id.* at 3:22–25. The ’482 patent states that the ecologic parameter (or ecocoms) is calculated applying the following formula:

$$Ecocoms(\%) = 1/n \sum_{i=1}^n (Cpdx \left(1 - \frac{Ei}{p \cdot Ct}\right) \times 100$$

where Ei is a measure of the flow of an actual input power statement, Ct is a measurement of preset flows, Cpd is an adjustment coefficient, “ n is the number of power sources or waste variables to be measured (with adjustment coefficient different from zero) and p the people who enjoy[] the comfort of the unit to be measured.” *Id.* at 5:27–6: 21.

E. Illustrative Claims

Claims 1 and 9 are independent claims and claim 1, reproduced below, is illustrative of the subject matter of the challenged claims.

1. A device for measuring power consumption and performance with respect to the environment of a power-consuming unit comprising

a data introduction module, which receives at least one power consumption value, measured by a measurement apparatus of the power-consuming unit;

an input device for inputting waste production data;
a display screen; and

a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to

(a) receive the at least one power consumption value from the data introduction module,

(b) receive the waste production data,

(c) calculate an ecological parameter based on the at least one power consumption value and the waste production data, and

(d) operate the display screen to display the calculated ecological parameter,

wherein the calculated ecological parameter is an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value.

Ex. 1001, 6:38–61

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1, 2, and 4–13 would have been unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. § ¹	Reference(s)/Basis
1, 2, 4, 5, 8	103(a)	Luff, ² Hill ³
6	103(a)	Luff, Hill, Zuta ⁴
7	103(a)	Luff, Hill, Zuta, Breton ⁵
9–11	103(a)	Luff
12, 13	103(a)	Luff, Zuta

Additionally, Petitioner relies upon the testimony of Glenn F. Bower, Ph.D. (Ex. 1003).

ANALYSIS

A. *Legal Standards*

In *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), the Supreme Court set out a framework for assessing obviousness under 35 U.S.C. § 103 that requires consideration of four factors: (1) the “level of ordinary skill in the pertinent art,” (2) the “scope and content of the prior

¹ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Because the ’482 patent claims the benefit of the filing date from an application filed before March 16, 2013, we apply the pre-AIA version of the statutory basis for unpatentability. *See* Ex. 1001.

² US 8,170,886 B2, issued May 1, 2012 (Ex. 1005). Petitioner argues that Luff is entitled to the benefit of the filing date of U.S. Provisional Application No. 61/040,466 (Ex. 1008). Pet. 17–19. Patent Owner did not address Luff’s effective filing date. *See generally* Prelim. Resp. Accordingly, for purposes of this Decision, we determine that Petitioner has satisfied its burden to show that Luff is entitled to the filing date of the Luff provisional patent application.

³ Hill, T., & Lewicki, P. (2006). *Statistics: Methods and Applications: A Comprehensive Reference for Science, Industry, and Data Mining*. Tulsa, OK: Statsoft (Ex. 1006).

⁴ US 2007/0262855 A1, published Nov. 15, 2007 (Ex. 1010).

⁵ US 6,148,656, issued Nov. 21, 2000 (Ex. 1007).

art,” (3) the “differences between the prior art and the claims at issue,” and (4) objective evidence of non-obviousness such as “commercial success, long-felt but unsolved needs, failure of others, etc.” *Id.* at 17–18. “While the sequence of these questions might be reordered in any particular case,” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 407 (2007), the U.S. Court of Appeals for Federal Circuit has “repeatedly emphasized that an obviousness inquiry requires examination of all four *Graham* factors and that an obviousness determination can be made only after consideration of each factor,” *Nike, Inc. v. Adidas AG*, 812 F.3d 1326, 1335 (Fed. Cir. 2016), *overruled on other grounds by Aqua Prods., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017) (en banc). We note that, with respect to the fourth *Graham* factor, the parties have not presented argument or evidence directed to objective evidence of nonobviousness. *See generally* Pet.; Prelim. Resp. The analysis below addresses the first three *Graham* factors.

B. Level of Ordinary Skill in the Art

Factors pertinent to a determination of the level of ordinary skill in the art include “(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.” *Envtl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). “Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case.” *Id.*

Petitioner, relying on the testimony of Dr. Bower, argues that a person having ordinary skill in the art “would have had a B.S. degree in Mechanical

or Electrical Engineering (or equivalent) with at least 1–2 years of academic or industry experience.” Pet. 11 (citing Ex. 1003 ¶¶ 50–52).

Patent Owner argues, without citing to any evidence, that a person having ordinary skill in the art would have either “(1) a B.S. in mechanical engineering or a closely related field with three or more years of experience in either programmable engine control systems or (2) at least a M.S. in mechanical engineering.” Prelim. Resp. 7.

Dr. Bower’s testimony is conclusory and does not identify the factual basis for his conclusion. Accordingly, we give it little weight. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). However, we give no weight to Patent Owner’s unsupported attorney argument. *See Elbit Sys. of Am., LLC v. Thales Visionix, Inc.*, 881 F.3d 1354, 1359 (Fed. Cir. 2018) (“‘[a]ttorney argument is not evidence’ and cannot rebut other admitted evidence” (quoting *Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017))); *Gemtron Corp. v. Saint-Gobain Corp.*, 572 F.3d 1371, 1380 (Fed. Cir. 2009) (unsworn attorney argument is not evidence). Accordingly, we adopt Petitioner’s description of the person having ordinary skill in the art, except that we delete the qualifier “at least” to eliminate vagueness as to the amount of practical experience. The qualifier expands the range indefinitely without an upper bound, and thus precludes a meaningful indication of the level of ordinary skill in the art.

C. Claim Construction

We construe claims “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b) (2019). Specifically, we apply the

principles set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc). Under that standard, the words of a claim are generally given their “ordinary and customary meaning,” which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *Phillips*, 415 F.3d at 1312–13.

Petitioner proposes construction of the terms “the calculated ecological parameter is an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value,” as recited in claim 1 and “means for introducing values of waste production,” as recited in claim 2. *See* Pet. 12–15

Patent Owner argues that “the claim terms be given their plain and ordinary meaning.” Prelim. Resp. 8.

Because no express construction is needed to resolve any dispute in this proceeding, we do not construe any of the claim limitations. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Luff and “Waste Production Data”

1. Summary of Luff

Luff is entitled “Systems, Methods, and Apparatus to Generate an Energy Consumption Index” and is directed “to the measurement of energy consumption and, more particularly, to systems, methods, and apparatus to generate an energy consumption index.” Ex. 1005, code (54), 1:14–16.

More specifically, Luff is directed to a system that collects resource consumption data, based on the activities of person(s) and/or household(s). *Id.* at 4:43–5:8. For example, as shown in Luff Figure 3 (not reproduced), a “Home Resource Consumption Measurement” (“HRCM”) is obtained by collecting energy consumption associated with various appliances. *Id.* at Fig. 3, 7:40–67. Additionally, the user can manually enter or adjust resource consumption information. *Id.* at 9:24–31.

2. “*Waste Production Data*”

Claim 1 of the ’482 patent recites “receive the *waste production data*” and “calculate an ecological parameter based on the at least one power consumption value and *the waste production data*.” Ex. 1001, 6:51–54 (emphasis added). Claim 9 recites substantially the same limitations: “receiving *waste production data*” and “determining an ecological parameter based on the at least one power consumption value and *the waste production data*.” *Id.* at 7:33–36 (emphasis added).

a) *Petitioner’s Arguments*

Petitioner argues Luff teaches receiving “waste production data” and using it to calculate an ecological parameter. *See* Pet. 36–38.⁶ Specifically, Petitioner argues Luff teaches inputting data on burning wood, and that a person having ordinary skill in the art “would have recognized that burning wood is a type of waste production because burning wood results in a waste produced (e.g., carbon emissions).” Pet. 36 (citing Ex. 1005, 9:21–31;

⁶ Petitioner relies on the same evidence and arguments for both claims 1 and 9. *See* Pet. 53–54 (relying on arguments for claim 1 for substantially the same limitations in claim 9). Accordingly, we will address Petitioner’s argument with respect to claim 1. However, our analysis is equally applicable to claim 9.

Ex. 1008 ¶ 42; Ex. 1003 ¶ 119). Petitioner further argues that “Luff also discloses accounting for the ‘energy required to dispose’ of different items, which a POSA would have understood to be waste produced (i.e., the claimed waste production data).” *Id.* (emphasis omitted) (citing Ex. 1005, 17:65–18:3). According to Petitioner, a person having ordinary skill in the art “would have understood that Luff discloses including waste production data in its calculation (which is received by the processor), or, at a minimum, would have found it obvious to include waste production data in Luff’s calculation to better account for the total environmental impact of the monitored entity.” *Id.* at 36–37 (citing Ex. 1003 ¶ 120).

Patent Owner does not address this limitation. *See generally* Prelim. Resp.

b) Our Analysis

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* reviews). Accordingly, even though Patent Owner did not address this limitation, the burden remains on Petitioner to demonstrate unpatentability and we must examine the evidence and arguments to ensure that Petitioner satisfies its burden to demonstrate a reasonable likelihood that it will prove a claim unpatentable. *See Dynamic Drinkware*, 800 F.3d at 1378.

Based on the current record, we are not sufficiently persuaded that Luff teaches or suggests “a processor” to “receive the waste production data” as recited in claim 1.

First, with regard to burning wood, Luff states:

The example HRCM device 302 and/or the example data collector 110 include a user interface to enter and/or adjust resource consumption information. Some types of resource consumption, such as for burning wood, is difficult for a machine to measure. The user interface allows a person 108 to input resource consumption measurements to the HRCM device 302 and/or the data collector 110 to log such resource consumption (e.g., 3 logs burned).

Ex. 1005, 9:21–31 (cited by Pet. 36). Although Luff refers to burning wood—which we agree produces waste—Luff neither suggests nor teaches any measurement of the waste produced. *See id.* Instead, Luff simply teaches inputting the material burned without any reference to waste *production* data. *See id.*

Second, with regard to Luff’s teaching of accounting for “energy required to dispose,” Luff states:

Other purchased items may have energy values calculated in a similar way or using any other method to determine the approximate energy associated with purchasing that item. For example, some purchased items may have energy values that are based on the energy required to dispose of or recycle them in addition to or as an alternative to the energy values described above.

Ex. 1005, 17:65–18:4. Luff also discusses a “personal energy consumption index,” calculated as the sum of “the home energy values, the transportation energy values, the out of home values, and the purchase energy values attributed to the person.” *Id.* at 22:20–24 (cited by Pet. 37). Although Luff mentions waste products, Petitioner has not sufficiently shown that Luff

teaches a processor that receives “waste production data.” *See, e.g., id.* at 17:65–18:4. Rather, placing the cited section in the context of the entire paragraph, Luff is simply discussing the energy value—the power consumption value—associated with an item. *See id.* at 17:47–18:4 (discussing the energy value of an item such as an apple). Petitioner has not sufficiently shown that this power consumption value is the same as waste production data—the amount of waste produced.

Third, we do not find Dr. Bower’s testimony persuasive. Dr. Bower’s testimony is substantially identical to the language in the Petition. *Compare* Ex. 1003 ¶ 119, *with* Pet. 36. Based on the facts of this case, Dr. Bower’s conclusory testimony without any explanation is not sufficient to demonstrate that Luff teaches a processor that “receives the waste production data.” *See Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 294 (Fed. Cir. 1985) (noting that the “[l]ack of factual support” for an expert opinion “may render the testimony of little probative value”).⁷

For the reasons explained above, the arguments and evidence presented in the Petition fail to provide sufficient reasoning and evidence to

⁷ With regard to dependent claim 6, Petitioner states that Luff teaches “[t]o transport the persons 108 in the vehicle 208, the vehicle 208 must consume resources such as fuel, engine fluids, and tire rubber. The consumed resources are measured and allocated to the persons 208 being transported in the vehicle.” Pet. 49 (emphasis omitted) (citing Ex. 1005, 5:51-56; Ex. 1008 ¶ 28). Because that evidence was not cited with regard to claim 1, it is not appropriate to consider it. However, even if we did consider it, because the cited section relates to accounting for “consume[d] resources” not waste production data, it is not sufficiently persuasive. *See* Ex. 1005, 5:51–61. That is, Luff teaches accounting for gas and other components that are consumed but are not waste products.

IPR2020-00894
Patent 8,909,482 B2

support Petitioner's contention that Luff teaches receive/receiving "waste production data" as recited in independent claims 1 and 9 and incorporated into dependent claims 2, 4–8, and 10–13. Therefore, the Petition has not demonstrated a reasonable likelihood of success in challenging claims 1, 2, and 4–13.

CONCLUSION

For the foregoing reasons, we determine that Petitioner has failed to show a reasonable likelihood that claims 1, 2, and 4–13 are unpatentable based on the grounds presented. Accordingly, we do not institute *inter partes* review of those challenged claims based on the current Petition.

ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314, no *inter partes* review is instituted as to any claim of the '482 patent.

IPR2020-00894
Patent 8,909,482 B2

PETITIONER:

Michael D. Specht
Jason A. Fitzsimmons
Daniel E. Yonan
Trevor M. O'Neill
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
mspecht-ptab@sternekessler.com
jfitzsimmons-ptab@sternekessler.com
dyonan-ptab@sternekessler.com
toneill-ptab@sternekessler.com

PATENT OWNER:

Timothy Devlin
Robyn T. Williams
DEVLIN LAW FIRM LLC
tdevlin@devlinlawfirm.com
rwilliams@devlinlawfirm.com

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2022-03-21

Document Title - Applicant Communication Re: Payment of Maintenance Fee,
8th Year, Large Entity

EXHIBIT 1



US006557540B1

(12) **United States Patent**
Mianzo et al.

(10) **Patent No.: US 6,557,540 B1**
(45) **Date of Patent: May 6, 2003**

(54) **METHOD OF CALCULATING A VALVE TIMING COMMAND FOR AN ENGINE**

(75) Inventors: **Lawrence A. Mianzo**, Plymouth, MI (US); **Brett D. Collins**, Ypsilanti, MI (US); **Ibrahim Haskara**, Brownstown, MI (US)

(73) Assignee: **Visteon Global Technologies, Inc.**, Dearborn, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/014,286**

(22) Filed: **Dec. 11, 2001**

(51) Int. Cl.⁷ **F01L 1/34**

(52) U.S. Cl. **123/678; 123/90.15; 701/103**

(58) Field of Search **123/678, 90.15, 123/90.19; 701/103**

(56) **References Cited**
U.S. PATENT DOCUMENTS

4,700,684 A 10/1987 Pischinger et al.

5,743,221 A 4/1998 Schmitz

5,752,491 A 5/1998 Schmitz et al.

6,053,137 A * 4/2000 Trzmiel et al. 123/90.17

6,196,174 B1 * 3/2001 Wada et al. 123/90.15

6,330,869 B1 * 12/2001 Yoshiki et al. 123/90.15

2001/0004884 A1 * 6/2001 Tachibana et al. 123/90.15

2001/0013324 A1 * 8/2001 Yoshizawa et al. 123/90.16

2002/0092488 A1 * 7/2002 Aoyama et al. 123/90.16

* cited by examiner

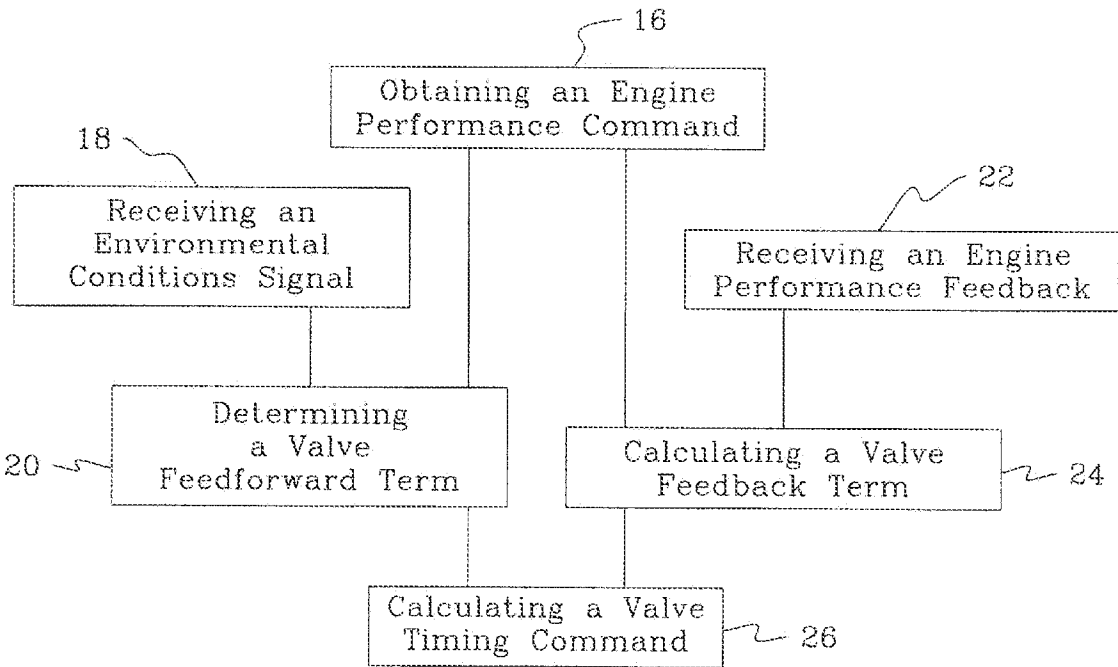
Primary Examiner—Erick Solis

(74) *Attorney, Agent, or Firm*—Brinks Hofer Gilson & Lione

(57) **ABSTRACT**

A method to calculate valve timing commands for an engine with variable valve timing is hereby disclosed. The method includes determining a valve feedforward term based on an engine performance command and an environmental conditions signal, calculating a valve feedback term based on the engine performance command and an engine performance feedback, and calculating a valve timing command based on the valve feedforward term and the valve feedback term.

16 Claims, 3 Drawing Sheets



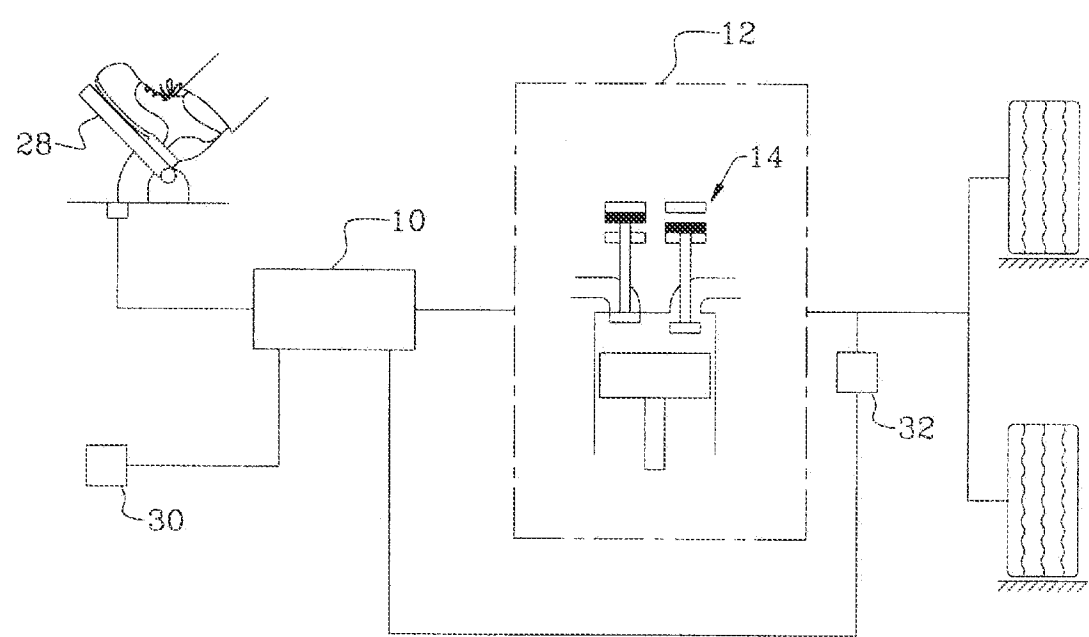


FIGURE 1

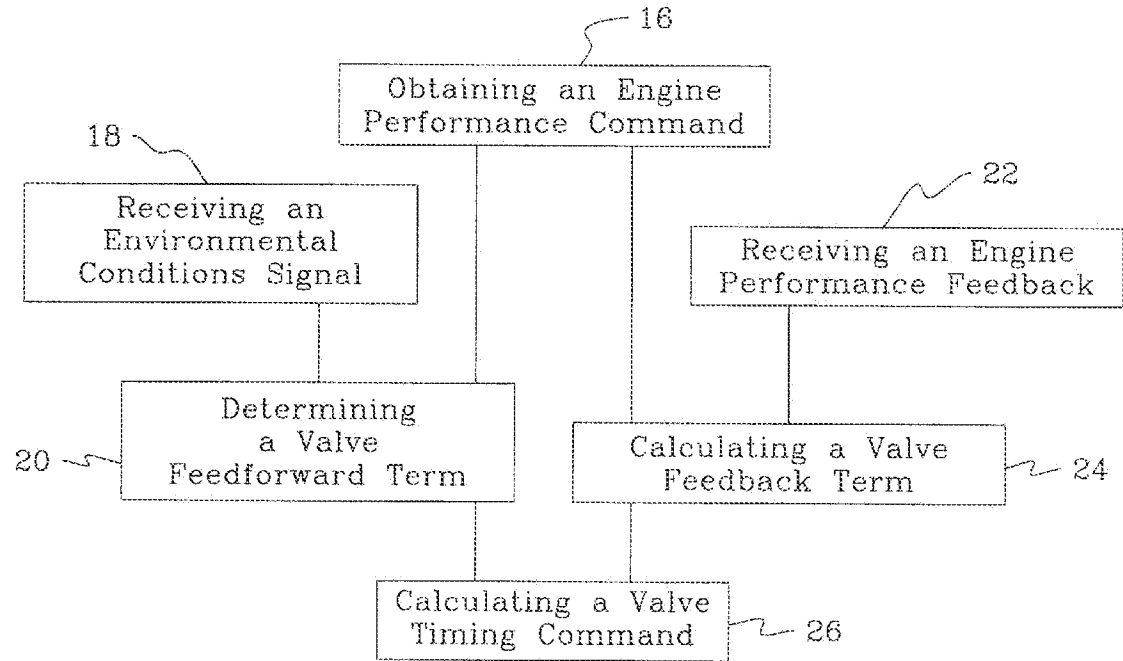


FIGURE 2

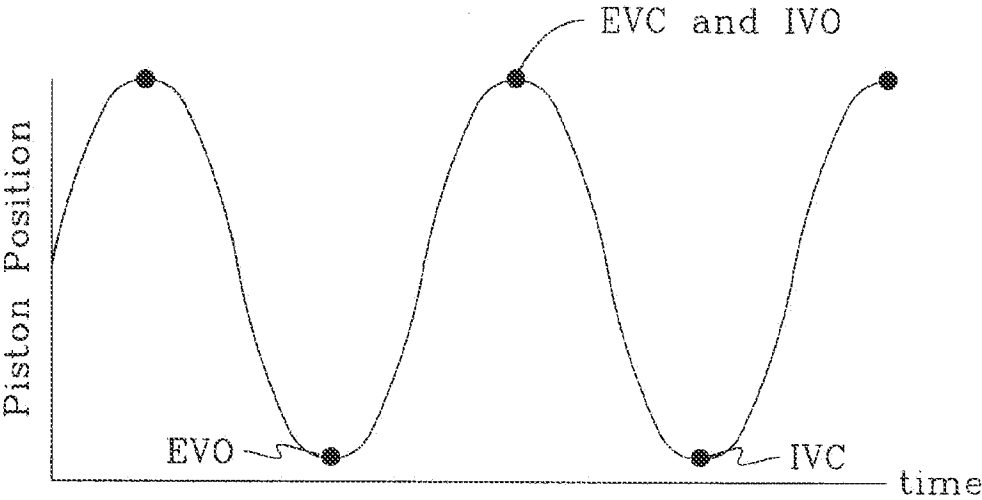


FIGURE 3A

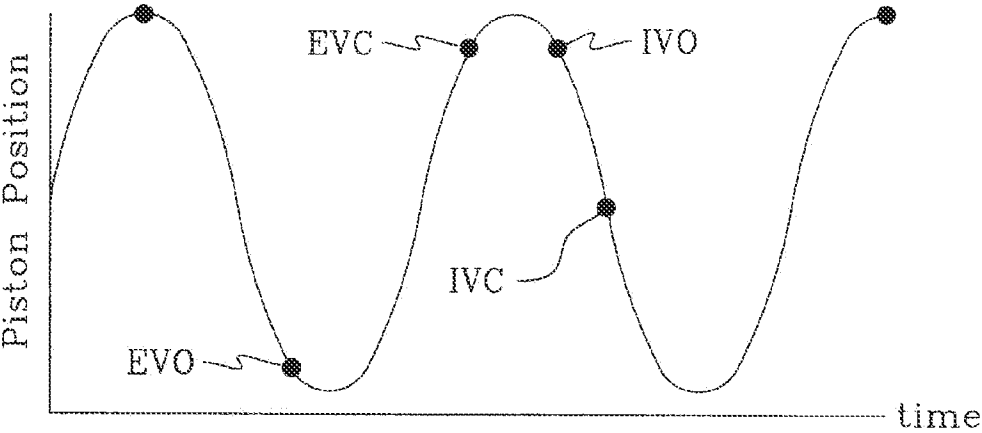


FIGURE 3B

US 6,557,540 B1

1

**METHOD OF CALCULATING A VALVE
TIMING COMMAND FOR AN ENGINE**

TECHNICAL FIELD

This invention relates generally to calculating commands for an engine and, more specifically, to calculating a valve timing command for an engine with variable timing valve actuators.

BACKGROUND

In gasoline engines of most vehicles, each cylinder of the engine cycles through four unique stages. In the first stage, an inlet valve opens and a piston draws air and fuel through the inlet valve and into the cylinder. The inlet valve closes and the piston reverses direction in the second stage to compress the air and fuel mixture. In the third stage, a spark combusts the mixture, which drives the piston (and powers the vehicle). An exhaust valve opens and the piston once again reverses direction, in the fourth stage, to push the combusted mixture through the exhaust valve and out of the cylinder.

The controlling of the inlet valve and the exhaust valve of each cylinder is a difficult task. The engine speed, which can exceed 6,000 rpm in most vehicles, dictates that the opening and closing of the inlet valve and the exhaust valve must be able to occur up to 50 times per second. In conventional engines, cams driven by the engine actuate the inlet valve and the exhaust valve. Modern research, however, has shown that fuel efficiency and power output of the engine may be optimized with an adjustment of the valve timing for a particular load on the engine. Some variable valve timing engines have been proposed, but the theoretical fuel efficiency and output power of these engines have not yet been reached.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is schematic of a vehicle having an engine controlled with the method of the preferred embodiment;

FIG. 2 is a flowchart of the method of the preferred embodiment; and

FIG. 3 is two timing charts of the valves of an engine.

**DESCRIPTION OF THE PREFERRED
METHODS**

The following description of the two preferred method of the invention is not intended to limit the invention to these preferred methods, but rather to enable any person skilled in the art of variable valve timing control to make and use this invention.

As shown in FIG. 1, the preferred method of the invention has been specifically created to be performed by a control unit 10 to calculate valve timing commands for an engine 12 with electromagnetic valve actuators 14. The method, however, may be performed by any suitable device to calculate valve timing commands for any suitable engine with any suitable variable timing valves.

As shown in FIG. 2, the preferred method of the invention has six principle actions: obtaining an engine performance command 16; receiving an environmental conditions signal 18; determining a valve feedforward term 20; receiving an engine performance feedback 22; calculating a valve feed-back term 24; and calculating a valve timing command 26 based on the valve feedforward term and the valve feedback

2

term. The method performed by the control unit may, of course, include other suitable actions before, during, or after these principle actions.

The action of obtaining an engine performance command 16 preferably includes receiving a vehicle performance command from a driver. Preferably, the vehicle performance command is received from the foot of a driver with the use of a conventional pedal 28, as shown in FIG. 1. Alternatively, the vehicle performance command could be received from the driver with the use of any suitable device. The action of obtaining an engine performance command also preferably includes deriving the engine performance command from the vehicle performance command. The engine performance command is preferably based on the vehicle performance command, but may alternatively be based on additional suitable factors, such as a traction control signal or a cruise control signal. The engine performance command is preferably a desired engine torque and, for this reason, the engine performance command may be thought of as an engine torque command. The engine performance command, however, may alternatively be another suitable variable, such as a desired engine acceleration.

The action of receiving an environmental conditions signal 18 preferably includes receiving an environmental conditions signal from an environmental sensor 30 in the vehicle. The environmental sensor 30 preferably senses the ambient temperature outside the vehicle and communicates this data to the control unit 10, which uses the data to determine the valve feedforward term. Other information, such as the ambient pressure, may be useful in the determination of the valve feedforward term. For this reason, the environmental sensor 30 may alternatively sense other suitable information. The environmental sensor 30 is preferably a conventional environmental sensor, but may alternatively be any suitable device.

Similarly, the action of receiving an engine performance feedback 22 preferably includes receiving the engine performance feedback from an engine sensor 32 in the vehicle. The engine sensor 32 preferably senses the engine speed and communicates this data to the control unit 10, which uses the data to determine the valve feedforward term and the valve feedback term. Other engine measurables, such as engine torque data, may be useful in the determination of the terms. For this reason, the engine sensor 32 may alternatively sense other suitable information. The engine sensor 32 is preferably a conventional engine sensor, but may alternatively be any suitable sensor.

The action of determining a valve feedforward term 20 preferably includes determining the valve feedforward term based on the engine torque command, the ambient temperature data, and the engine speed data. The determination, however, may be based on other suitable factors, such as engine torque data, air-fuel ratio data, engine combustion stability data, or ambient pressure data. The control unit 10 preferably includes a look-up table, which has been optimized for fuel efficiency, power output, and engine emissions based on various engine torque commands, various ambient temperature data, and various engine speed data (or engine torque data). The control unit 10 may alternatively be programmed to perform a real-time optimization of the fuel efficiency, power output, and engine emission (or any other suitable measurement) based on the engine torque command, the ambient temperature data, and the engine speed data (or any other suitable commands and measurables).

The action of calculating the valve feedback term 24 preferably includes comparing the engine performance com-

US 6,557,540 B1

3

mand and the engine performance feedback. By the definition of the term, the valve feedback term functions to compare the input with the output and to calculate a correction term based on the difference, if any. The comparison and the calculation are preferably accomplished by the control unit 10, but may alternatively be accomplished by a suitable separate device.

As shown in FIG. 3A, the position of the piston in the cylinder can be traced as a sinusoidal wave over a time period. The events of the opening of the exhaust valve ("EVO"), the closing of the exhaust valve ("EVC"), the opening of the inlet valve ("IVO"), and the closing of the inlet valve ("IVC") can be placed on this sinusoidal wave. As shown in FIG. 3B, the events of the EVO, the EVC, the IVO, and the IVC may be shifted within the time period (note that the shift in the EVC and the IVO preferably mirror each another, but may alternatively be separately controlled). The adjustment of the timing of the EVO, the EVC/IVO, and the IVC when used partially, separately, or together may provide the desired fuel efficiency, power output, and emissions from the engine 12 of the vehicle. The action of calculating a valve timing command 26 preferably includes calculating an EVO command, an EVC/IVO command, and an IVC command. The control unit 10, of course, may alternatively include other suitable parameters for the control of the variable timing valves.

The second preferred method of the invention includes the principle actions of the first preferred method and the additional principle action of receiving fuel conversion data and engine emissions data. These preferably include receiving the fuel conversion data and engine emissions data from suitable emission sensors (not shown) in the cylinder or the exhaust port of the engine 12. The emission sensors preferably sense the amount of NO_x in the exhaust and communicates this data to the control unit 10. The control unit 10 preferably uses this information to modify the output value from the look-up table, but may alternatively use this information to continually adjust the values in the look-up table. The control unit 10 may alternatively use this information as another factor in the determination of the valve feedback term. The emission sensors are preferably conventional emission sensors, but may alternatively be any suitable sensor.

As any person skilled in the art of variable valve engine control will recognize from the previous detailed description and from the figures and claims, modifications and changes can be made to the preferred methods without departing from the scope of this invention defined in the following claims.

We claim:

1. A method for calculating a valve timing command for an engine of a vehicle, comprising:
- obtaining an engine performance command;
 - receiving an environmental conditions signal;
 - determining a valve feedforward term based on the engine performance command and the environmental conditions signal;

4

- receiving an engine performance feedback;
- calculating a valve feedback term based on the engine performance command and the engine performance feedback; and
- calculating a valve timing command based on the valve feedforward term and the valve feedback term.

2. The method of claim 1 wherein said obtaining an engine performance command includes receiving a vehicle performance command from a driver of the vehicle and deriving the engine performance command based on the vehicle performance command.

3. The method of claim 1 wherein said receiving an environmental conditions signal includes receiving ambient temperature data.

4. The method of claim 3 wherein said determining a valve feedforward term includes determining the valve feedforward term based on the ambient temperature data.

5. The method of claim 4 wherein said determining a valve feedforward term includes determining the valve feedforward term based on the engine performance feedback.

6. The method of claim 5 wherein said determining a valve feedforward term includes referencing a look-up table with the engine performance command, the ambient temperature, and the engine performance feedback.

7. The method of claim 1 wherein said receiving an engine performance feedback includes receiving engine speed data.

8. The method of claim 1 wherein said obtaining an engine performance command includes obtaining an engine torque command; and wherein receiving an engine performance feedback includes receiving engine torque data.

9. The method of claim 8 wherein calculating a valve feedback term includes calculating a valve feedback term based on the engine torque command and the engine torque data.

10. The method of claim 1 wherein said calculating a valve timing command includes calculating an EVO command, an EVC/IVO command, and an IVC command.

11. The method of claim 1 further comprising receiving fuel conversion data.

12. The method of claim 11 wherein said determining a valve feedforward term includes determining a valve feedforward term based on the fuel conversion data.

13. The method of claim 11 wherein said calculating a valve feedback term includes calculating a valve feedback term based on the fuel conversion data.

14. The method of claim 1 further comprising receiving engine emissions data.

15. The method of claim 14 wherein said determining a valve feedforward term includes determining a valve feedforward term based on the engine emissions data.

16. The method of claim 11 wherein said calculating a valve feedback term includes calculating a valve feedback term based on the engine emissions data.

* * * * *

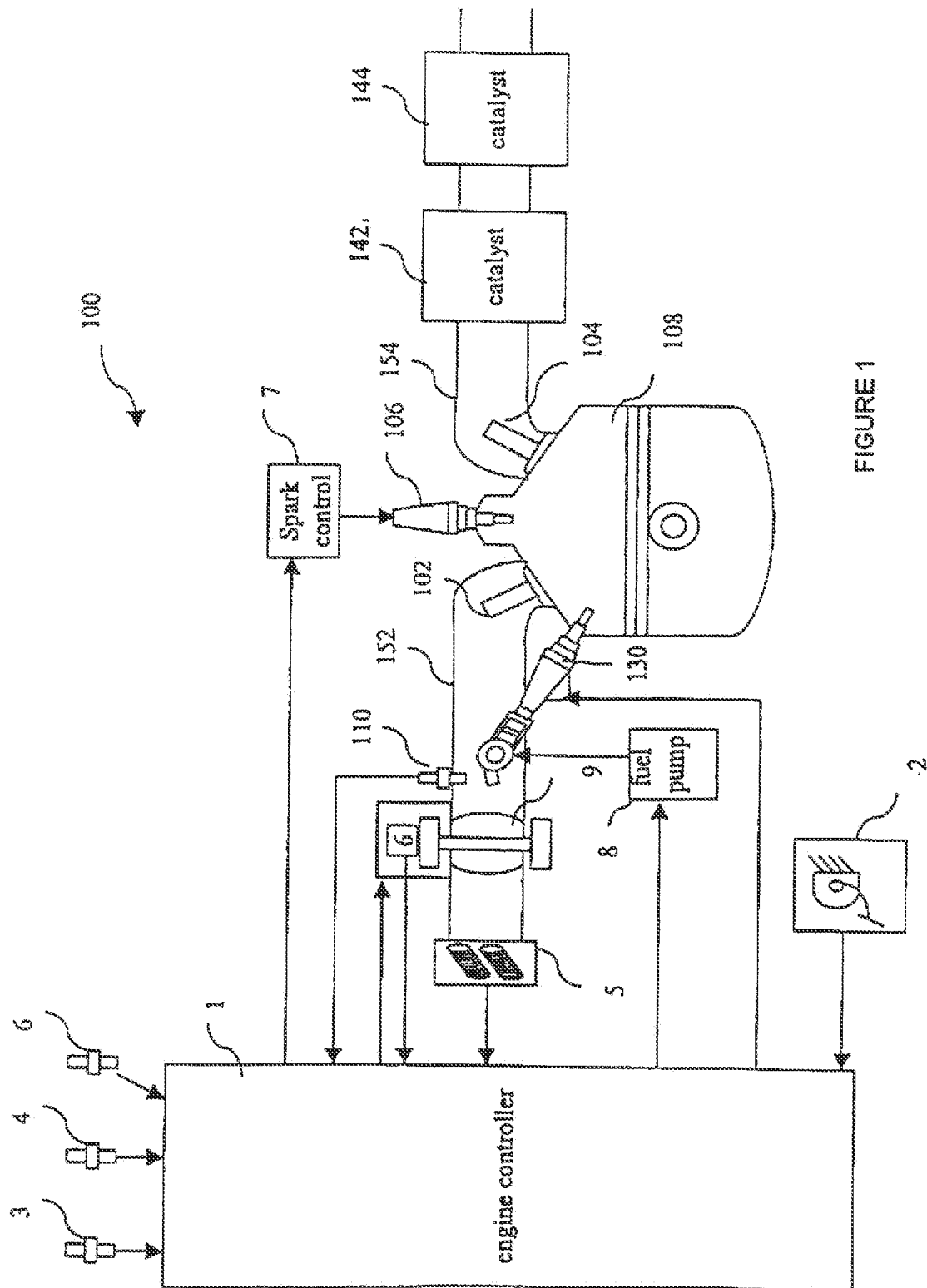
EXHIBIT 3

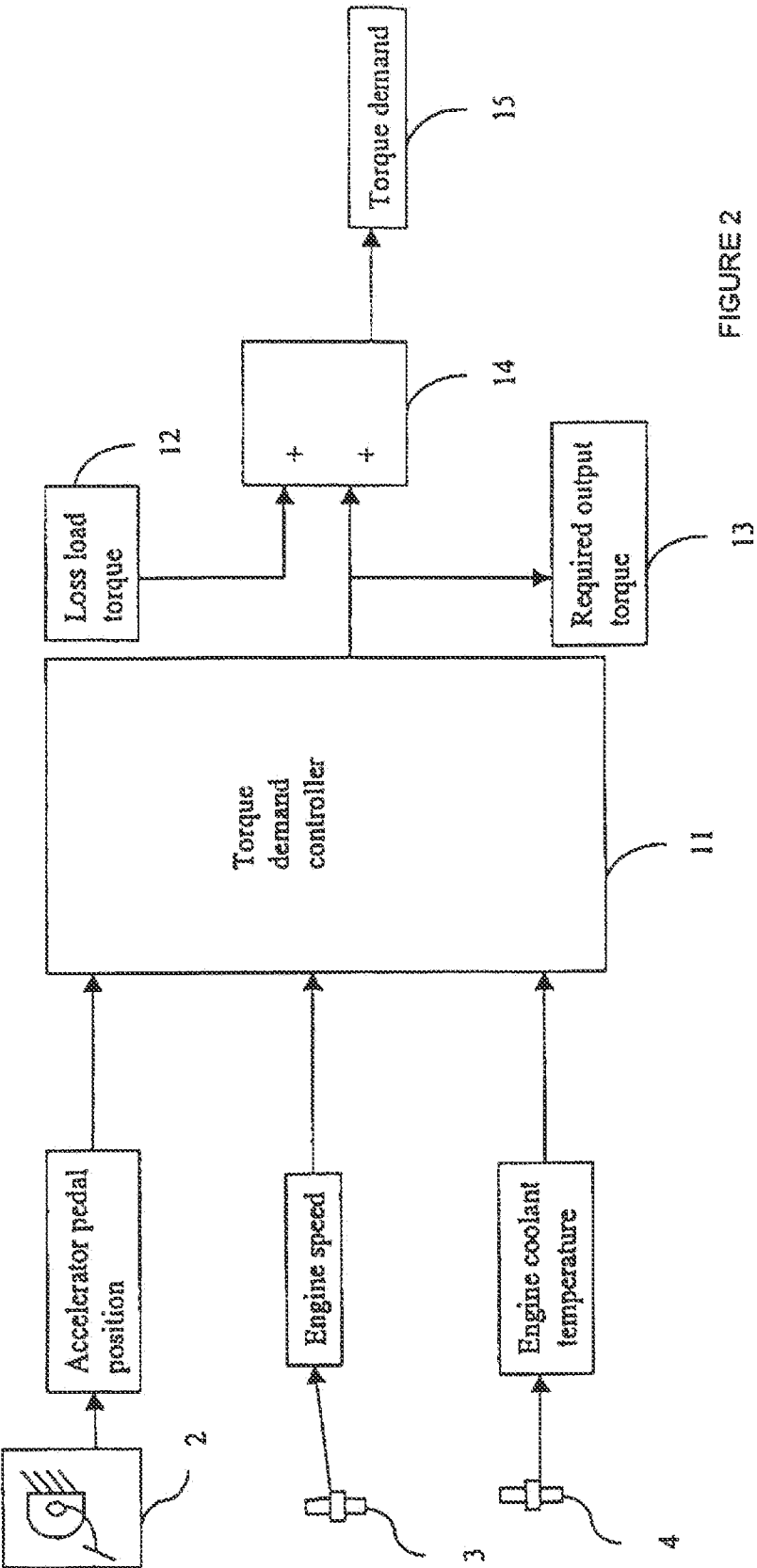
U.S. Patent

Jun. 24, 2003

Sheet 1 of 3

US 6,581,565 B2





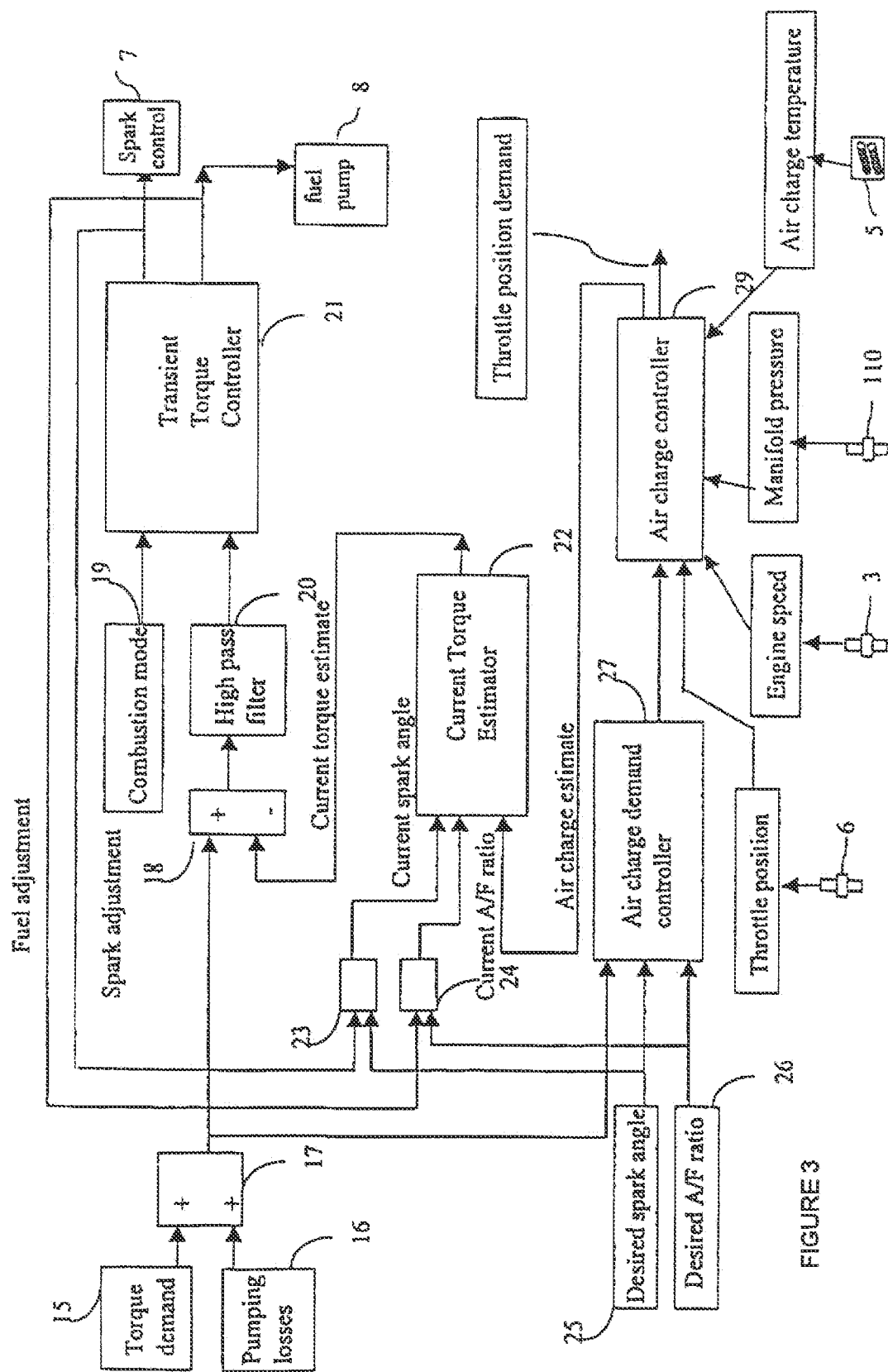


FIGURE 3

US 6,581,565 B2

1

ENGINE TORQUE CONTROLLER

TECHNICAL FIELD

This invention relates to an engine torque controller for spark ignition internal combustion engines and more specifically for direct injection engines.

BACKGROUND

An engine torque controller is comprised of a torque demand controller and a torque producer. The torque demand controller determines a required target torque, in accordance with an accelerator pedal position, current engine speed, external loads and other factors. This determined torque is then used by the torque producer to produce the desired torque by controlling the spark angle and the air/fuel ratio.

Direct Injection Spark Ignition (DISI) engines inject fuel directly into cylinders where it is ignited by a spark from a spark plug. DISI engines operate in a stratified mode or a homogenous mode. When a DISI engine is in the stratified mode, the combustion chambers contain stratified layers having different air/fuel mixtures. The strata closest to the spark plug contains a stoichiometric mixture, which is a mixture in which the exact amount of air to combust the amount of fuel is present, i.e. when the combustion leaves no excess oxygen or unburned fuel. Subsequent strata contain progressively leaner mixtures. Operation in a stratified mode occurs at lower speeds and lower load conditions.

When the engine is in a homogenous mode, a homogenous mixture of air and fuel is introduced into the combustion chamber. Homogenous operation may be either lean of stoichiometry (i.e. higher air/fuel ratio), at stoichiometry, or rich of stoichiometry (i.e. lower air fuel ratio).

In engine torque controllers for DISI engines, when the engine is operating in stratified mode, spark angle has little influence on the torque produced. The torque producer modifies the air/fuel in order to control the torque produced. Conversely, when the engine is operating in homogenous mode, the air/fuel ratio is controlled tightly in order to maintain correct operation of the catalytic converter to reduce noxious emission. The torque producer modifies the timing of the spark ignition in order to control the torque produced.

A problem occurs in either of these modes of operation when there is a steady state error between the torque demanded and the estimate of the torque produced. In the stratified mode if a fuel adjustment occurs due to such a steady state error then the air/fuel ratio will not be ideal and fuel economy will suffer and performance of the catalytic converter will deteriorate. In the homogenous mode, if the timing of the spark ignition is altered due to such a steady state torque error then the fuel economy will once again suffer and the engine is more likely to stall when a load is imposed. Therefore, there is a need for a method of correction for a steady state error between the torque demanded and an estimate of the torque produced.

SUMMARY

In a preferred embodiment, the engine is a direct injection spark ignition engine and the transient torque controller is arranged to receive a combustion mode signal indicating whether the engine is operating in a stratified mode or a homogenous mode. If the signal indicates that the engine is operating in the stratified mode then the fuel and spark

2

controller is arranged to control the fuel adjustment signal. If the signal indicates that the engine is operating in the homogeneous mode then the fuel and spark controller is arranged to control the spark adjustment signal.

Preferably, the controller also has an air charge controller arranged to receive an air charge demand signal, a throttle position signal, an engine speed signal, a manifold pressure signal and an air charge temperature signal and arranged to output the estimated air charge signal. Preferably, there is also an air charge demand controller arranged to receive the desired torque signal, a desired spark angle signal and a desired air/fuel ratio signal and to output the air charge demand signal.

According to another aspect of the invention, there is provided a method of controlling torque for an engine. The method includes estimating a current torque signal in dependence upon a received current spark angle signal, a received current air/fuel ratio signal and a received estimated air charge signal, comparing the estimated current torque signal with a desired torque signal to provide a difference signal, and filtering low frequency components from the difference signal. Finally, controlling a fuel adjustment signal and a spark adjustment signal in dependence upon the filtered difference signal.

These and other aspects and advantages of the present invention will become apparent upon reading the following detailed description of the invention in combination with the accompanying figures.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a block diagram illustrating part of an engine and an engine controller, in accordance with the present invention;

FIG. 2 is a block diagram of a torque demand controller, in accordance with the present invention; and

FIG. 3 is a block diagram of a torque producer, in accordance with the present invention.

DETAILED DESCRIPTION

FIG. 1 illustrates an embodiment of a direct injection spark ignition engine 100 which has an engine controller 1. The engine controller 1 receives signals from an accelerator pedal and sensor assembly 2, an engine speed sensor 3, an engine temperature sensor 4, an air charge temperature sensor 5, a manifold absolute pressure sensor 110 and a throttle position indicator 6.

A fuel injector 130 injects fuel directly into a combustion chamber 108. The injected fuel mixes with an air charge which enters through an air intake valve 102 via an air intake manifold 152. The air charge is controlled by a throttle 9 and the fuel injected is controlled by a fuel pump 8. A spark control unit 7 controls a spark plug 106, to generate a spark for ignition of the air/fuel mixture. Exhaust gases from the resulting combustion exit via an exhaust valve 104 into an exhaust manifold 154. The exhaust manifold 154 has a three way catalytic converter 142 and a Nox trap/catalyst 144.

FIG. 2 illustrates an embodiment of a torque demand controller 11 that is part of the engine controller 1. The torque demand controller 11 calculates a required output torque signal 13, based on an accelerator pedal position signal received from the accelerator pedal and sensor assembly 2, an engine speed signal received from the engine speed sensor 3 and an engine temperature signal received from the engine temperature sensor 4. A loss load torque signal 12, which represents losses due to losses in the engine and powertrain system, is added to the required output torque signal 13 by an adder 14 to generate a torque demand signal 15.

US 6,581,565 B2

3

Referring now to FIG. 3, an adder 17 receives as inputs the torque demand signal 15 and a pumping losses signal 16, which represents losses due to the inherent losses in the engine cycle (i.e. due to the energy required to draw air in and to push out exhaust gases). The adder 17 outputs a

desired torque signal. An air charge demand controller 27 receives as inputs the desired torque signal, a desired spark angle signal 25 and a desired air fuel ratio signal 26. The desired spark angle signal 25 and the desired air fuel ratio signal 26 are calculated elsewhere in the engine controller 1 and depend upon signals such as engine speed, engine load and engine temperature.

The air charge demand controller 27 generates an air charge demand signal that is received by an air charge controller 29. The air charge controller 29 also receives as inputs a signal indicating throttle position that is received from the throttle position indicator 6 (FIG. 1), the engine speed sensor 3, the manifold absolute pressure sensor 110 and the air charge temperature meter 5. The air charge controller 29 generates a signal indicating desired throttle position that is sent to throttle 9 (FIG. 1) and a signal representing an estimate of the air charge.

The estimated air charge may be different from the air charge demanded by the air charge demand controller 27 due to delays in the engine 100, such as the time taken for the throttle 9 to move, the time taken for the pressure in the air intake manifold 152 to rise or fall, or any errors in position of the throttle. The air charge estimate signal is sent to a current torque estimator 22.

The current torque estimator 22 uses the air charge estimate signal, together with a signal representing the current spark angle and a signal representing the current air/fuel ratio to generate a signal representing an estimate of the current torque.

The estimate of the current torque is compared to the desired torque signal by a comparator 18 to generate an error signal which is then filtered by a high pass filter 20. The resulting filtered error signal is used by a transient torque controller 21 to generate signals for temporarily adjusting the torque produced by the engine 100.

A combustion mode signal 19, which is produced elsewhere in the engine controller 1, indicates whether the engine 100 is operating in a stratified mode or in a homogeneous mode. If the engine 100 is operating in the stratified mode then a fuel adjustment signal is generated and sent to the fuel pump 8 in order to adjust the amount of fuel which is injected into the combustion chamber 108 by the fuel injector 130. If the engine 100 is operating in the homogeneous mode then a spark adjustment signal is generated and sent to the spark control unit 7 to adjust the timing of the ignition spark generated by the spark plug 106.

The signal representing the current spark angle is calculated by a calculator 23 using the desired spark angle and any spark adjustment signal received from the transient torque controller 21. The signal representing the current air fuel ratio is calculated by a calculator 24 using the desired air fuel ratio and any fuel adjustment signal received from the transient torque controller 21. When the engine 100 is operating in stratified mode the current spark angle will be equal to the desired spark angle 25. When the engine 100 is operating in homogeneous mode the current air/fuel ratio will be equal to the desired air fuel ratio 26.

As any person skilled in the art of systems and methods of controlling the torque output of an engine will recognize from the previous detailed description and from the figures and claims, modifications and changes can be made to the preferred embodiments of the invention without departing from the scope of this invention defined in the following claims.

4

What is claimed is:

1. A device for controlling a torque output of an engine, the device comprising:

a torque demand controller for generating a torque demand signal; and

a torque producer which receives the torque demand signal, the torque producer includes:

an estimator which receives as inputs a current spark angle signal, a current air/fuel ratio signal and an estimated air charge signal and outputs an estimated torque signal;

a comparator which receives as inputs the estimated torque signal and a desired torque signal and outputs a difference signal;

a high pass filter which receives as an input the difference signal and outputs a filtered difference signal in which low frequency components are absent; and

a transient torque controller which receives as an input the filtered difference signal and outputs a fuel adjustment signal and a spark adjustment signal.

2. The device in claim 1, wherein the estimated air charge signal is produced by an air charge controller which receives as inputs an air charge demand signal, a throttle position signal, an engine speed signal, a manifold pressure signal and an air charge temperature signal.

3. The device in claim 2, wherein the air charge demand signal is produced by an air charge demand controller which receives as inputs the desired torque signal, a desired spark angle signal and a desired air/fuel.

4. The device of claim 1, in which the engine is a direct injection spark ignition engine, wherein the transient torque controller is arranged to receive a combustion mode signal indicating whether the engine is operating in a stratified mode or a homogeneous mode, and

wherein the transient torque controller is arranged to control the fuel adjustment signal when the combustion mode signal indicates that the engine is operating in the stratified mode, and

wherein the transient torque controller is arranged to control the spark adjustment signal when the combustion mode signal indicates that the engine is operating in the homogeneous mode.

5. The device in claim 4, wherein the estimated air charge signal is produced by an air charge controller which receives as inputs an air charge demand signal, a throttle position signal, an engine speed signal, a manifold pressure signal and an air charge temperature signal.

6. The device in claim 5, wherein the air charge demand signal is produced by an air charge demand controller which receives as inputs the desired torque signal, a desired spark angle signal and a desired air/fuel.

7. A method for controlling a torque output of an engine, the method comprising:

estimating a current torque signal from a received current spark angle signal, a received current air/fuel ratio signal and a received estimated air charge signal;

comparing the estimated current torque signal with a desired torque signal to output a difference signal;

filtering out a plurality of low frequency components from the difference signal; and

controlling a fuel adjustment signal and a spark adjustment signal in dependence upon a filtered difference signal.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,581,565 B2
DATED : June 24, 2003
INVENTOR(S) : Garon N. Heslop et al.

Page 1 of 1

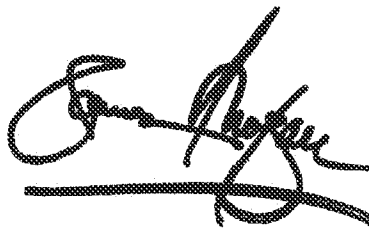
It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 4,

Lines 30 and 53, after "air/fuel" insert -- ratio -- before "." (period).

Signed and Sealed this

Twenty-eighth Day of October, 2003

A handwritten signature in black ink, appearing to read "James E. Rogan", written over a horizontal line.

JAMES E. ROGAN
Director of the United States Patent and Trademark Office

EXHIBIT 5

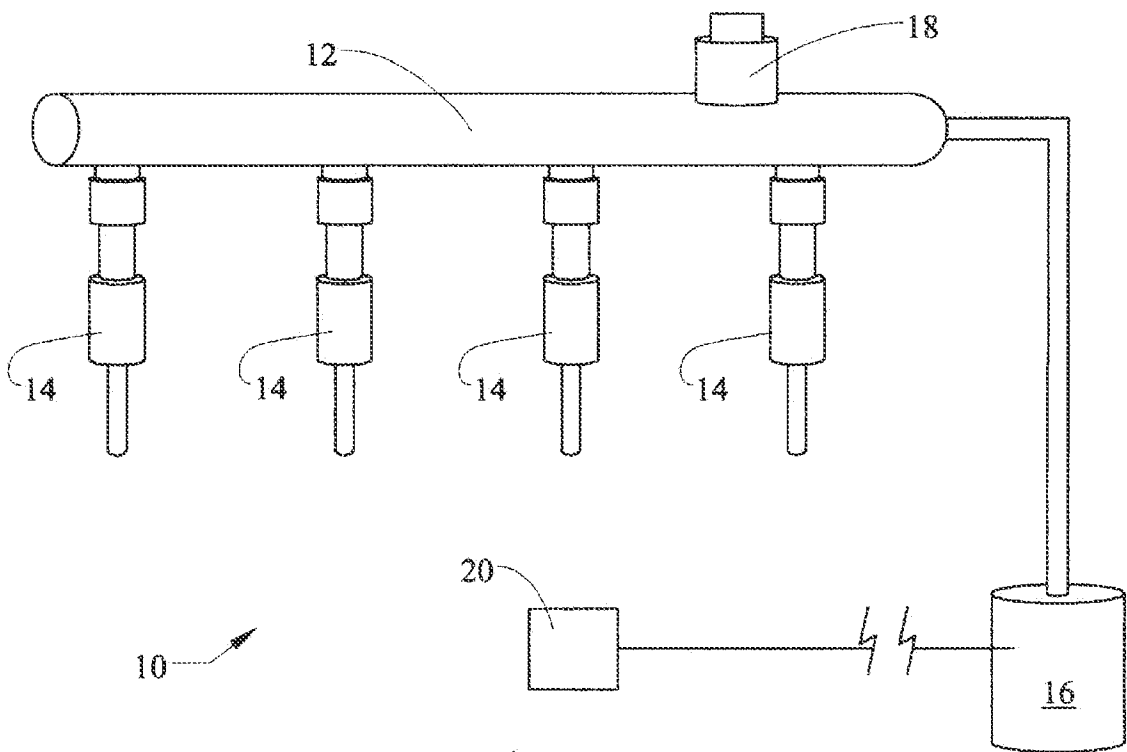


Fig. 1

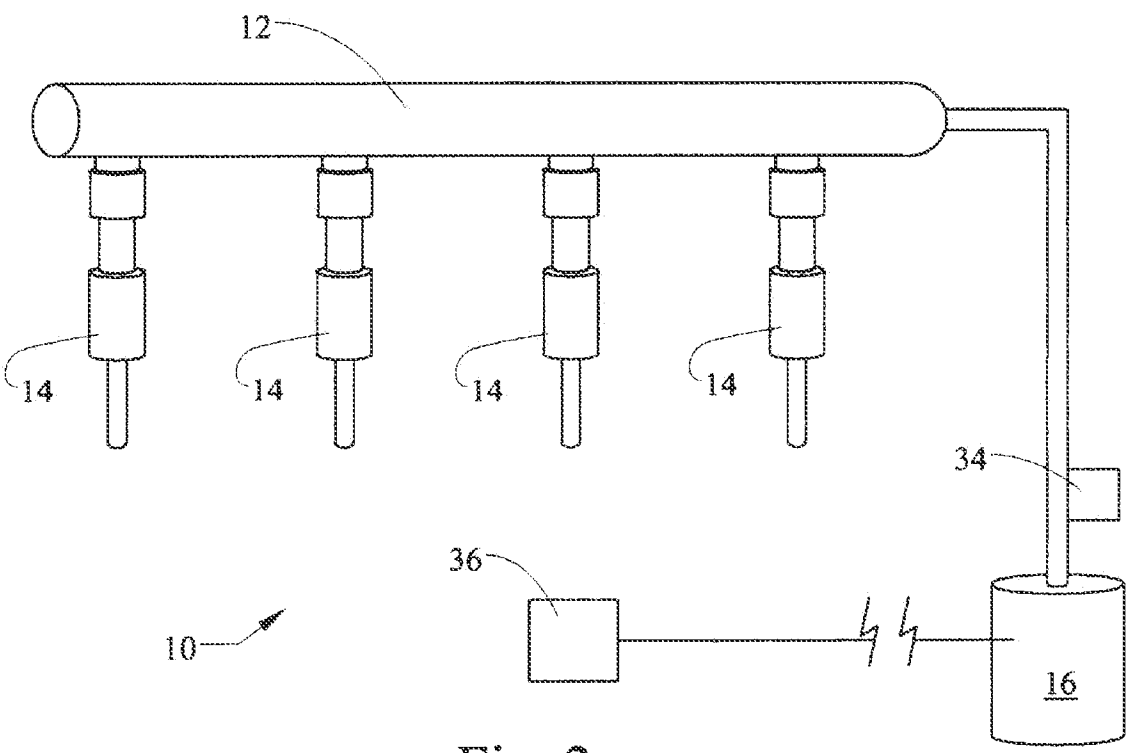


Fig. 2

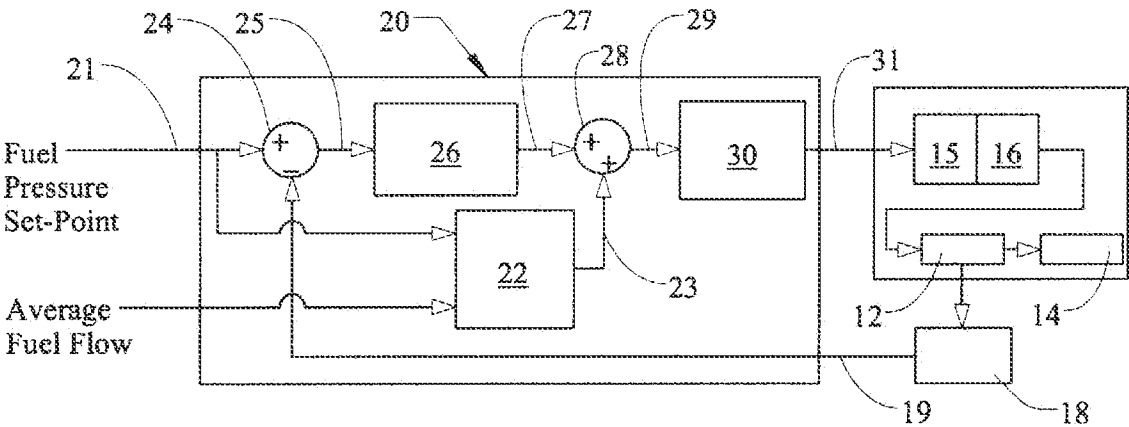


Fig. 3

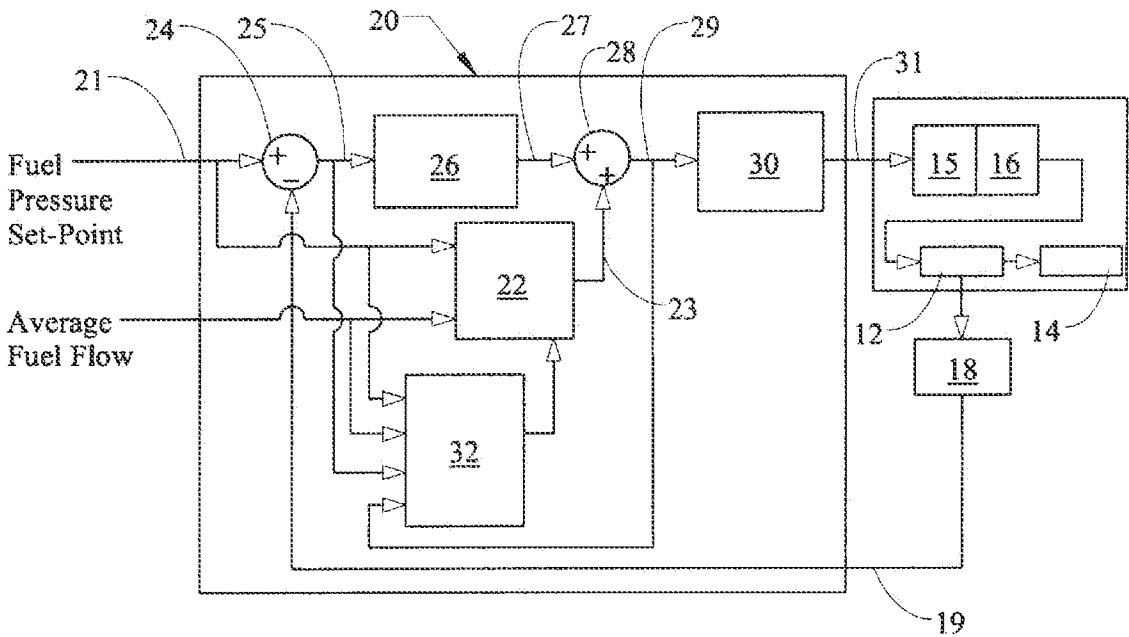


Fig. 4

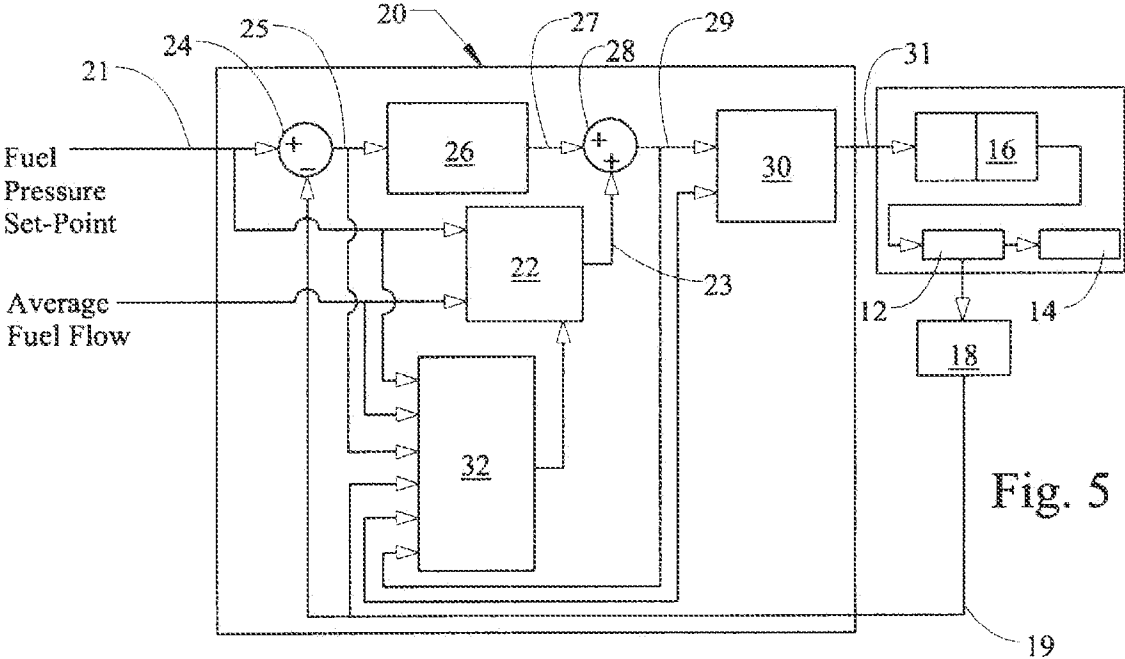


Fig. 5

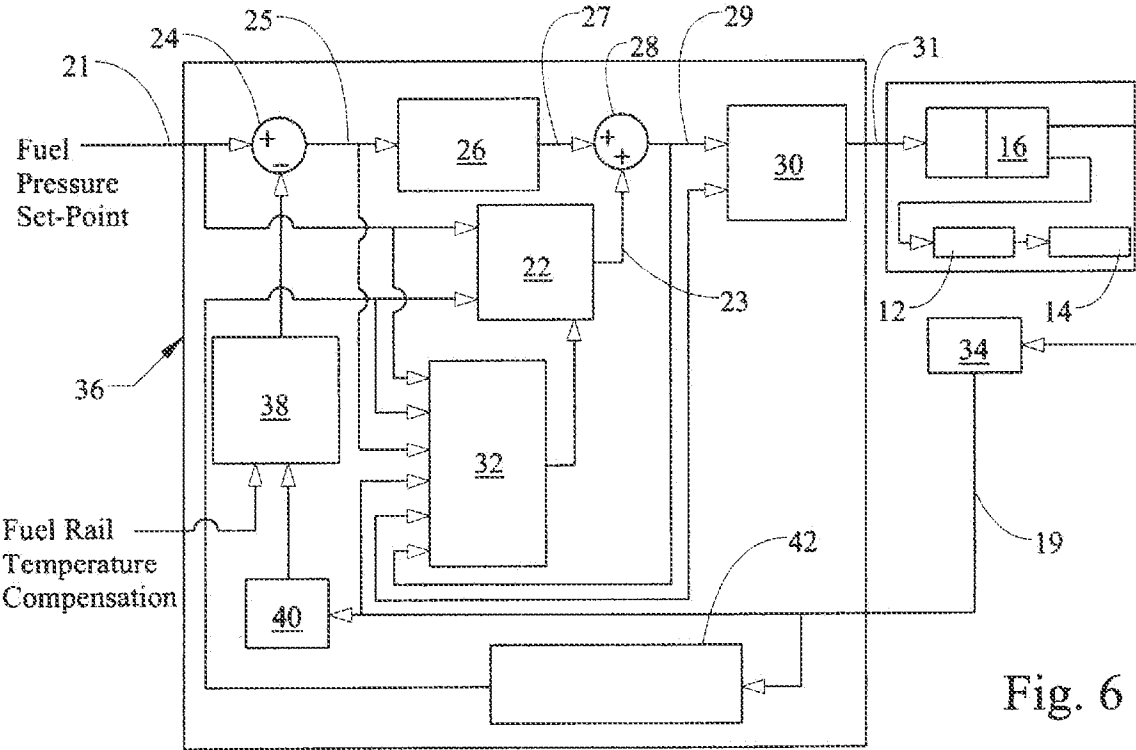


Fig. 6

US 6,581,574 B1

1
**METHOD FOR CONTROLLING FUEL RAIL
PRESSURE**

TECHNICAL FIELD

The present invention generally relates a method of controlling the fuel pressure within the fuel rail of an internal combustion engine.

BACKGROUND

Within an internal combustion engine fuel delivery system, a fuel rail delivers fuel to fuel injectors that inject the fuel into the cylinders of the engine. The pressure of the fuel being injected through the fuel injectors is critical, therefore it is important to keep the pressure within the fuel rail as consistent as possible. Closed loop control systems for controlling the fuel pressure within fuel rails have been developed, but do not adapt to system variations such as part-to-part tolerance differences and wear. Therefore, there is a need for an improved method of controlling the fuel pressure within the fuel rail of an internal combustion engine.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view of a first preferred embodiment of a fuel rail delivery system of the present invention;

FIG. 2 is a schematic view of a second preferred embodiment of a fuel rail delivery system of the present invention;

FIG. 3 is a control diagram illustrating the method of controlling the fuel delivery system of the preferred embodiment;

FIG. 4 is a control diagram for a variation of the first preferred embodiment;

FIG. 5 is a control diagram similar to FIG. 4 wherein an adaptive learning algorithm receives additional feedback information; and

FIG. 6 is a control diagram for the second preferred embodiment.

**DETAILED DESCRIPTION OF THE
PREFERRED EMBODIMENTS**

The following description of the preferred embodiments of the invention is not intended to limit the scope of the invention to these preferred embodiments, but rather to enable any person skilled in the art to make and use the invention.

Referring to FIG. 1, a fuel delivery system 10 of the present invention includes a fuel rail 12 adapted to deliver fuel to fuel injectors 14 of an internal combustion engine, a fuel pump 16 adapted to deliver fuel to the fuel rail 12, a fuel pressure sensor 18, and a fuel pump motor controller 20.

Referring to FIG. 3, the fuel pump motor controller 20 is a processor that is adapted to control the fuel pump 16. Mainly, the fuel pump motor controller 20 controls the speed of a motor 15 that drives the fuel pump 16. The fuel pressure sensor 18 measures the pressure within the fuel rail 12. The fuel pump motor controller 20 receives the fuel pressure and calculates the difference between a set-point pressure and the fuel rail pressure. This difference is the fuel rail pressure error signal 25 which is used to control the fuel pump speed.

The set-point pressure is the pressure at which the fuel delivery system 10 works most efficiently. In order to achieve proper fuel injection characteristics such as spray penetration and spray pattern, it is important that the fuel

2
delivered to the fuel injector nozzles 14 remains at the appropriate pressure. This optimum pressure is the set-point pressure, and is pre-determined based upon the injector features and the specifications of the particular application. A set-point pressure signal 21 is sent to the fuel pump motor controller 20.

The fuel pump motor controller 20 calculates and outputs a motor drive signal 31 to the fuel pump motor 15. The motor drive signal 31 is calculated from the desired fuel pressure and average fuel flow demand, and attempts to drive the fuel pump motor 15 at a speed that will provide the desired fuel pressure at the desired fuel flow rate.

The fuel pump motor controller 20 includes a feed forward controller 22, a feedback controller 26, and a fuel pump motor controller driver 30. The feed forward controller 22 uses a function or algorithm, such as a look-up table with an interpolation routine, to output a feed forward control signal 23. The feed forward controller 22 inputs the set-point pressure and the average fuel flow demanded into the function or algorithm and calculates the feed forward control signal 23.

The fuel rail pressure error signal 25 is calculated by subtracting the fuel pressure sensor signal 19 from the set-point pressure signal 21. This calculation is performed by a first summing junction 24. The fuel rail pressure error signal 25 is input to the feed back controller 26. In turn, the feed back controller 26 calculates a feed back control signal 27. The feed back controller 26 can be any suitable controller, such as a Proportional Integration and Differential or model based controller.

The feed forward control signal 23 and the feed back control signal 27 are summed in a second summing junction 28, thereby generating a motor controller signal 29. The fuel pump motor controller driver 30 receives the motor controller signal 29 and generates a motor drive signal 31 that controls the speed of the fuel pump motor 15.

In a nominal fuel system with the desired fuel rail pressure at a given fuel flow rate, the feed forward control signal 23 and the motor controller signal 29 would be the same. The feed back controller 26 modifies the feed forward control signal 23 to compensate for system variations due to part to part tolerances and system aging, etc.

A first preferred embodiment of the invention is shown in FIG. 3, wherein the fuel pressure sensor 18 is a relatively low bandwidth sensor that is mounted onto the fuel rail 12 to directly measure the fuel pressure therein. Referring to FIG. 4, in a variation of the first preferred embodiment, the fuel pump motor controller 20 further includes an adaptive learning controller 32 which uses an algorithm to monitor the conditions of the fuel delivery system 10 and updates the feed forward controller 22 when the system is operating in a steady state condition.

The algorithm of the adaptive learning controller 32 receives the set-point pressure signal 21, the average fuel flow, the fuel rail pressure error 25, and the motor controller signal 29 as inputs. The algorithm then compares the motor controller signal 29 to the feed forward control signal 23 corresponding to the current set-point signal and the average fuel flow within the feed forward controller 22, and updates the values within the feed forward controller 22 appropriately.

The algorithm of the adaptive learning controller 32 receives the error signal 25 and the feed forward controller 22 is only updated when the error has stabilized and is below a pre-determined threshold. Referring to FIG. 5, additionally, the speed of the fuel pump 16 and the pressure

US 6,581,574 B1

3

from the pressure sensor 18 can also be received by the adaptive learning controller 32 to provide additional parameters for more accurate updating of the feed forward controller 22.

A second preferred embodiment is shown in FIG. 2, wherein like elements are numbered the same as the first preferred embodiment. The second preferred embodiment includes a fuel pressure sensor 34 mounted at the fuel pump 16 to measure the fuel pressure within the fuel delivery system 10 at the fuel pump 16. The fuel pressure sensor 34 of the second preferred embodiment is a relatively wide bandwidth sensor.

Referring to FIG. 6, a fuel pump motor controller 36 of the second preferred embodiment is similar to the fuel pump motor controller 20 of the first preferred embodiment, however the second preferred embodiment also includes a fuel system model 38, a low-pass filter 40, and a device 42 to calculate the average fuel flow. The fuel system model 38 receives the fuel pressure as measured by the pressure sensor 34 at the fuel pump 16 and the fuel system model 38 estimates the fuel rail pressure based upon the pressure at the fuel pump 16.

The wide bandwidth pressure sensor 34 will measure both the average fuel pump outlet pressure as well as pressure pulses caused by the opening and closing of the fuel injectors 14. The low-pass filter 40 filters out pulses in the pressure readings due to the opening and closing of the fuel injectors 14, so the feed back controller 26 does not respond to these injector pulsations. The fuel system model 38 can also include input of the fuel rail 12 temperature. The temperature of the fuel rail 12 influences the fuel rail pressure estimation, so the fuel system model 38 can take this temperature into consideration to more accurately approximate the pressure within the fuel rail 12 based upon the pressure measured at the fuel pump 16. The wide band pressure from the pressure sensor 34 is also used by the device 42 to calculate the average fuel flow. From the pressure pulsations caused by the opening and closing of the injectors, the injector frequency and on-time duration can be obtained. By using this information along with the injector flow rate, the average fuel flow rate can be calculated, thereby eliminating the need for external average fuel flow information.

It is to be understood, that the processors, sensors, fuel pump, and controllers are conventional devices that are common in the industry and are described herein merely to provide examples of how the method of the present invention can be practiced.

The foregoing discussion discloses and describes two preferred embodiments. One skilled in the art will readily recognize from such discussion, and from the accompanying drawings and claims, that changes and modifications can be made to the preferred embodiments without departing from the true spirit and fair scope of the inventive concepts as defined in the following claims. The preferred embodiments have been described in an illustrative manner, and it is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation.

We claim:

1. A method of controlling the fuel pressure within a fuel delivery system having a fuel pump which delivers fuel to a fuel rail of an internal combustion engine comprising:

- providing a set-point fuel pressure;
- providing the estimated average fuel flow through the system;

4

generating a feed forward control signal based upon the set-point fuel pressure and the average fuel flow; measuring the fuel rail pressure with a fuel pressure sensor;

filtering the output of the fuel pressure sensor to filter out pulses due to the opening and closing of the fuel injectors;

comparing the fuel rail pressure to the set-point fuel pressure and generating an error signal based upon the difference between the fuel rail pressure and the set-point fuel pressure; and

modifying the feed forward control signal based upon the error signal thereby generating a motor controller signal and sending the motor control signal to the fuel pump motor.

2. The method of claim 1 wherein generating a feed forward control signal includes providing a feed forward controller which provides established fuel pump motor control parameters at particular set-point pressure and average fuel flow rate values, wherein the set-point pressure and average fuel flow are input to the feed forward controller and a feed forward control signal having set of corresponding fuel pump motor control parameters is thereby generated.

3. The method of claim 1 further including:

comparing the motor control signal to the fuel pump motor control parameters within the feed forward controller which correspond to the set-point pressure and the average fuel flow; and

updating the feed forward controller with new fuel pump motor control parameters.

4. The method of claim 3 further including monitoring the error signal, and updating the feed forward controller after the error signal has stabilized and is below a pre-determined level.

5. The method of claim 1 wherein measuring the fuel rail pressure includes measuring the fuel pressure at the fuel pump and estimating the fuel rail pressure based upon the fuel pressure as measured at the fuel pump.

6. The method of claim 1 further including:

detecting pulses in the signal from the fuel pressure sensor to establish when the injectors open and close;

measuring the time between when an injector opens and closes to determine how long the injector is open;

using the injector flow rate and the injector open time to calculate the average fuel flow.

7. A fuel delivery system comprising:

a fuel rail adapted to deliver fuel to fuel injectors of an automotive vehicle, a fuel pump adapted to deliver fuel to said fuel rail, a fuel pressure sensor adapted to measure the fuel rail pressure, a low-pass filter adapted to filter the output of said fuel pressure sensor to filter out pulses due to the opening and closing of the fuel injectors, and a fuel pump motor controller having:

a feed forward controller adapted to provide a feed forward signal having fuel pump motor control parameters based upon a set-point fuel pressure and the average fuel flow through said system;

a first summing junction adapted to compare the fuel rail pressure to the set-point fuel pressure and to generate an error value based upon the difference between the fuel rail pressure and the set-point fuel pressure;

a feed back controller adapted to receive the error value and to generate a feed back control signal;

a second summing junction adapted to receive the feed back control signal from said feed back controller

US 6,581,574 B1

5

and the feed forward control signal from the feed forward controller and to modify the fuel pump motor control parameters of the feed forward control signal based upon the feed back control signal to generate a motor controller signal; and
a fuel pump motor controller driver adapted to receive the motor controller signal and to control the speed of said fuel pump based upon the motor controller signal.

8. The fuel delivery system of claim 7 wherein said fuel pressure sensor is mounted at said fuel rail to directly measure the fuel pressure within said fuel rail.

9. The fuel delivery system of claim 7 wherein said feed back controller is a proportional integration and differential closed loop controller.

10. The fuel delivery system of claim 7 further including an adaptive learning controller having an algorithm which is adapted to monitor the conditions of the fuel delivery system and to update said feed forward controller.

11. The fuel delivery system of claim 7 wherein said fuel pressure sensor is mounted at said fuel pump to measure the fuel pressure within the fuel delivery system at said fuel pump.

12. The fuel delivery system of claim 11 further including a fuel system model adapted to estimate the fuel pressure within said fuel rail based upon the fuel pressure as measured at said fuel pump.

13. A method of controlling the fuel pressure within a fuel delivery system having a fuel pump which delivers fuel to a fuel rail and fuel injectors of an internal combustion engine comprising:

- providing a set-point fuel pressure;
- providing the estimated average fuel flow through the system;
- generating a feed forward control signal based upon the set-point fuel pressure and the average fuel flow;
- measuring the fuel rail pressure with a fuel pressure sensor;
- comparing the fuel rail pressure to the set-point fuel pressure and generating an error signal based upon the

6

difference between the fuel rail pressure and the set-point fuel pressure;

modifying the feed forward control signal based upon the error signal thereby generating a motor controller signal and sending the motor control signal to the fuel pump motor;

detecting pulses in the signal from the fuel pressure sensor to establish when the fuel injectors open and close;

measuring the time between when an injector opens and closes to determine how long the injector is open;

using the injector flow rate and the injector open time to calculate the average fuel flow.

14. The method of claim 13 wherein generating a feed forward control signal includes providing a feed forward controller which provides established fuel pump motor control parameters at particular set-point pressure and average fuel flow rate values, wherein the set-point pressure and average fuel flow are input to the feed forward controller and a feed forward control signal having set of corresponding fuel pump motor control parameters is thereby generated.

15. The method of claim 13 further including:

- comparing the motor control signal to the fuel pump motor control parameters within the feed forward controller which correspond to the set-point pressure and the average fuel flow; and
- updating the feed forward controller with new fuel pump motor control parameters.

16. The method of claim 15 further including monitoring the error signal, and updating the feed forward controller after the error signal has stabilized and is below a pre-determined level.

17. The method of claim 13 wherein measuring the fuel rail pressure includes measuring the fuel pressure at the fuel pump and estimating the fuel rail pressure based upon the fuel pressure as measured at the fuel pump.

18. The method of claim 13 further including filtering the signal sent from the fuel pressure sensor to filter out pulses due to the opening and closing of the fuel injectors.

* * * * *

EXHIBIT 7

(12) **United States Patent**
Pursifull

(10) **Patent No.: US 6,588,260 B1**
(45) **Date of Patent: Jul. 8, 2003**

(54) **ELECTRONIC THROTTLE DISABLE
CONTROL TEST SYSTEM**

(75) **Inventor: Ross Dykstra Pursifull, Dearborn, MI
(US)**

(73) **Assignee: Visteon Global Technologies, Inc.,
Dearborn, MI (US)**

(*) **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 70 days.

(21) **Appl. No.: 09/695,165**

(22) **Filed: Oct. 24, 2000**

(51) **Int. Cl.⁷ G01M 15/00**
(52) **U.S. Cl. 73/118.1**
(58) **Field of Search 73/116, 117.2,
73/117.3, 118.1, 118.2**

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,359,894 A * 11/1982 Ikeura et al. 73/118.2

4,515,009 A * 5/1985 Hasegawa et al. 123/478
5,088,461 A * 2/1992 Ohashi et al. 123/353
5,473,936 A * 12/1995 Sasakura et al. 73/117.3
5,950,597 A * 9/1999 Kamio et al. 123/397
6,318,337 B1 * 11/2001 Pursifull 123/396

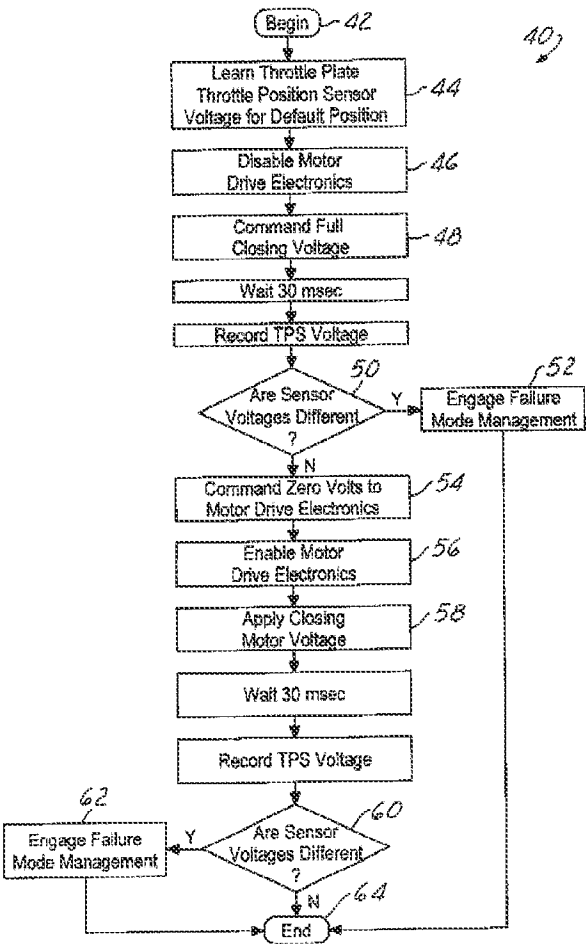
* cited by examiner

Primary Examiner—Eric S. McCall
(74) *Attorney, Agent, or Firm*—John Kajander

(57) **ABSTRACT**

A method for testing the integrity of an electronic throttle
disable function begins by disabling the drive electronics
responsible for controlling the throttle motor. The micro-
controller doing the plate position control commands full
closing voltage from throttle motor drive electronics (while
those electronics are disabled). Then the throttle position
voltage is recorded. If the disable system is working, the
H-driver will output zero volts even though a full motor
closing voltage is requested. The throttle position voltage is
then compared to a predetermined default throttle position
voltage. If there is a significant difference between the two
voltages, then failure mode management is engaged.

17 Claims, 2 Drawing Sheets

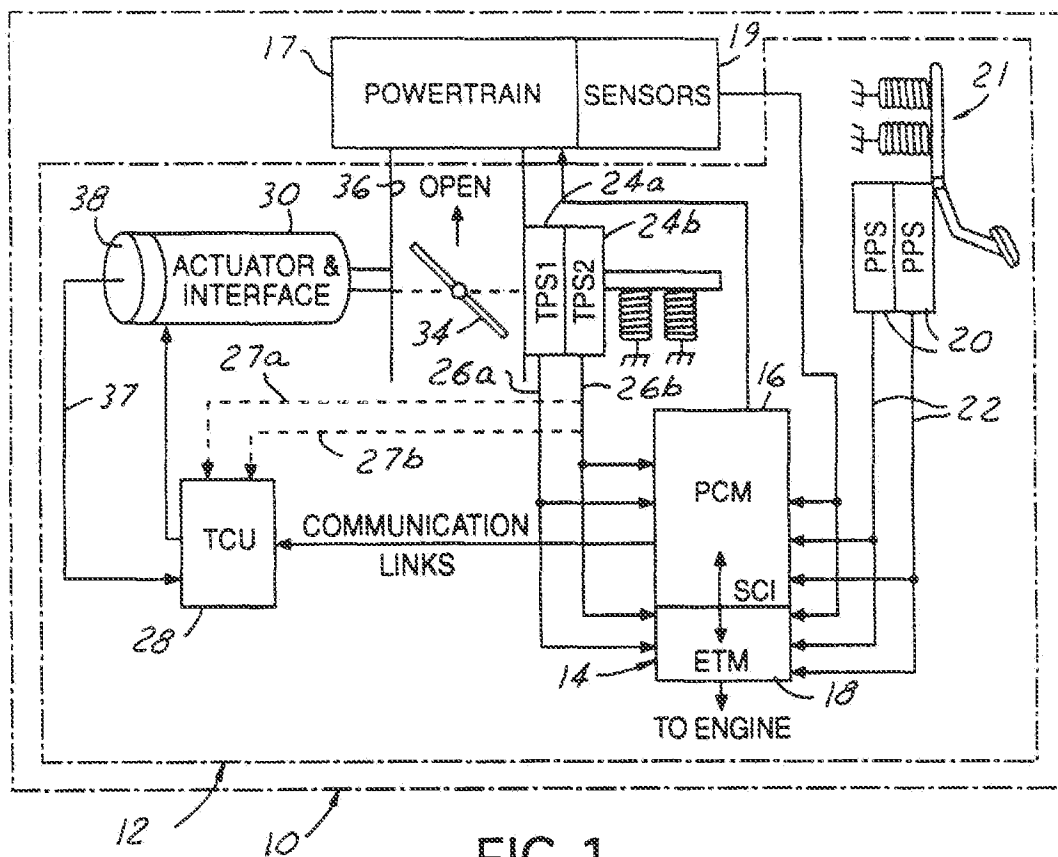


U.S. Patent

Jul. 8, 2003

Sheet 1 of 2

US 6,588,260 B1



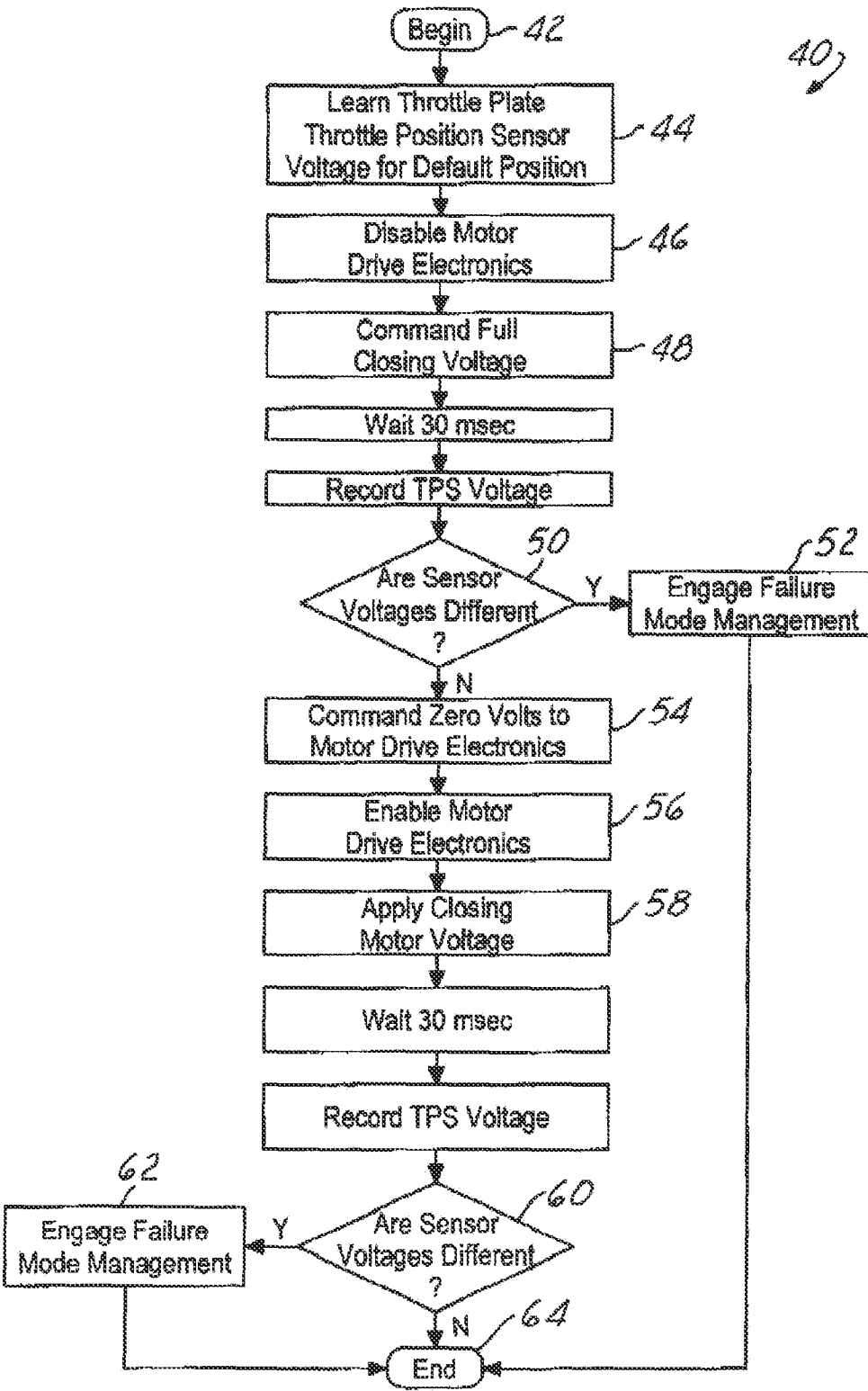


FIG. 2

US 6,588,260 B1

1

**ELECTRONIC THROTTLE DISABLE
CONTROL TEST SYSTEM**

TECHNICAL FIELD

The present invention relates generally to control systems for internal combustion engines, and more particularly, to an electronic throttle disable control test system.

BACKGROUND ART

Many previously known motor vehicle throttle controls have a direct physical linkage between an accelerator pedal and the throttle body so that the throttle plate is pulled open by the accelerator cable as the driver presses the pedal. The direct mechanical linkage includes biasing that defaults the linkage to a reduced operating position, also known as idle, in a manner consistent with regulations. Nevertheless, such mechanisms are often simple and unable to adapt fuel consumption efficiency, minimize regulated emissions, improve driveability to changing traveling conditions, and add significant weight and components to the motor vehicle.

An alternative control for improving throttle control and the efficient introduction of fuel air mixtures into the engine cylinders is presented by electronic throttle control. The electronic throttle control includes a throttle control unit that positions the throttle plate by an actuator controlled by a microprocessor using position feedback sensors. The micro controllers (or micro processors) are often included as part of a powertrain electronic control that can adjust the fuel and air intake and ignition in response to changing conditions of vehicle operation as well as operator control. Protection may be provided so that an electronic system does not misread or misdirect the control and so that unintended operation is avoided when portions of the electronic control suffer a failure.

One previously known type of protection to avoid unintended actuation of excessive throttle is to use a disable function of the electronic throttle drive electronics. The disable function allows the PCM to shut down the electronic throttle drive electronics in the event that the PCM senses a throttle position differing from expected throttle position. Unfortunately, typical electronic throttle systems do not test the integrity of the disable function.

The disadvantages associated with these conventional electronic throttle disable techniques have made it apparent that a new technique for testing the electronic throttle disable function is needed. The new technique should not intrude on normal throttle operation while verifying function integrity at least once each time the vehicle is powered up. The present invention is directed to these ends.

SUMMARY OF THE INVENTION

It is, therefore, an object of the invention to provide an improved and reliable electronic throttle disable control test system. Another object of the invention is to test the electronic throttle driver disable function. And additional object of the invention is to not intrude upon normal throttle operation.

In accordance with the objects of this invention, an electronic throttle disable control test system is provided. In one embodiment of the invention, a method for testing the integrity of an electronic throttle disable function begins by disabling the electronic throttle motor's drive electronics (which is an integrated H-driver in the preferred embodiment). The H-driver is commanded to apply dull

2

closing voltage, however, since the H-driver is disabled, no voltage is applied to the motor and the throttle remains at its default position. The throttle position voltage is then compared to a predetermined default position voltage. If there is a significant difference between the two voltages, then failure mode management is engaged. These voltages can be either "absolute" meaning relative to system ground or "relative" meaning relative to the throttle position sensor voltage output at closed throttle, default position, or open stop position. This allows one to detect the voltage difference between default and closed stop.

At this point, we have verified that the throttle does not move when disabled. Then we have to verify that it does move when enabled.

The present invention thus achieves an improved electronic throttle disable control test system. The present invention is advantageous in that the integrity of the electronic throttle disable function is tested at least once each time the vehicle is powered up.

Additional advantages and features of the present invention will become apparent from the description that follows, and may be realized by means of the instrumentalities and combinations particularly pointed out in the appended claims, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be well understood, there will now be described some embodiments thereof, given by way of example, reference being made to the accompanying drawings, in which:

FIG. 1 is an electronic throttle disable control test system in accordance with one embodiment of the present invention; and

FIG. 2 is a flow chart for an electronic throttle disable control test in accordance with one embodiment of the present invention.

**BEST MODES FOR CARRYING OUT THE
INVENTION**

In the following figures, the same reference numerals will be used to identify identical components in the various views. The present invention is illustrated with respect to an electronic throttle disable control test system, particularly suited for the automotive field. However, the present invention is applicable to various other uses that may require electronic throttle disable control test systems.

Referring to FIG. 1, a motor vehicle powertrain system 10 including electronic throttle control system 12 includes an electronic control unit 14. In the preferred embodiment, the electronic control unit 14 includes a powertrain control module (PCM) 16 including a main processor and an electronic throttle monitor (ETM) 18 including an independent processor. The PCM and ETM share sensors 19 and actuators that are associated with the powertrain system 17 and control module 16. Preferably, the electronic throttle monitor 18 includes a processor physically located within the powertrain control module housing, although a separate housing, separate locations and other embodiments can also be employed in practicing the invention. Moreover, while the electronic throttle monitor 18 and the powertrain control module 16 have independent processors, they share the inputs and outputs of powertrain sensors 19 and actuators 21 and 34, respectively, for independent processing.

A wide variety of inputs are represented in the FIG. 1 diagram by the diagrammatic representation of redundant

US 6,588,260 B1

3

pedal position sensors 20. The sensors 20 are coupled through inputs 22 and are representative of many different driver controls that may demonstrate the demand for power. In addition, the electronic control unit 14 includes inputs 26a and 26b for detecting throttle position. A variety of ways for providing such indications is diagrammatically represented in FIG. 1 by a first throttle position sensor 24a and a redundant second throttle position sensor 24b to obtain a power output indication. As a result of the many inputs represented at 19, 22, 26a and 26b, the electronic controller 14 provides outputs for limiting output power so that output power does not exceed power demand. A variety of outputs are also diagrammatically represented in FIG. 1 by the illustrated example of inputs to a throttle control unit 28 that in turn powers an actuator and motive interface 30 for displacing the throttle plate 34. For example, an actuator and interface may comprise redundant drive motors powering a gear interface to change the angle of the throttle plate 34 in the throttle body 36.

Likewise, the responsive equipment like motors may also provide feedback. For example, the motor position sensor 38 or the throttle position sensors 24a and 24b may provide feedback to the throttle control unit 28, as shown at 37, 27a and 27b, respectively, to determine whether alternative responses are required or to maintain information for service or repair.

The purpose of the present invention is to establish a method with which to test the ability to take an action (which is taken upon failure detection). For a number of detected electronic control system failures, the throttle plate 34 position control disables the drive electronics for the throttle motor 30. In normal operation, the system would never take this action.

The challenge is to design a test that does not intrude in normal throttle control operation. Since disabling the driver results in the plate 34 going to default, to test this function non-intrusively, one must test when the system is off-line but powered (initialization or shut-down) or when default is requested anyway. An advantage over previous technology is that the driver disable function (which is a significant contributor to system predictability when a system failure is detected) can now be tested at least once each time the vehicle is powered up.

Referring to FIG. 2, a flow chart for an electronic throttle disable control test 40 in accordance with one embodiment of the present invention is illustrated. In the present invention, control test 40 begins with step 42 and immediately proceeds to step 44 where PCM 16 learns the TPS output voltage for the default position of throttle plate 36. (At this point, no motor voltage is applied so that the plate will have attained the default position.) The sequence then proceeds to step 46.

In step 46, PCM 16 disables the drive electronics responsible for actuating motor 30. The sequence then proceeds to step 48 where PCM 16 commands full closing motor voltage. PCM 16 waits approximately 30 milliseconds and then records the resulting throttle position sensor voltage. The sequence then proceeds to step 50.

In step 50, the throttle position voltage corresponding to the default position of throttle plate 34, determined in step 44, is compared to the throttle position voltage obtained after disabling the drive electronics. If the two voltages are significantly different, it means that the motor drove the plate to a new position and the disable function is not working and then the PCM 16 will engage failure mode management in step 52 and proceed to the end of the

4

sequence 64. If, however, the two voltages are not significantly different, then the sequence proceeds to step 54.

In step 54, PCM 16 commands zero volts and proceeds to step 56 where it enables the H-driver. In step 58 PCM 16 applies approximately five volts in the closing direction to throttle motor 30. PCM 16 then waits 30 milliseconds before applying full voltage in the closing direction to throttle motor 30. PCM 16 then waits another 30 milliseconds before learning the output voltage corresponding to a close stop of throttle plate 34. PCM 16 then records the close stop TPS output voltage and the sequence proceeds to step 60.

In step 60, the voltage corresponding to the default position of throttle plate 34, determined in step 44, is compared to the close stop voltage obtained in step 58. If the two voltages are not significantly different, then the sequence proceeds to end step 64. If, however, the two voltages are significantly different, then throttle plate 34 may be potentially frozen. In this case, PCM 16 engages failure mode management in step 62, including ice breaking strategy.

While the present invention is shown with respect to testing the integrity of the drive electronics disable function after learning the default voltage corresponding to the default position of throttle plate 34, one skilled in the art would realize that testing may also occur before learning the default voltage by simply comparing the voltage obtained in step 48 with the close stop voltage. One skilled in the art would also recognize that various routine functions, such as checking memory, may occur before or after the test.

The present invention thus achieves an improved and reliable electronic throttle disable control test system by means to test the disable function without intruding on normal throttle operation. The present invention does this at least once each time the vehicle is powered up.

From the foregoing, it can be seen that there has been brought to the art a new and improved electronic throttle disable control test system. It is to be understood that the preceding description of the preferred embodiment is merely illustrative of some of the many specific embodiments that represent applications of the principles of the present invention. Clearly, numerous and other arrangements would be evident to those skilled in the art without departing from the scope of the invention as defined by the following claims:

What is claimed is:

1. An electronic throttle control apparatus for testing integrity of a motor drive electronics disable feature comprising:

a PCM having drive electronics for controlling a motor coupled to an electronic throttle plate, said PCM having control logic to disable said drive electronics and return said electronic throttle plate to a default position, determine a default throttle position sensor (TPS) output voltage corresponding to said default position, command a full closing motor voltage, compare a full closing TPS output voltage to said default TPS output voltage, and engage failure mode management when said full closing TPS output voltage and said default TPS output voltage are significantly different from each other.

2. The electronic throttle control apparatus of claim 1, wherein said PCM further includes control logic operative to enable said drive electronics.

3. The electronic throttle control apparatus of claim 1, wherein said PCM further includes control logic operative to apply close stop voltage to said motor.

4. The electronic throttle control apparatus of claim 3, wherein said PCM further includes control logic operative to

US 6,588,260 B1

5

compare said full closing TPS output voltage to said close stop TPS output voltage.

5. The electronic throttle control apparatus of claim 4, wherein said PCM includes control logic operative to engage failure mode management when said full closing TPS output voltage and said close stop TPS output voltage are significantly different.

6. The electronic throttle control apparatus of claim 1, wherein said PCM includes control logic operative to test said motor drive electronics disable feature before learning said default throttle position sensor output voltage.

7. The electronic throttle control apparatus of claim 1, wherein said PCM includes control logic operative to test said motor drive electronics disable feature before checking PCM memory.

8. An electronic throttle control test system for an automobile having and internal combustion engine, said system comprising:

a motorized throttle located on the internal combustion engine, said motorized throttle having a throttle plate coupled to a motor for controlling an amount of airflow entering the internal combustion engine; and

a PCM having drive electronics for controlling said motor coupled to said throttle plate, said PCM having control logic to disable said drive electronics such that said throttle plate returns to or remains at a default position, determine a default throttle position sensor (TPS) output voltage corresponding to said default position, command a full closing motor voltage, compare said full closing TPS output voltage to said default TPS output voltage, and engage failure mode management when said full closing TPS output voltage and said predetermined default TPS output voltage are significantly different.

9. The electronic throttle control test system of claim 8, wherein said PCM includes control logic operative to test disabling of said drive electronics before learning said default throttle position sensor output voltage.

6

10. The electronic throttle control test system of claim 8, wherein said PCM includes control logic operative to test disabling of said drive electronics before checking PCM memory.

11. A method for testing integrity of an electronic throttle plate driver disable function controlled by a powertrain control module (PCM) comprising the steps of:

- disabling said driver;
- determining a first throttle position value with said driver disabled;
- commanding full closing voltage;
- determining a second throttle position value at said full closing voltage;
- comparing said first and second throttle position values; and
- engaging failure mode management when said first and second throttle position values are significantly different.

12. The method of claim 11, further comprising the step of enabling said driver.

13. The method of claim 11, further comprising the step of applying close stop output voltage to a motor.

14. The method of claim 13, further comprising the step of comparing a throttle position sensor (TPS) output voltage at said full closing voltage to a TPS output voltage at said close stop voltage.

15. The method of claim 14, further comprising the step of engaging failure mode management when said TPS output voltage at said full closing voltage and said TPS output voltage at said close stop voltage are significantly different.

16. The method of claim 11, wherein said testing occurs before learning default throttle position sensor output voltage.

17. The method of claim 11, wherein said testing occurs before checking PCM memory.

* * * * *

EXHIBIT 9



US006736122B2

(12) **United States Patent**
West

(10) **Patent No.: US 6,736,122 B2**
(45) **Date of Patent: May 18, 2004**

(54) **MOTOR VEHICLE ENGINE
SYNCHRONIZATION**

6,244,248 B1 * 6/2001 Halleron et al. 123/339.12

FOREIGN PATENT DOCUMENTS

(75) **Inventor:** Phillip James West, Billerlcaay (GB)

DE	3904619	A1	8/1990
EP	0 277 826		8/1988
EP	0 990 787	A2	4/2000
JP	11-107814		4/1999

(73) **Assignee:** Visteon Global Technologies, Inc.,
Dearborn, MI (US)

(*) **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 138 days.

* cited by examiner

Primary Examiner—Hai Huynh

(74) *Attorney, Agent, or Firm*—Brinks Hofer Gilson &
Lione

(21) **Appl. No.:** 10/104,153

(22) **Filed:** Mar. 22, 2002

(57) **ABSTRACT**

(65) **Prior Publication Data**

US 2002/0139359 A1 Oct. 3, 2002

(30) **Foreign Application Priority Data**

Mar. 30, 2001 (GB) 0108010

(51) **Int. Cl.⁷** **F02D 41/24**

(52) **U.S. Cl.** **123/690; 701/115; 73/119 A**

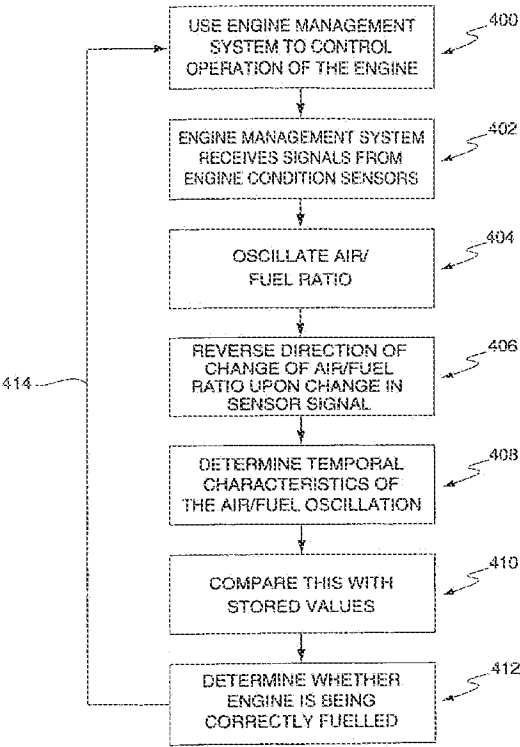
(58) **Field of Search** 123/688, 690,
123/691, 692, 693, 703, 704, 480; 701/103,
109, 115; 73/117.1, 117.2, 117.3, 119 A

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,535,135	A	7/1996	Bush et al.	123/672
5,551,410	A	9/1996	Messih et al.	123/679
5,613,473	A	* 3/1997	Angermaier	123/481

8 Claims, 8 Drawing Sheets



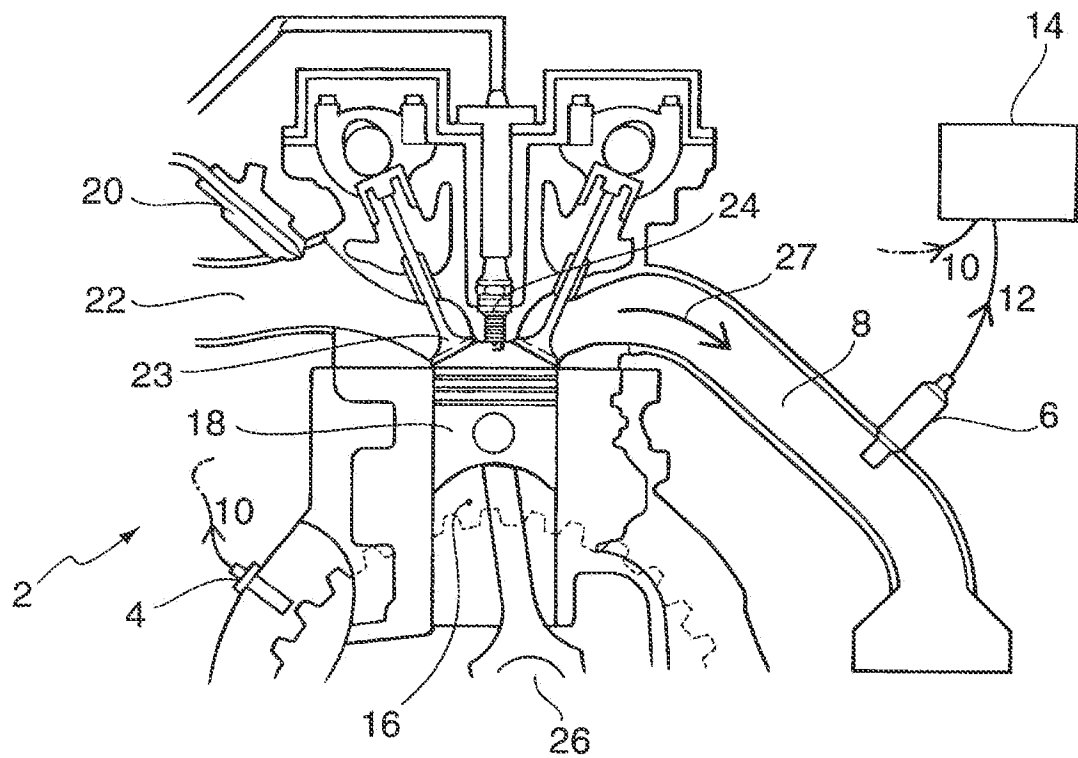


Fig. 1

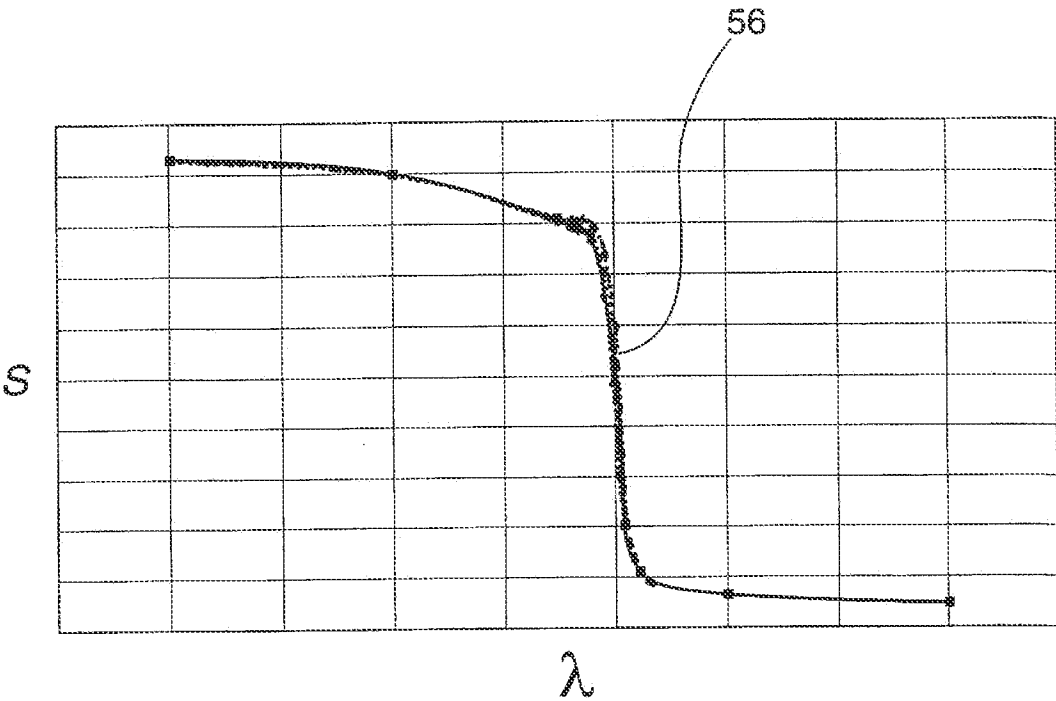
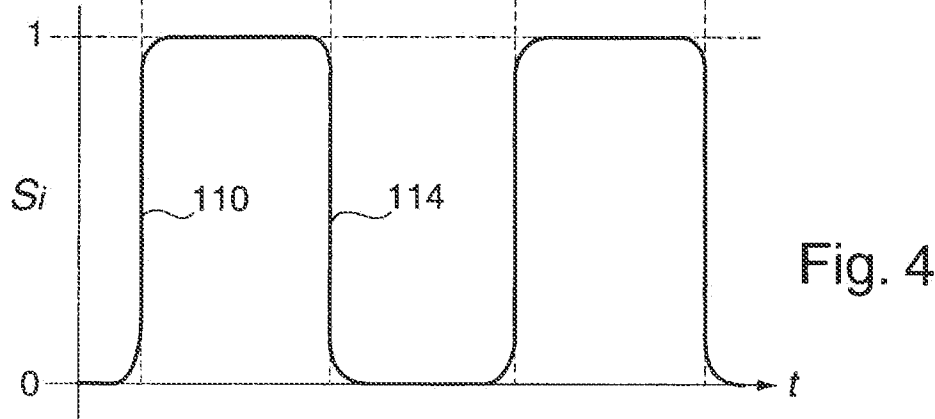
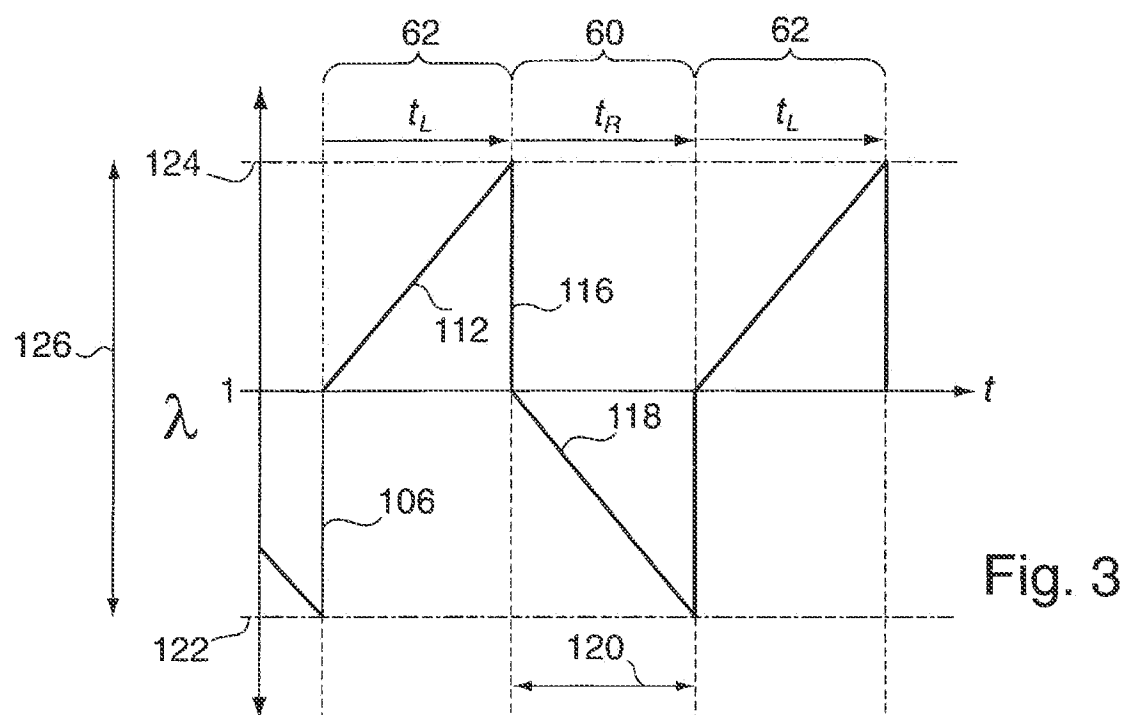
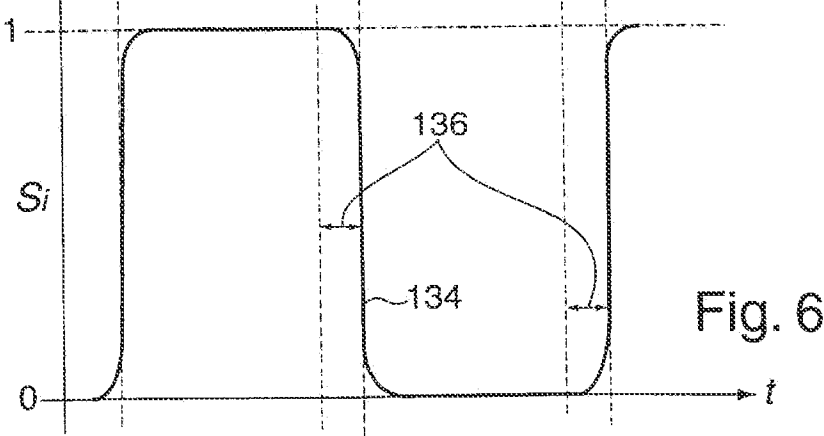
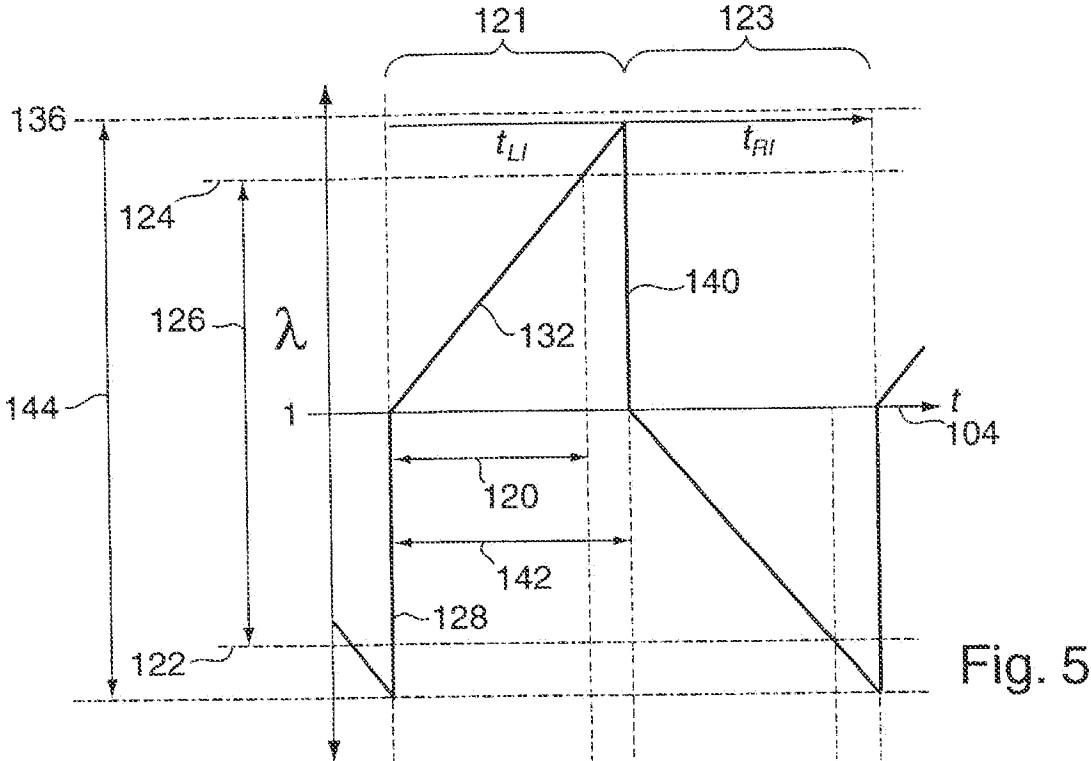


Fig. 2





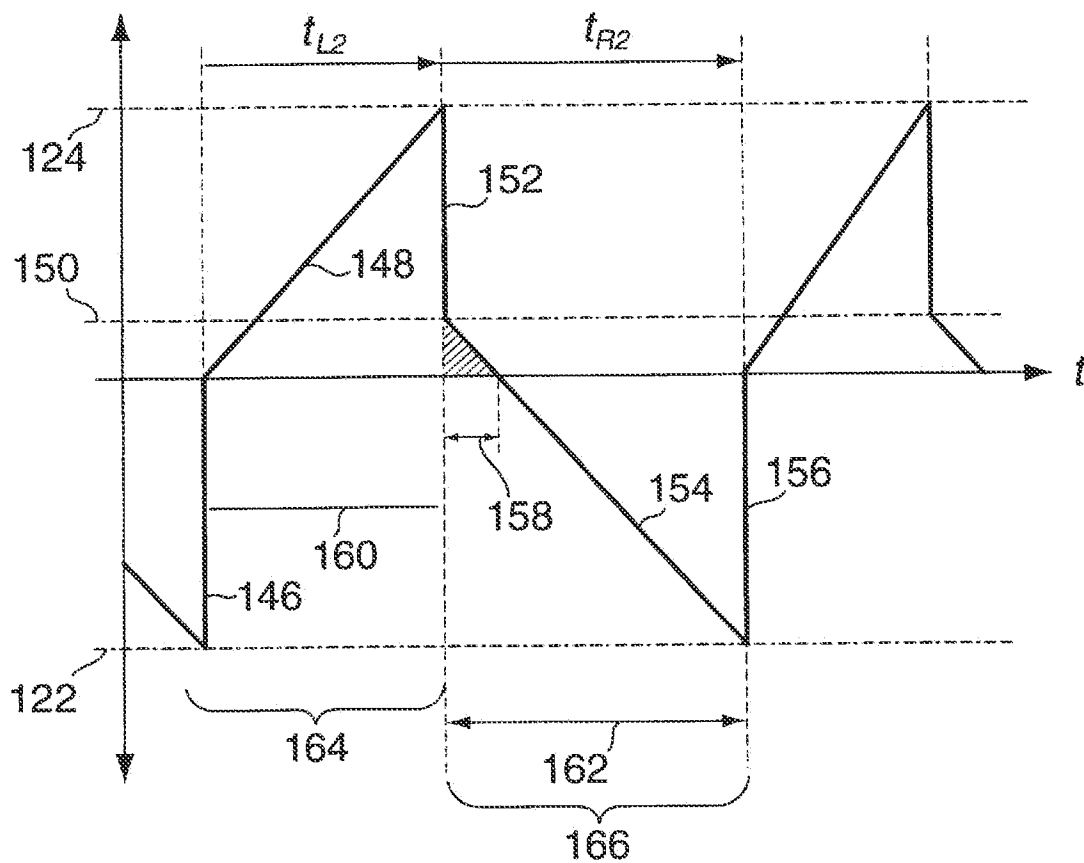


Fig. 7

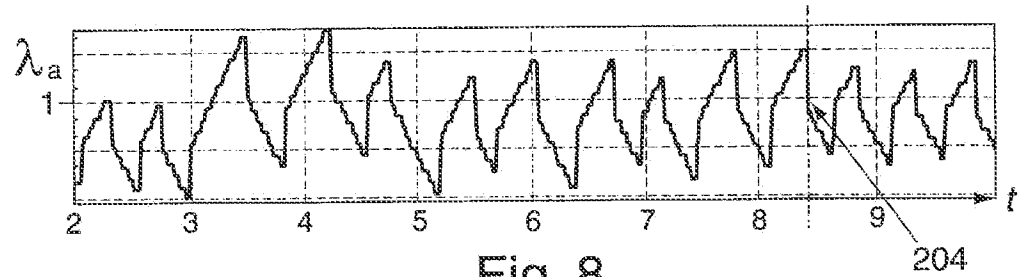


Fig. 8

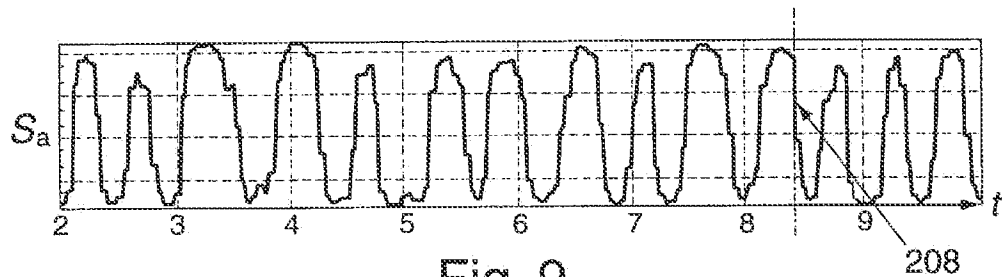


Fig. 9

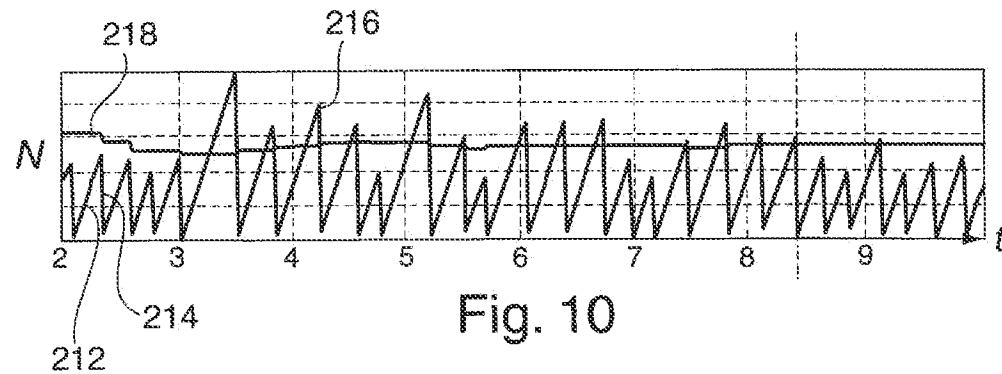


Fig. 10

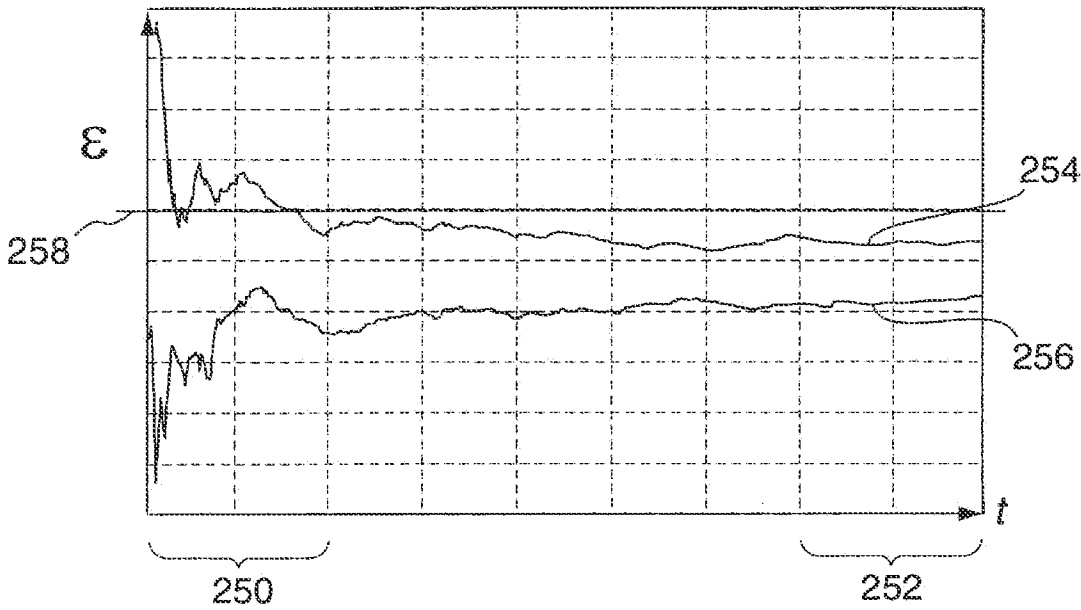


Fig.11

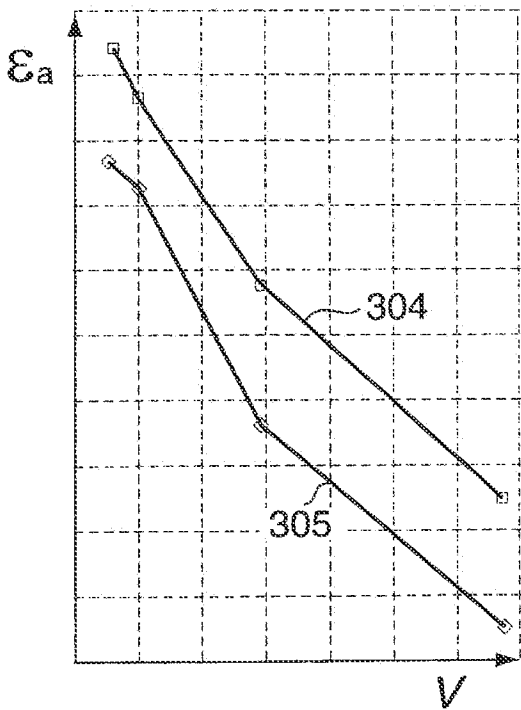


Fig.12

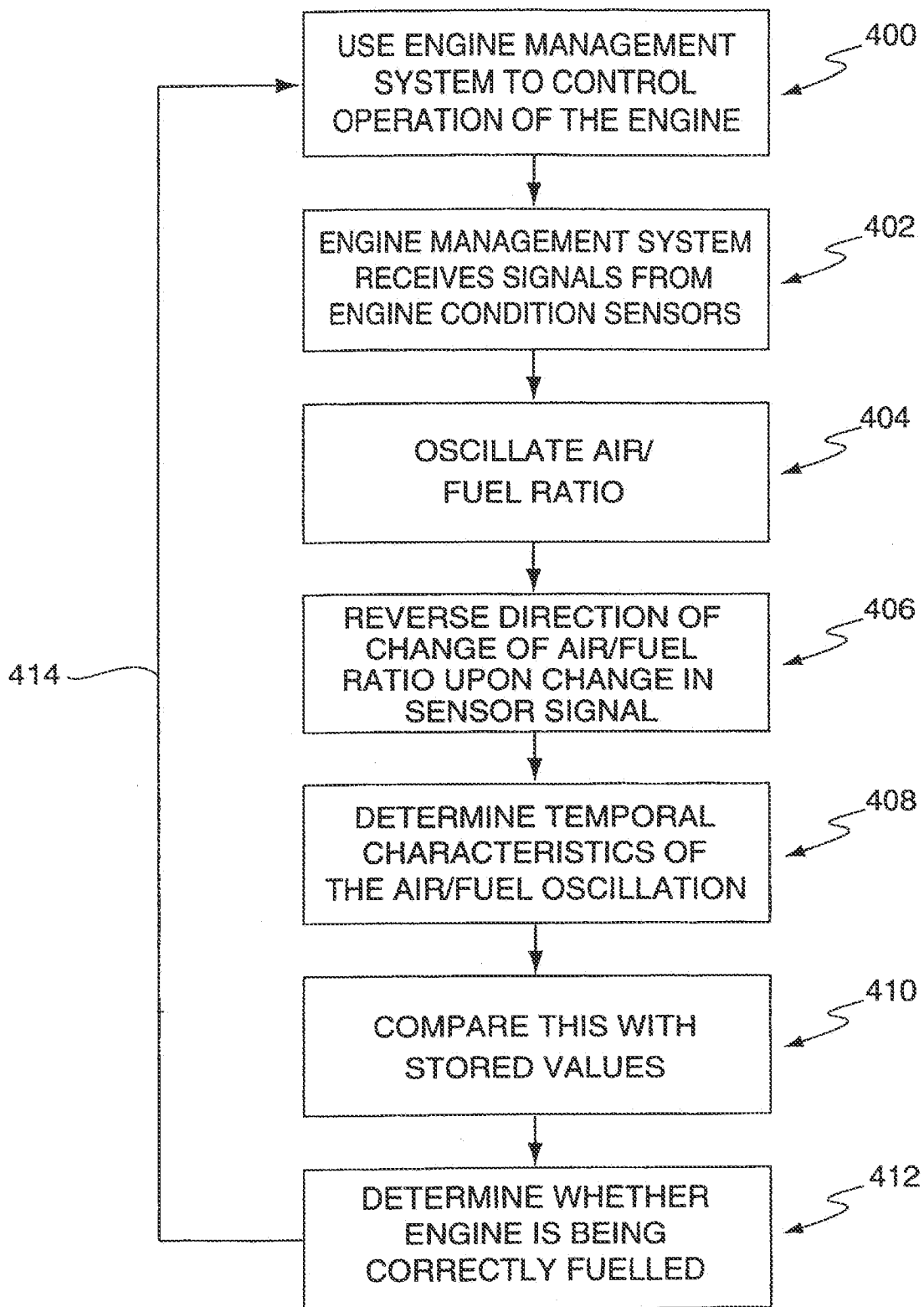


Fig. 13

US 6,736,122 B2

1

**MOTOR VEHICLE ENGINE
SYNCHRONIZATION**

BACKGROUND OF THE INVENTION

This invention relates to an engine management system capable of determining engine phase of a four-stroke internal combustion engine.

When a four-stroke engine is running it is desirable to verify that the fuel is being injected into the cylinder during the correct stroke. If the fuel is injected on the wrong stroke, the engine may still run, but engine emissions will increase and engine efficiency will drop.

Internal combustion engines normally have a crankshaft sensor that provides a rotation signal that can be used to verify piston position over one complete revolution of the engine. However, as the engine takes two full revolutions to complete one cycle of the four strokes, this type of engine sensor cannot distinguish between the two halves of the cycle, sometimes referred to as the charge phase in which the cylinder is charged with air and fuel, and the power phase in which the air fuel charge is ignited and expelled as exhaust gas.

Currently, the most common method of verifying the engine injection stroke is through the use of a camshaft position sensor. However, a camshaft sensor with associated wiring and engine machining adds cost to the engine.

It is possible to achieve engine stroke verification without the use of a camshaft position sensor, for example as described in patent document EP 0 990 787 A. This document describes a method of determining engine stroke in which one cylinder of the engine is made to run for one cycle at non-optimal conditions. This causes a sharp change in the operating conditions for that cylinder, which can then be detected by measuring a momentary change in the composition of the exhaust gas. The time at which the exhaust gas composition changes can then be used to determine the engine stroke on which exhaust gas is expelled by the affected cylinder.

This method suffers from a number of problems, primarily the need to operate the engine in a non-optimal manner and the need for steady state operation before, during and after the test.

SUMMARY OF THE INVENTION

The present invention seeks to provide an improved system for engine injection stroke verification.

According to the present invention there is provided an internal combustion engine, comprising a number of cylinders, the or each cylinder containing a four-stroke reciprocating piston, an exhaust conduit, one or more engine operating condition sensors including an exhaust gas sensor in the exhaust conduit for measuring the composition of the exhaust gas, a fuel injection system, and an engine management system for controlling the operation of the engine including the fuel injection system and the air/fuel ratio for at least one cylinder, wherein the engine management system contains engine operation data, the engine operation data being related to expected engine operation with engine fueling on the correct stroke and/or engine fueling on an incorrect stroke, and the engine management system is arranged to:

- a) receive from said sensor(s) respective signal(s);
- b) oscillate the air/fuel ratio between a relatively rich level and a relatively lean level, the exhaust gas composition varying depending on the air/fuel ratio;

2

c) reverse the direction of change of the air/fuel ratio when the exhaust gas composition is sensed as being indicative of rich engine operation or lean engine operation;

d) determine the temporal characteristics of the oscillation in the air/fuel ratio; and

e) determine whether or not the engine is being fueled on the correct stroke by comparing said temporal characteristics with said relevant engine operation data.

This procedure provides the advantage that there is no need for a camshaft position sensor, and the engine is no longer required to operate in a non-optimal manner to provide the engine management with the signals required to verify whether or not the engine is being fueled on the correct stroke by comparing.

The term "engine management system" will be understood to mean any electronic system capable of controlling or influencing the operation of the engine.

The term "temporal characteristics" should be understood as meaning period or frequency or any other time dependent characteristic that could be used to characterise an oscillating system.

It should be understood that the term "measure exhaust gas composition" means to measure one or more of the composition characteristics of the exhaust gas composition such as the concentration of one or more of the component gases.

In order to meet modern emission standards, engine control systems utilize a form of closed loop control to control the air/fuel ratio of the cylinder charge. The use of closed loop control is dictated by the use of three way catalytic converters which require very accurate control of the air/fuel ratio around a stoichiometric value in order to operate at their maximum efficiency. Closed loop control uses feedback from a sensor at an output from a system to control an input to the system that affects the signal from the output, sensor. In this case the output sensor measures the exhaust gas composition and the engine management system varies the air/fuel ratio accordingly. In open loop control the engine management system does not take account of the signal from the exhaust gas sensor when setting the air/fuel ratio. Open loop control may occur, for instance, when the driver presses the throttle.

A simplified model of a three way catalyst is that of an oxygen storage device. When the engine air fuel ratio is lean, the exhaust gas is rich in NO_x gases and the oxygen storage sites in the catalyst remove the oxygen in the NO_x gasses to create harmless N₂. Some of the excess oxygen in the exhaust gases is also stored in this phase. When the air fuel ratio is rich, the exhaust gases are rich in hydrocarbons HC, CO and H₂. The oxygen stored on the catalyst is then released to react with these gases to form CO₂ and H₂O.

To measure the exhaust gas composition, it is common to use a Heated Exhaust Gas Oxygen (HEGO) sensor. Commonly available HEGO sensors have a steep change in output around the oxygen concentration resulting from near stoichiometric air/fuel ratio. This results in the HEGO sensor being used in a bi-stable manner to detect either rich or lean combustion, rather than provide an absolute indication of air/fuel ratio.

In a closed loop feedback system this bi-stable HEGO sensor is ideally suited to a limit cycle operation oscillating the air/fuel ratio about the stoichiometric value. The present invention takes advantage of the fact that there is already a slight oscillation in engine operating conditions to determine whether or not the engine is being fueled on the correct stroke. For this invention to be applicable there is no need

US 6,736,122 B2

3

for the engine to be fitted with a catalyst, but the invention is particularly suited to an engine that does have a catalyst fitted.

The engine management system may calculate a transport delay time from the period or frequency of the reversal of the oscillation in the air/fuel ratio, this being indicative of the time taken for a change in engine operating conditions to alter the composition of the exhaust gas at the exhaust gas sensor. This transport delay, time may then be compared with the engine operation data stored in the engine management system to determine whether or not the engine is being fueled on the correct stroke.

The exhaust sensor may be an exhaust gas oxygen sensor, but may be any other sensor capable of detecting changes in the composition of the exhaust gases that relate to a change in the air/fuel ratio in the engine.

These types of sensors are common in the field and can be obtained cheaply. It is also usual for the engine to have an exhaust gas oxygen sensor in the exhaust conduit as part of the engine management system and this method would simply make greater use of it.

The period or frequency of the reversal cycle data may be averaged over a plurality of oscillations in the air/fuel ratio. This reduces the effect of signal noise inherent in real systems so that the data used in comparisons is more reliable.

The period or frequency data of an oscillation in the air/fuel ratio may be ignored by the engine management system if said period or frequency is outside a predetermined range. Large signal errors and instances of open loop control can then be ignored by the engine management system so these errors do not alter the final results.

The engine management system may have a range of pre-determined engine operating conditions during which it calculates the period or frequency of the reversal cycle or the transport delay and stores this for future reference. This avoids errors in readings taken at extremes of the operating range of the engine.

The stored, period or frequency of the reversal cycle or the transport delay is used to calculate an average error for those particular engine operating conditions for which data is recorded. The engine management system is then used to determine whether or not the engine is being fueled on the correct stroke by comparing said temporal characteristics with said relevant engine operation data. This provides the same benefits as the averaging operation described above.

The fuel injection system may be a direct injection system, in which fuel is injected directly in to the cylinders. In a preferred embodiment of the invention, however, the fuel injection system is an indirect injection system in which fuel is injected into an inlet port for each cylinder.

According to another aspect of the invention there is provided a method of operating an internal combustion engine the engine comprising a number of cylinders, the or each cylinder containing a four-stroke reciprocating piston, one or more engine operating condition sensors including an exhaust gas sensor, a fuel injection system, and an engine management system, wherein the engine management system contains engine operation data, the engine operation data being related to expected engine operation with engine fueling on the correct stroke and/or engine fueling on an incorrect stroke, wherein the method comprises the steps of:

- a) using the engine management system to control the operation of the engine including the fuel injection system and the air/fuel ratio for at least one cylinder;
- b) sending to the engine management system from said sensor(s) respective signal(s) indicative of engine operating conditions, including exhaust gas composition;

4

- c) oscillating the air/fuel ratio between a relatively rich level and a relatively lean level, the exhaust gas composition varying depending on the air/fuel ratio;
- d) using the engine management system to reverse the direction of change of the air/fuel ratio when the exhaust gas composition is sensed as being indicative of rich engine operation or lean engine operation;
- e) using the engine management system to determine the temporal characteristics of the oscillation in the air/fuel ratio; and
- f) using the engine management system to determine whether or not the engine is being fueled on the correct stroke by comparing said temporal characteristics with said relevant engine operation data.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view of a four-stroke internal combustion engine according to the invention, having, a crank shaft sensor and an exhaust gas oxygen sensor in an exhaust outlet, both sensors providing a signal to an engine management system;

FIG. 2 is a plot of the output of the exhaust gas sensor against air/fuel ratio;

FIGS. 3 and 4 illustrate a conventional method of controlling air/fuel ratio close to a stoichiometric level for the purposes of emission reduction, showing respectively an idealised cyclic variation in air/fuel ratio and a corresponding ideal signal generated by the exhaust gas sensor;

FIGS. 5 and 6 illustrate how FIGS. 3 and 4 are altered by fueling of the engine on the incorrect engine phase;

FIG. 7 shows how the variation in air/fuel ratio changes when the engine is set to run for lean operation;

FIGS. 8, 9 and 10 show plots of real data from an internal combustion engine for, respectively, the measured inlet air fuel ratio, the exhaust gas sensor signal, and a count of engine cycles between points where the signal from the exhaust gas sensor alternates;

FIGS. 11 and 12 show plots of real data, respectively, of how the count of engine cycles in FIG. 10 can be averaged over time to distinguish between in-phase and out-of-phase engine operation, and how these counts change with engine speed; and

FIG. 13 shows a flow chart illustrating a method according to the invention for determining whether or not the engine is being fueled on the correct stroke.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows a schematic view of a four-stroke internal combustion engine 2, having a crankshaft sensor 4 and an exhaust gas oxygen sensor 6 in an exhaust outlet 8, both sensors providing respective signals 10, 12 to an engine management system 14. Also shown in the drawing is a cylinder 16 with an associated piston 18 and indirect fuel injection means 20 for injecting a fine mist of fuel into the inlet conduit 22. Although in this drawing only one cylinder is shown, it should be understood that there will usually be more than one cylinder.

Air is supplied to the cylinder 16 via an inlet conduit 22, the air is mixed with fuel from the fuel injection means 20 in a ratio defined by the engine management system 14. This

US 6,736,122 B2

5

air/fuel mixture is then drawn into the cylinder 16, compressed by the piston 18 and ignited by a spark plug 24. The ignited air/fuel mixture expands and forces the piston down giving power to a crankshaft 26. Exhaust gases 27 created by this combustion event are expelled from the cylinder via the exhaust outlet 8, where the level of oxygen present in the exhaust gases is measured by the exhaust gas oxygen sensor 6. The exhaust gas oxygen sensor signal 12 is indicative of the level of oxygen in the exhaust gases. The engine management system 14 also receives a signal 10 from the crankshaft sensor 4, which enables the engine management system 14 to calculate the position of the crankshaft 26 and hence the position of the piston 16.

FIG. 2 shows a plot 56 of the output signal (S_i) 12 of the exhaust gas oxygen sensor 6 against air/fuel ratio λ . The air/fuel ratio λ is defined as the actual air/fuel ratio divided by the air/fuel ratio needed for a chemical reaction in the correct stoichiometric ratio. As can be seen from the plot the sensor output signal 12 changes rapidly at an air/fuel ratio $\lambda=1$. This behaviour effectively makes the exhaust gas oxygen sensor 6 bi-stable. This means that this exhaust gas oxygen sensor 6 is suited for use in closed loop control of an engine with the air/fuel ratio being oscillated about the stoichiometric value $\lambda=1$.

FIGS. 3 and 4 illustrate a conventional method of controlling air/fuel ratio λ close to a stoichiometric level $\lambda=1$ for the purposes of emission control, showing respectively an idealised cyclic variation in air/fuel λ against time (t) ratio and a corresponding ideal signal S_i generated by the exhaust gas oxygen sensor 6. It can be seen from FIG. 3 that the air/fuel ratio λ varies cyclically between a rich phase 60 ($\lambda < 1$) and a lean phase 62 ($\lambda > 1$). Starting at the beginning of one of the rich phases 60, the stoichiometric value is $\lambda=1$ and then falls at a constant rate for a time t_R . During this time t_R , the sensor output signal (S_i) 12 is steady at a low level $S_i=0$, indicating combustion products from earlier lean engine operation are still present in the exhaust outlet 8 around the exhaust gas oxygen sensor 6.

During time t_R , combustion products from rich operation are transported along the exhaust outlet 8 towards the exhaust gas oxygen sensor 6. The end of the rich phase occurs when these rich combustion products reach the exhaust gas oxygen sensor 6 the sensor signal S_i rapidly switches from low $S_i=0$ to high $S_i=1$. This switch is detected by the engine management system 14 and, in response, the engine management system 14 causes the air/fuel ratio λ to rise suddenly to the stoichiometric value $\lambda=1$. The air/fuel ratio λ is steadily increased until the sensor output signal 12 suddenly changes from high $S_i=1$ to low $S_i=0$, in response to the combustion products from the lean operation reaching the exhaust gas oxygen sensor 6. At this point the air/fuel ratio λ is dropped to the stoichiometric value $\lambda=1$ and then steadily falls.

This cycle continues while the closed loop control is still in force. The air/fuel ratio λ varies between a relatively rich value 122 of about 0.96 and a relatively lean value 124 of about 1.04. This defines a standard operating range 126 for the air/fuel ratio λ . The time intervals 120 between the sudden changes in sensor output are related to the time delay for the combustion products to reach the exhaust gas oxygen sensor 6 following a change in engine conditions. This time delay 120 is called the transport delay time for the engine.

FIGS. 5 and 6 illustrate how FIGS. 3 and 4 are altered by fueling of the engine on the incorrect engine phase. Starting at the beginning of one of the lean phases 121, the stoichiometric value is $\lambda=1$ and is increased at a constant rate for a

6

time t_{L1} . During this time t_{L1} , the sensor output 12 is steady at a high level $S_i=1$, indicating combustion products from earlier rich engine operation are still present in the exhaust outlet 8 around the exhaust gas oxygen sensor 6. When the combustion products from the lean operation reach the exhaust gas oxygen sensor 6, the sensor output signal S_i will change to low $S_i=0$ causing a change in the air/fuel ratio λ .

In this case, due to the fueling of the engine on the incorrect stroke, there is an additional time delay 136 between the engine management system 14 altering the air/fuel ratio λ and the combustion products from this altered ratio affecting the sensor output signal 12. This additional time delay 136 is due to the fuel injection occurring at the incorrect engine phase, for example, near the end of the compression stroke, rather than near the end of the exhaust stroke. As a result, the inlet valve 23 is not open at or shortly after the injection of fuel into the air inlet 22, and the fuel pools behind the inlet valve 23. When the inlet valve 23 opens this pool is drawn into the cylinder 16. Since the fuel is no longer in a fine mist when it enters the cylinder 16, the combustion event will be less efficient. The additional time delay 136 measured is the time between the injection of the fuel and the introduction of the fuel into the cylinder 16.

The increased time delay 142 between these sudden changes in engine condition for the incorrectly fueled engine is greater than the time delay 120 in the correctly fueled engine. This leads to the air/fuel ratio λ varying over a range 144 than is the case for a correctly fueled engine.

FIG. 7 shows how the variation in air/fuel ratio λ changes when the engine is set to run for lean operation. Starting at the beginning of one of the lean phases 164, the air/fuel ratio is the stoichiometric value $\lambda=1$ and then rises at a constant rate for a time t_{L2} . When the combustion products from this lean operation reach the exhaust gas oxygen sensor 6 and the sensor signal 12 changes from high $S_i=1$ to low $S_i=0$ the engine management system 14 drops the air/fuel ratio to a level above the stoichiometric value $\lambda=1$. The air/fuel ratio then falls at a steady rate to begin rich operation of the engine during a time T_{R2} until a further sensor switch is detected. When the air/fuel ratio λ suddenly rises to the stoichiometric level $\lambda=1$ and begins to rise steadily.

The extra period of lean fueling 158 gives rise to a measured transport delay time which can take one of two values 160, 162. During the cycle with no extra lean fueling 164, the time delay 160 is less than the time delay 162 due to the period of extra lean fueling 158 occurring during the cycle 166.

It has been found during test track evaluation of a motor car incorporating the invention, that this lean bias effect does not cause problems in the verification of whether or not the engine is fueled on the correct stroke.

FIG. 8 shows a plot of real data taken during evaluation of the motor car incorporating the invention. The plot shows that the measured air/fuel ratio λ_a against time t has a "saw-tooth" shape. This is to be expected from the conventional method of closed-loop control of an engine outlined above. This plot shows that there is significant noise in the sensor outputs that could potentially affect the results. In this case, it can be seen that the measured air/fuel ratio λ_a does not oscillate symmetrically above and below about the stoichiometric value $\lambda_a=1$. A typical jump in the air/fuel ratio is highlighted 204 to show that even with the associated signal noise it is possible to define a point at which the sudden jump in the air/fuel ratio occurs. This then allows the calculation of the time taken between these jumps so that the fueling stroke of the engine can be verified.

US 6,736,122 B2

7

FIG. 9 shows the actual exhaust gas sensor output S_n associated with the plot in FIG. 8. The inherent noise in the system can be seen since the plot is not regular. A typical change in the sensor output is highlighted 208 to show that the sensor switch point can be determined even through signal noise. This allows the engine management system 14 to determine the time at which the switch in engine operating conditions should occur.

FIG. 10 shows the counted number of engine cycles N between the sensor switches rising 212 and being reset 214 when a sudden change in sensor output is detected. The plot 218, represents the expected number of engine cycles between the sensor switch events. As can be seen, the actual number of engine cycles between sensor switches, defined by the height of the peaks 216 in the plot of engine cycle count N against time t , varies above and below the expected number of cycles 218. The difference between the peak height 216 and the expected number of engine cycles, 218 defines an error. This error could be due to noise, or due to incorrect fueling of the engine producing an associated extra transport time delay.

FIG. 11 shows how a cumulative average difference λ between the actual number of engine cycles and the expected number of engine cycles between the sudden changes in sensor output, as calculated from FIG. 10, may be averaged to lessen the effects of noise in the system. There are two plots 254, 256 shown in FIG. 11. The first plot 254 is obtained from an engine being correctly fueled and the second plot 256 is obtained from an engine being incorrectly fueled. These plots show how the average errors, for a test carried out at a constant engine speed, converge over time 201. Initially, [250] the difference 250 varies greatly, but the later difference 250 is relatively steady. The plot 254 from the correctly fueled engine is consistently closer to a zero difference line 258 than the plot 256 from the incorrectly fueled engine. This shows that after averaging the difference between the expected delay time and the actual delay time it is possible to differentiate between a correctly fueled engine and an engine that is being incorrectly fueled, by the mean error away from the zero differences line 258.

FIG. 12 shows two plots 304, 305 of the variation in the average difference λ_n over a number of readings, between the expected and actual number of engine cycles between the sudden changes in sensor output as shown in FIG. 11 and the engine speed V . Both plots 304, 305 show that the average difference λ_n decreases as engine speed V increases. The plot 304 from an engine that is correctly fueled is consistently above the plot 305 from an engine that is being incorrectly fueled. As a result of this distinct difference, an engine can be characterized over a wide range of engine operating conditions in terms of the time taken between the sudden changes in engine output for both correct phase fueling and incorrect phase fueling. Once such a characterization has been made, it is possible to establish whether or not the engine is being correctly fueled by analysing the frequency or period of the sudden changes in exhaust gas sensor output, and then comparing this with an expected frequency or period.

FIG. 13 shows a flow chart illustrating a method according to the invention for determining whether or not the engine is being fueled on the correct stroke.

The engine management system is used to control the operation of the engine 400 including the fuel injection system and the air/fuel ratio for at least one cylinder.

The engine management system receives signals 402 indicative of the engine operating conditions from sensors

8

positioned around the engine, including at least one exhaust gas composition sensor.

The air/fuel ratio is oscillated 404 between a relatively rich level and a relatively lean level, the exhaust gas composition varying depending on the air/fuel ratio.

The direction of change of the air/fuel ratio is reversed 406 when the exhaust gas composition is sensed as being indicative of rich engine operation or lean engine operation.

The temporal characteristics of the oscillation in the air/fuel ratio are then determined 408 and this temporal characteristic is then compared 410 with stored engine operating condition data, in order to determine 412 whether or not the engine is being fueled on the correct stroke. The cycle then returns 414 to the start.

If it is determined that the engine is being incorrectly fueled, the engine management system can then be used to adjust automatically the fueling stroke of the engine.

The invention therefore provides a convenient way to sense and correct fueling on an incorrect stroke of the engine.

What is claimed is:

1. An internal combustion engine, comprising a number of cylinders, the or each cylinder containing a four-stroke reciprocating piston, an exhaust conduit, one or more engine operating condition sensors including an exhaust gas sensor in the exhaust conduit for measuring the composition of the exhaust gas, a fuel injection system, and an engine management system for controlling the operation of the engine including the fuel injection system and the air/fuel ratio for at least one cylinder, wherein the engine management system contains engine operation data, the engine operation data being related to expected engine operation with engine fueling on the correct stroke and/or engine fueling on an incorrect stroke, and the engine management system is arranged to:

- a) receive from said sensor(s) respective signal(s);
- b) oscillate the air/fuel ratio between a relatively rich level and a relatively lean level, the exhaust gas composition varying depending on the air/fuel ratio;
- c) reverse the direction of change of the air/fuel ratio when the exhaust gas composition is sensed as being indicative of rich engine operation or lean engine operation;
- d) determine the temporal characteristics of the oscillation in the air/fuel ratio; and
- e) determine whether or not the engine is being fueled on the correct stroke by comparing said temporal characteristics with said relevant engine operation data.

2. A method of operating an internal combustion engine the engine comprising a number of cylinders, the or each cylinder containing a four-stroke reciprocating piston, one or more engine operating condition sensors including an exhaust gas sensor, a fuel injection system, and an engine management system, wherein the engine management system contains engine operation data, the engine operation data being related to expected engine operation with engine fueling on the correct stroke and/or engine fueling on an incorrect stroke, wherein the method comprises the steps of:

- a) using the engine management system to control the operation of the engine including the fuel injection system and the air/fuel ratio for at least one cylinder;
- b) sending to the engine management system from said sensor(s) respective signal(s) indicative of engine operating conditions, including exhaust gas composition;
- c) oscillating the air/fuel ratio between a relatively rich level and a relatively lean level, the exhaust gas composition varying depending on the air/fuel ratio;

US 6,736,122 B2

9

d) using the engine management system to reverse the direction of change of the air/fuel ratio when the exhaust gas composition is sensed as being indicative of rich engine operation or lean engine operation;
e) using the engine management system to determine the temporal characteristics of the oscillation in the air/fuel ratio; and
f) using the engine management system to determine whether or not the engine is being fueled on the correct stroke by comparing said temporal characteristics with said relevant engine operation data.
3. A method as claimed in claim 2, comprising the additional steps of calculating the engine management system transport delay time from the period or frequency of the reversal of the oscillation in the air/fuel ratio, this transport delay time being indicative of the time taken for a change in engine operating conditions to alter the composition of the exhaust gas at the exhaust gas sensor, this transport delay time; and
comparing the engine management transport delay with the engine operation data stored in the engine management system to determine whether or not the engine is being fueled on the correct stroke.

10

4. A method as claimed in claim 2, wherein the exhaust sensor is an exhaust gas oxygen sensor.
5. A method as claimed in claim 2, wherein the period or frequency of the reversal cycle data is averaged over a plurality of oscillations in the air/fuel ratio.
6. A method as claimed in claim 2, wherein the period or frequency data of an oscillation in the air/fuel ratio is ignored by the engine management system if said period or frequency is outside a pre-determined range.
7. A method as claimed in claim 2, wherein the engine management system has a range of pre-determined engine operating conditions during which it calculates the period or frequency of the reversal cycle or the transport delay and stores it for future reference.
8. A method as claimed in claim 7, wherein the stored period or frequency of the reversal cycle or the transport delay is used to calculate an average error for those particular engine operating conditions for which data is recorded and using the engine management system to determine whether or not the engine is being fueled on the correct stroke by comparing said temporal characteristics with said relevant engine operation data.

* * * * *

EXHIBIT 11

U.S.008909482B2

(12) **United States Patent**
Maso Portabella

(10) Patent No.: US 8,909,482 B2

(45) Date of Patent: Dec. 9, 2014

(54) **DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT**

(76) Inventor: Alberto Maso Portabella, Cabrera de Mar (ES)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 932 days.

(58) **Field of Classification Search**

CPC G01D 4/00; G01R 22/10; G07C 5/02;
Y02B 70/343; Y04S 20/34; G06Q 10/00;
G06Q 10/063; G06Q 10/0639; G06Q
10/06393; G06Q 30/02

USPC 702/19, 24, 45, 50, 57, 60, 61, 68, 179,
702/182, 183, 188; 705/7.11, 7.12, 7.39, 10
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

(21) Appl. No.: 13/054,355

2004/0117240 A1* 6/2004 Ness et al. 705/10

(22) PCT Filed: Jul. 20, 2009

FOREIGN PATENT DOCUMENTS

(86) PCT No.: PCT/IB2009/053135

WO WO02/067152 8/2002

§ 371 (c)(1).

(2), (4) Date: Jan. 14, 2011

OTHER PUBLICATIONS

PCT International Search Report completed for PCT/IB2009/
053135 Aug. 24, 2010.

(87) PCT Pub. No.: WO2010/007601

* cited by examiner

PCT Pub. Date: Jan. 21, 2010

(65) **Prior Publication Data**

Primary Examiner — John H Le

US 2011/0130972 A1 Jun. 2, 2011

(74) *Attorney, Agent, or Firm* — Barnes & Thornburg LLP

(30) Foreign Application Priority Data

(57) ABSTRACT

Jul. 18, 2008 (ES) 200802159

A device for measuring power consumption and performance relative to the environment of a power-consuming unit is disclosed. The device includes a data introduction module, a keyboard for inputting data of waste production in the power-consuming unit, a computing device, and a display screen. The computing device receives the data from the data introduction module and the keyboard. The computing device is also provided with a processor that includes a calculation algorithm of an ecological parameter indicative of the performance relative to the environment of the power-consuming unit. The ecological parameter is calculated as an adjusted mean of the sum of the deviations of each power consumption value with respect to a reference value.

(51) Int. Cl.

G06F 19/00 (2011.01)

G01R 21/00	(2006.01)
-------------------	-----------

GOLD 4/00 (2006.01)

G07C 5/02 (2006.01)

G01R 22/10 (2006.01)

(52) U.S. Cl.

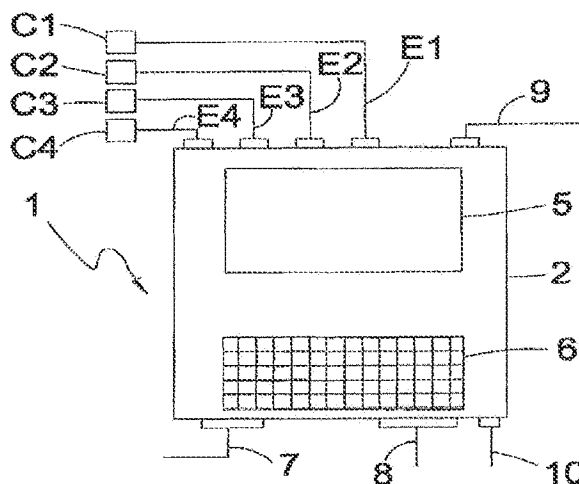
CPC : *G01D 4/00* (2013.01); *G07C 5/02* (2013.01);

G01R 22/10 (2013.01); Y02B 70/343 (2013.01);

Y048 20/34 (2013.01)

USPC 702/19; 702/45; 702/61; 705/7.39

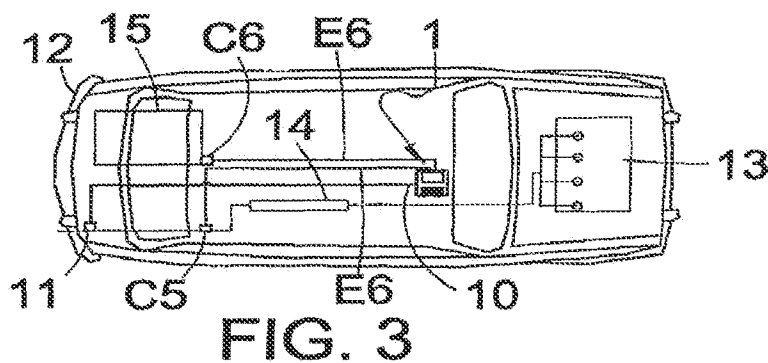
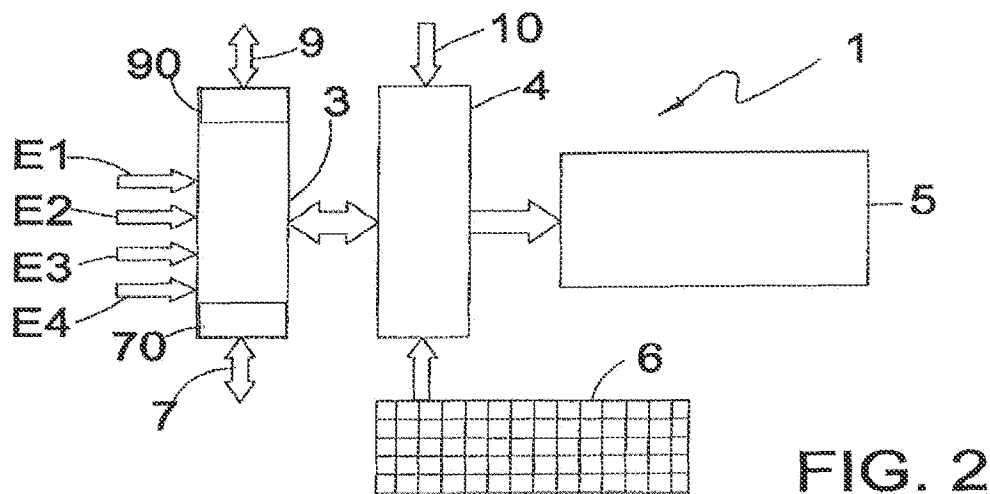
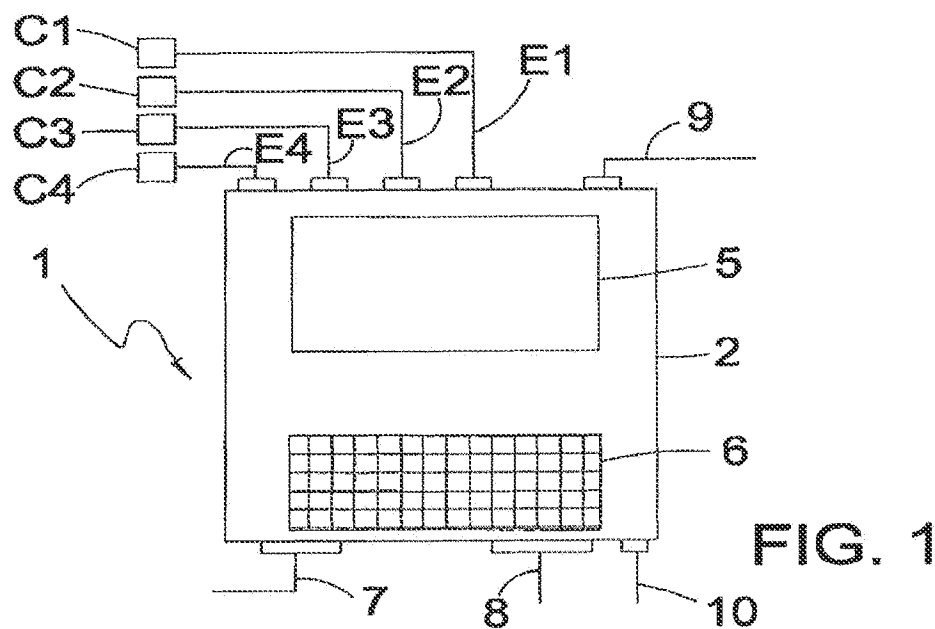
16 Claims, 1 Drawing Sheet



U.S. Patent

Dec. 9, 2014

US 8,909,482 B2



US 8,909,482 B2

1

**DEVICE FOR MEASURING POWER
CONSUMPTION AND PERFORMANCE WITH
RESPECT TO THE ENVIRONMENT OF A
POWER-CONSUMING UNIT**

**CROSS-REFERENCE TO RELATED
APPLICATIONS**

This application is a U.S. national counterpart application of International Application Serial No. PCT/IB2009/053135 filed Jul. 20, 2009, which claims priority to Spanish Patent Application No. P200802159 filed Jul. 18, 2008. The disclosures of PCT/IB2009/053135 and P200802159 are each hereby incorporated herein by reference.

TECHNICAL FIELD OF THE INVENTION

The invention refers to a device for measuring power consumptions and the respectful performance with the environment, from the measured power consumptions and from the residue production, in a power-consuming unit, a comfort unit (houses, communities, hotels and restaurants, spare time spaces, sport spaces, private and public motor vehicles, and goods vehicles, etc.) or a production unit.

The measurement of this respectful performance or not will be carried out by what we call "ecological parameter", from the measurements of power consumptions (direct consumptions) and of residues and wastes generated (indirect consumptions).

BACKGROUND OF THE INVENTION

A lot of kinds of programmable logic controllers (PLC) are known, in which, from state variables, the outputs of a system are determined (e.g. electrical or pneumatic, etc.) or another kinds of devices that, from inputs, calculate the values of parameters of interest. Examples of these devices can be the known analysers of the electric mains that, from voltage, current intensity and imbalance signals, calculate the electric power consumed by an installation.

However, in the current art no device or apparatus that calculates ecological parameters or magnitudes are known, from power consumption and waste production data in installations, if we define such parameters or magnitudes as a deviation of an optimal work point, defined by an authority. E.g. in which the emissions of COx or NOx are the minimum possible according to its use.

The present invention has the objective to provide an apparatus that fulfils this gap in the current art.

DESCRIPTION OF THE INVENTION

To this end, the object of the present invention is a new measuring device of power consumptions which calculates ecological parameters from the measured power consumptions and from data of waste production, that it is characterised in that it comprises:

- a module for introducing data, provided with at least an input of a value of power consumption of a magnitude, measured in a corresponding measure apparatus of the power-consuming unit;
- a keyboard for introducing data and for selecting menus, in particular data of waste production of the power-consuming unit;
- computing means that receive the data from the module for introducing data and from the keyboard, and which are provided with a processor that incorporates an algorithm

2

for calculating an ecological parameter from the measured consumptions of power and from the introduced data; and

- a display screen, communicated with the computing means, to display the calculated ecological parameter, said ecological parameter being calculated as an adjusted mean of the sum of the deviations of each value of power consumption measured according to a reference value.

According to another feature of the present invention, the device comprises means for introducing values of waste production.

In preferred variants, the device can comprise an input module of a data bus of a domotic network and/or an USB input for a serial data bus.

In an embodiment of domestic or industrial application, the device comprises at least:

- an input of water flow, from a corresponding first water flow meter;
- an input of combustible gas or liquid flow, from a second flow meter of combustible gases or liquids;
- an input for measuring the electric power, from a counter or analyser of the electric mains; and
- an input for measuring the waste weight from a waste weighting scales.

In an alternative embodiment, for calculating the ecological parameter corresponding to the automobile, the device can comprise at least:

- an input of fuel flow, from a corresponding fuel flow meter of the motor of an automobile; and
- means for introducing the production of wastes of the automobile, selected among: tire rubber wastes, motor oil wastes, coolant liquid wastes, and liquid wastes from closed circuits, not being limitative, by the keyboard of the device.

The device can be provided also with an input for exhaust gases flow, from a corresponding flow meter of exhaust gases of the combustion system of the power-consuming unit, e.g. the motor exhaust; and a gas analyser for measuring the emission levels of gases and particles. The device compares the result obtained with the admitted levels by the current regulations. The incorrect combustion and the subsequent excess of gas (CO₂ and NO_x) and particle emission is not a user or producer question, because they do not influence on it, but the direct responsible is the manufacturer of the apparatus or combustion chamber. However, additionally, the repair of said anomaly it is a question of the user or producer. This does not affect only to explosion motors and domestic boilers, but also to production and transformation centres.

Preferably, the device comprises a shell, which encloses the several components of the device, and in whose external part it is the keyboard and the screen.

BRIEF DESCRIPTION OF THE DRAWINGS

In the attached drawings some embodiments of the device object of the present invention are shown, only as a non-limitative example. In said drawings:

FIG. 1 is a diagrammatical frontal elevation view, that shows a device according to the present invention, with its particular connections;

FIG. 2 is a block diagram that shows the internal composition of the device of FIG. 1; and

FIG. 3 is a diagrammatical view that shows an alternative embodiment of the invention, to be applied to automobiles.

DETAILED DESCRIPTION OF THE DRAWINGS

In said drawings it can be seen the constitution and way of the device for measuring power consumptions and for calcu-

US 8,909,482 B2

3

lating ecological parameters from the measured power consumptions, directly and indirectly.

The function of the device of the invention is to measure the respectful performance or behaviour with the environment of a "power-consuming unit". The "power-consuming unit" object of the measure of the possible different power manifestations consumed can be: a house, community (hotel, sports centre, residence, sport spaces, shops, department stores, leisure halls, office buildings and studies, administration centres, etc.), transformation centres, garages, warehouses, motor vehicles or transportation means, private or public.

The basis of the operation will consist in the comparison between the basic actual power flow required by the user for their comfort with the normal consumptions of the current regulations (e.g. UNE, ISO standards, etc.) and/or those recommended by official administrations of the place and/or statistic data of normal power consumptions and wastes (hereinafter "typical consumptions" including flows of power consumptions and wastes by person or by own unit of a preset population).

For this comparison, the proposed system will calculate an ecological parameter as an adjusted mean of the sum of deviations of each value of power consumption measured with respect to its corresponding reference value.

To this end, as seen in FIGS. 1 and 2, the device 1 of the present invention is constituted by an apparatus that has a carcass or shell 2 that includes the following elements:

- a module for introducing data 3, provided with inputs of power consumption values E1, E2, E3, E4, of magnitudes, measured with corresponding measure apparatuses C1, C2, C3, C4;
- a keyboard 6 for introducing data and selecting menus, in particular data of the waste production;
- computing means 4, which receive the data from the module for introducing data 3 and the keyboard 6, and which are provided with a processor that includes a calculation algorithm for an ecological parameter from the measured power consumptions and from the introduced data; and
- a display screen 5, communicated with said computing means 4, to display the calculated ecological parameter.

The apparatus is provided with an electrical source 8, as it can be seen in FIG. 1.

To introduce values of the waste production one of the inputs E4, digital or analogical, can be used, from a weight apparatus, or they can be introduced manually through a keyboard 6.

The device 1 can be complemented with an input module 90 for a data bus 9 of a domotic network, and an USB input 70 for a serial data bus 7, or equivalent means.

In FIG. 1 a device particularly devised for special application in buildings (houses, hotel, sports centre, residence, sport spaces, shops, department stores, leisure halls, office buildings and studies, administration centres, transformation centres, garages, warehouses, etc.) is shown. The shell 2 comprises at least the following inputs:

- an input for the water flow E1 from a corresponding first water flow meter C1;
- an input for the flow of combustible gases or liquids E2, from the second flow meter of combustible gases or liquids C2;
- an input for measuring electric power E3, from a meter or analyser of electric mains C3; and
- an input for measuring the weight of the wastes E4 from a scale for weighting wastes C4, through the corresponding ports.

4

The number of inputs will be according to the complexity of the installation. E.g. an industry can be provided with several devices of this kind, each associated with a corresponding section or unit of factory, warehouse, office, etc.

In FIG. 3 is shown an embodiment particularly devised for automobiles, in which the device comprises an input for fuel flow E6, from a flow meter C6 of fuel, associated with the fuel deposit 15; and an input of exhaust gases flow E5, from a corresponding flow meter C5 of exhaust gases from the exhaust system 14 of the motor 13 of an automobile 12. In this case, by the keyboard the flows of production of wastes of the automobile are introduced manually, e.g. rubber wastes from tires, oil wastes for the motor, coolant liquid wastes, liquid wastes from closed circuits and metal wastes.

The device has an input 10 to collect, optionally, the information from a gas analyser 11 (FIG. 3), to measure the emission levels of gases and particles. The device 1 compares the result obtained with the levels admitted by the current regulations.

The algorithm of the computing means 4 calculates the total basic power flow obtained by the evaluation of the flows of the measured power statements E1, E2, E3, E4, E5, E6, etc., referred to the number of people which use the unit to be measured in each trip. The calculation algorithm integrates all the trips of a time period to be defined or the accumulated total.

Each flow has an incidence in the environment: the water consumption reverts in its exploitation, the fuel consumption is associated to the direct emissions of CO₂, NO_x, . . . , the electric consumption to the indirect emissions of CO₂, NO_x, . . . , and the waste production with indirect environmental impact, by the quantity of paper, glass, organic material, plastics, oils and greases, rubbers, metals, . . . expressed in kg that the unit consumes per time unit and please who enjoy the comfort of said unit, to be compared with preset consumptions and wastes. These data, once treated by the algorithm, give as result an ecologic parameter (here denoted as "ecocom"), which is the measure of the conduct that respects our environment, to provide integral or combined or individual "ecocoms" of the comfort or production unit.

Regarding the presentation of the results, from said comparison the actual percentage of power consumption with respect to the preset consumption is obtained, indicating if the performance is respectful (equal to zero or higher) or abusive when it is negative. Both deviations are measured as a percentage. The percent unit of each flow is called positive "ecocom", if the result is respectful or negative if it is not. The algorithm of all the flows provides the integral "ecocom" of the unit. As there can be difficulties to receive all the flows, the algorithm of the ecometer could provide only "ecocoms" of water exploitation and/or direct gases emission and/or indirect gases emission and/or waste production. It is also possible to measure only those flows the public administration considers suitable to pay ecotaxes, evaluating a specific pack (which can be called "administrative ecocom").

The results are presented in a permanent way in a screen 5, indicating the periods of time on which they are based: the day, week, month accumulations, etc. or others, such as those consumed by trip in the case of vehicles. To know better the power exploitation, by a menu the "ecocoms" can be displayed (day, week, month, . . .) of exploitation of the different power sources in the screen or to pass to other successive ones with the direct or indirect emissions or waste production.

As stated previously, if the consumption of only one or several flows are calculated for installation difficulties, the permanent screen shows that they are individual "ecocoms" by power source or waste, combined or integral.

US 8,909,482 B2

5

Regarding the installation of different measuring apparatus C1, C2, C3, C4, C5, C6, etc., the water flow meter C1 is placed downstream the company meter and upstream the home key, with the possibility to emit impulses or analogical or digital or light signals. The same applies to C2, flow meter for combustible gases or liquids, to C3, electric measuring equipment in the general board of the unit, to C5, in the case of exhaust gases, and to C6, in the case of fuel flow of an automobile. The same can be said to the flow of waste production E4, which will be from a scale C4. The emission of information can be wireless or wired. In the case that there is no installation, by the keyboard 6 the flow data can be introduced manually.

Algorithm for Calculating the Ecologic Parameter

It results from the adjusted arithmetic mean of all the quotients between the absolute value of actual flows (E1, E2, E3, E4, E5, ...) that enter in the power-consuming unit object of the measure of the different possible power statements, with respect to their flows or corresponding reference values. The absolute value of the actual flows is taken because the input power consumption has a sign opposed to a waste, which indirectly is associated to another external power consumption;

therefore, as the contributions of each factor is the interesting part, all are taken in flow absolute value, no the quotient of flows, not being compensated to each other.

It is defined:

1—Flow of an actual input power statement (E1, E2, E3, E4, E5, E6, ..., generally Ei): As the power quantity consumed by the time unit of that power statement, by user of the unit to be measured. E.g. the drinkable consumed in a home is a power flow because it is obtained from the nature with transportation, purification cost ...; these power costs are environmental costs associated with that consumed water. The combustible liquid and gas flow consumed is another actual input power flow associated with the direct emissions of CO2 and others to the atmosphere. The electricity consumption is another power flow associated with the indirect emissions of CO2 and other not desired gases. The wastes are also indicative of the environmental impact and they indicate indirectly a power expense. E.g. it is also an input power flow the quantity of glass we waste for identical reasons, but not those that we buy and remains for the development of the activity in the unit. Also with the paper, the organic material, the containers, the spare parts from repairs, etc.

2—Preset flows (Ci): They would be the average power consumption desired or recommended by the public administration of the zone where the activity of each unit to be measured is developed. If there is no environmental policy defined by the administration, standard consumptions or statistic data of consumptions are taken, inputs as consumption and outputs of wastes per resident or per production unit.

3—Adjustment coefficient (Cpd): Each coefficient designs a deviation percentage with respect to the preset consumption of consumed power statement. But not all have the same importance according to:

3.1. Habits regarding the consumptions of the unit. In certain regions there are power statements that have an important weight due to the proximity to the resource, subsidized prices or no other sources ... In these situations it must take into account the suitable specific weight that the administration determines or the statistical data. In the case of a motor vehicle, the water consumption will be dismissed, but not the fuel liquids or gases consumptions, the oil and grease wastes and rubber and metal wastes.

3.2. The power policies of the zone. According to the administration of the place and attending if to the environ-

6

ment conduct is associated a tax; these quotients must be adjusted depending on which deviations the administration could reward or punish.

3.3. Practical ends. These coefficients can be zero, because the contribution of said consumption is so low that is dismissed, according to the cost of its measure. E.g. the quantity of organic wastes of an electric train.

The adjusted coefficients are between 0 and 1.

Hence, the ecologic parameter (or "ecocoms", in %), for "n" magnitudes of power consumption or wastes, is calculated applying the formula:

$$Ecocoms(\%) = 1/n \sum_{i=1}^n \left(Cpd_i \left(1 - \frac{Ei}{p \cdot Ci} \right) \right) \times 100$$

Wherein n is the number of power sources or waste variables to be measured (with adjustment coefficient different from zero) and p the people who enjoys the comfort of the unit to be measured.

Interpretation of the Results

The result is a percentage that when is close to zero the performance is desirable, but if it is negative and far away from zero, the performance of this unit is not respectful and the distance to zero is the degree of the separation from the desirable performance, and therefore it can be penalised and the penalization can be measured. Lastly, if it is positive the performance is excellent and the separation from zero is the measure of its environmental excellence.

The device for measuring power consumptions and the respectful performance, according to the present invention, can be used for the calculation of an ecologic parameter, which can be used as basis for the application of called eco-taxes by the administration.

What is claimed is:

1. A device for measuring power consumption and performance with respect to the environment of a power-consuming unit comprising

a data introduction module, which receives at least one power consumption value, measured by a measurement apparatus of the power-consuming unit;
an input device for inputting waste production data;
a display screen; and

a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to

(a) receive the at least one power consumption value from the data introduction module,
(b) receive the waste production data,
(c) calculate an ecological parameter based on the at least one power consumption value and the waste production data, and
(d) operate the display screen to display the calculated ecological parameter,

wherein the calculated ecological parameter is an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value.

2. The device of claim 1 further comprising a means for introducing values of waste production.

3. The device of claim 1 further comprising an input module of a data bus in a domotic network.

4. The device of claim 1 further comprising USB input for a serial data bus.

US 8,909,482 B2

7

5. The device of claim 1 wherein the at least one power consumption value includes at least two power consumption values selected from the group of:
a water flow input from a corresponding first water flow meter;
a combustible gas and liquid flow input from a second combustible gas and liquid flow meter;
an electric power measurement input from a meter or analyser of electric mains; and
a waste weight measurement input from a scale for weighing wastes.
6. The device of claim 1 wherein the at least one power consumption value includes a fuel flow input from a corresponding flow meter from the motor of an automobile;
the waste production data corresponds to one of tire rubber wastes, motor oil wastes, coolant liquid wastes, closed circuit liquid wastes and metal wastes, and
the fuel flow input and the waste production data are used to calculate the ecological parameter corresponding to the automobile.
7. The device of claim 6 wherein the at least one power consumption value includes an exhaust gas flow input from a corresponding flow meter of exhaust gases of a combustion system of the automobile.
8. The device of claim 1 further comprising a shell, which encloses the different components of the device, and in whose external part is the input device and the display screen.
9. A method of determining an ecological parameter by processor, comprising:
receiving a first power consumption value of a power consuming unit,
receiving a waste production data value,
determining an ecological parameter based on the first power consumption value and the waste production data value, and
outputting the determined ecological parameter for display on a display screen.

8

10. The method of claim 9, wherein the first power consumption value corresponds to one of water flow, combustible gas flow, and electric power flow.
11. The method of claim 10, wherein the waste production data corresponds to waste weight.
12. The method of claim 9, wherein the first power consumption value corresponds to one of fuel flow and exhaust gas flow.
13. The method of claim 12, wherein the waste production data corresponds to one of rubber wastes, oil waste, coolant liquid wastes, and metal.
14. The method of claim 12, further comprising generating a positive ecological parameter when a user expends less than a predetermined standard quantity of power consumed in a time period.
15. The method of claim 9, further comprising generating a negative ecological parameter when a user expends more than a predetermined standard quantity of power consumed in a time period.
16. The method of claim 9, wherein the ecological parameter is determined as a percentage based on an algorithm of the form

$$\text{Parameter(\%)} = 1/n \sum_{i=1}^n \left(Cpd \left(1 - \frac{Ei}{p \cdot Ci} \right) \right) \times 100$$

wherein “Ei” is a power quantity consumed in a time period,
“Ci” is a predetermined standard quantity of power consumed in the time period,
“Cpd” is a coefficient corresponding to the predetermined standard quantity of power consumed in the time period,
“n” is a sum of a number of measured power sources and waste variables, and
“p” is a number of users of the measured power sources and waste variables.

* * * * *

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 13/054,355														
APPLICATION AS FILED - PART I																				
		(Column 1)			(Column 2)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY											
FOR		NUMBER FILED		NUMBER EXTRA		RATE(\$)		FEE(\$)		RATE(\$)		FEE(\$)								
BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A		N/A		N/A		165		N/A										
SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A		N/A		N/A		215		N/A										
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A		N/A		N/A		110		N/A										
TOTAL CLAIMS (37 CFR 1.16(j))		16		minus 20 =		*		x	26	=	0.00		OR							
INDEPENDENT CLAIMS (37 CFR 1.16(h))		3		minus 3 =		*		x	110	=	0.00									
APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$270 (\$135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).										0.00								
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))														0.00						
* If the difference in column 1 is less than zero, enter "0" in column 2.														TOTAL		490		TOTAL		
APPLICATION AS AMENDED - PART II																				
		(Column 1)			(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY										
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)		ADDITIONAL FEE(\$)		RATE(\$)		ADDITIONAL FEE(\$)								
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=		OR	x	=									
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		OR	x	=									
	Application Size Fee (37 CFR 1.16(s))													OR						
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))													OR						
TOTAL ADD'L FEE																TOTAL ADD'L FEE				
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)		ADDITIONAL FEE(\$)		RATE(\$)		ADDITIONAL FEE(\$)								
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=		OR	x	=									
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		OR	x	=									
	Application Size Fee (37 CFR 1.16(s))													OR						
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))													OR						
TOTAL ADD'L FEE																TOTAL ADD'L FEE				
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.																				

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 13/054,355		Filing Date 01/14/2011		☒ To be Mailed	
ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO										
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)							
FOR		NUMBER FILED		NUMBER EXTRA		RATE (\$)		FEE (\$)		
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A		N/A		N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))		N/A		N/A		N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A		N/A		N/A				
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =		*		X \$ =				
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =		*		X \$ =				
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL				
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			(Column 3)				
AMENDMENT	07/16/2014	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0	X \$40 =		0		
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X \$210 =		0		
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE		0		
(Column 1)			(Column 2)			(Column 3)				
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =				
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =				
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE				
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.						LIE /LISA THOMAS/				
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".										
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".										
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.										

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET Substitute for Form PTO-1360 (For use with Form PTO/SB/06)							Application Number		Filing Date				
							13054355						
							Applicant(s) Alberto MASO PORTABELLA						
							* May be used for additional claims or amendments						
CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT			*		*		*	
	Indep	Depend	Indep	Depend	Indep	Depend		Indep	Depend	Indep	Depend	Indep	Depend
1	1		1				51						
2		1		1			52						
3		1		1			53						
4		1		1			54						
5		4		1			55						
6		4		1			56						
7		(1)		1			57						
8		(1)		1			58						
9			1				59						
10				1			60						
11				1			61						
12				1			62						
13				1			63						
14				1			64						
15				1			65						
16			1				66						
17							67						
18							68						
19							69						
20							70						
21							71						
22							72						
23							73						
24							74						
25							75						
26							76						
27							77						
28							78						
29							79						
30							80						
31							81						
32							82						
33							83						
34							84						
35							85						
36							86						
37							87						
38							88						
39							89						
40							90						
41							91						
42							92						
43							93						
44							94						
45							95						
46							96						
47							97						
48							98						
49							99						
50							100						
Total Indep	1		3		0								
Total Depend	13	↙	13	↙	0	↙							
Total Claims	14		16		0								

Derwent Innovation Patent Export, 2022-09-19 13:53:16 +0000

Search results for: PNS=(US8909482);

Collections searched: DWPI; ARIPO grant; Argentina UM; Argentina app; Armenia grant; Australia UM; Australia app; Australia grant; Austria UM; Austria app; Austria grant; Belarus UM; Belarus grant; Belgium app; Belgium grant; Brazil UM; Brazil app; Brazil grant; Bulgaria UM; Bulgaria app; Bulgaria grant; Canada app; Canada grant; China, Mainland UM; China, Mainland app; China, Mainland grant; Colombia app; Costa Rica UM; Costa Rica app; Croatia UM; Croatia app; Croatia grant; Cuba app; Cuba grant; Czech Republic UM; Czech Republic app; Czech Republic grant; Czechoslovakia grant; Denmark UM; Denmark app; Denmark grant; Estonia UM; Estonia app; Estonia grant; Eurasian (EAPO) grant; Europe (EP) app; Europe (EP) grant; Finland app; Finland grant; France app; France grant; Georgia grant; German Democratic Republic app; German Democratic Republic grant; Germany UM; Germany app; Germany grant; Greece app; Greece grant; Gulf Cooperation Council grant; Hong Kong UM; Hong Kong app; Hong Kong grant; Hungary grant; Iceland grant; India app; India grant; Indonesia UM; Indonesia app; Ireland UM; Ireland app; Ireland grant; Israel grant; Italy grant; Italy grant; Italy grant; Italy grant; Japan UM; Japan app; Japan grant; Korea UM; Korea app; Korea grant; Latvia grant; Lithuania grant; Luxembourg app; Luxembourg grant; Malaysia app; Malaysia grant; Mexico app; Mexico grant; Moldova UM; Moldova grant; Monaco grant; Mongolia UM; Mongolia grant; Morocco app; Morocco grant; Netherlands app; Netherlands grant; New Zealand grant; Norway app; Norway grant; OAPI grant; PCT (WO) app; Philippines UM; Philippines app; Philippines grant; Poland UM; Poland grant; Portugal UM; Portugal app; Portugal grant; Romania UM; Romania app; Romania granted; Russia UM; Russia app; Russia grant; Serbia UM; Serbia app; Serbia grant; Singapore app; Singapore grant; Slovakia UM; Slovakia app; Slovakia grant; Slovenia UM; Slovenia grant; South Africa app; Spain UM; Spain app; Spain grant; Sweden app; Sweden grant; Switzerland app; Switzerland grant; Taiwan UM; Taiwan appl; Taiwan grant; Thailand UM; Thailand app; Thailand grant; Tunisia app; Turkey UM; Turkey app; Turkey grant; UK app; UK grant; USSR grant; Ukraine UM; Ukraine grant; United States app; United States grant; Uruguay app; Vietnam UM; Vietnam app; Vietnam grant; Other

Table of Contents

- 1. US8909482B2 Device for measuring power consumption and performance with respect to the environment of a power-consuming unit

Family 1/1

1 record(s) per family

Record 1/1 US8909482B2 Device for measuring power consumption and performance with respect to the environment of a power-consuming unit

Title: Device for measuring power consumption and performance with respect to the environment of a power-consuming unit

Title - DWPI: Device for measuring energy consumption/environmentally friendly performance of energy consuming unit, calculates ecological parameter as weighted average of sum of deviations of energy consumption values in relation to reference value

Priority Number: ES20082159A | WO2009IB53135A

Priority Date: 2008-07-18 | 2009-07-20

Application Number: US13054355A

Application Date: 2011-01-14

Publication Date: 2014-12-09

IPC Class Table:

IPC	Section	Class	Subclass	Class Group	Subgroup
G06F001900	G	G06	G06F	G06F0019	G06F001900
G01D000400	G	G01	G01D	G01D0004	G01D000400
G01R002100	G	G01	G01R	G01R0021	G01R002100
G07C000502	G	G07	G07C	G07C0005	G07C000502
G01R002210	G	G01	G01R	G01R0022	G01R002210

IPC Class Table - DWPI:

IPC - DWPI	Section - DWPI	Class - DWPI	Subclass - DWPI	Class Group - DWPI	Subgroup - DWPI
G01D000400	G	G01	G01D	G01D0004	G01D000400
G01D000708	G	G01	G01D	G01D0007	G01D000708
G01R002100	G	G01	G01R	G01R0021	G01R002100
G06F001900	G	G06	G06F	G06F0019	G06F001900
G06Q005000	G	G06	G06Q	G06Q0050	G06Q005000

G07C000502	G	G07	G07C	G07C0005	G07C000502
G01R002210	G	G01	G01R	G01R0022	G01R002210
G01R	G	G01	G01R	-	-

Assignee/Applicant: Maso Portabella Alberto,Cabrera de Mar,ES

JP F Terms:

JP FI Codes:

Assignee - Original: Maso Portabella Alberto

Any CPC Table:

Type	Invention	Additional	Version	Office
Current Current Current	G01D 4/00 G07C 5/02	G01R 22/10 Y02B 70/34 Y04S 20/30	20130101 20130101 20130101	EP; US EP; US EP; US
Current	G01D 7/08	-	20130101	ES
Original Original Original	G01D 4/00 G07C 5/02	G01R 22/10 Y02B 70/343 Y04S 20/34	20130101 20130101 20130101	US US US

ECLA:

Abstract:

A device for measuring power consumption and performance relative to the environment of a power-consuming unit is disclosed. The device includes a data introduction module, a keyboard for inputting data of waste production in the power-consuming unit, a computing device, and a display screen. The computing device receives the data from the data introduction module and the keyboard. The computing device is also provided with a processor that includes a calculation algorithm of an ecological parameter indicative of the performance relative to the environment of the power-consuming unit. The ecological parameter is calculated as an adjusted mean of the sum of the deviations of each power consumption value with respect to a reference value. |

Dispositivo para la medición de consumos energéticos y del comportamiento respetuoso con el medio ambiente de una unidad consumidora de energía. Com- prende un módulo de introducción de datos (3), que está dotado a su vez por lo menos de una entrada de un valor de consumo energético (E1, E2, E3, E4, E5, E6) de una magnitud, medido en un correspondiente aparato de medida (C1, C2, C3, C4, C5, C6) de la unidad consumidora de energía; un teclado (6) de

introducción de datos, medios de computación (4) que reciben los datos procedente del módulo de introducción de datos y del teclado, y que están provistos de un procesador que incorpora un algoritmo de cálculo de un parámetro ecológico, indicativa del comportamiento respetuoso con el medio ambiente de la unidad consumidora de energía, a partir los consumos energéticos medidos y de los datos introducidos; y una pantalla de visualización, comunicada con los medios de computación. El parámetro ecológico se calcula como una media ponderada de la suma de desviaciones de cada valor de consumo energético medido con respecto a un valor de referencia.

L'invention concerne un dispositif pour mesurer les consommations d'énergie et le comportement sans danger pour l'environnement d'une unité de consommation d'énergie. Ce dispositif comprend un module d'introduction de données (3) qui comporte au moins une entrée de valeur de consommation d'énergie (E1, E2, E3, E4, E5, E6) d'une amplitude, mesurée dans un appareil de mesure correspondant (C1, C2, C3, C4, C5, C6) de l'unité de consommation d'énergie; un clavier (6) d'introduction de données, des moyens de calcul (4) qui reçoivent les données provenant du module d'introduction de données et du clavier, et qui sont équipés d'un processeur qui comprend un algorithme de calcul d'un paramètre écologique, indiquant le comportement sans danger pour l'environnement de l'unité de consommation d'énergie, à partir des consommations d'énergie mesurées et des données introduites; et un écran de visualisation, en communication avec les moyens de calcul. Le paramètre écologique est calculé comme une mesure pondérée de la somme des écarts de chaque valeur de consommation d'énergie mesurée par rapport à une valeur de référence.

Language of Publication: EN

INPADOC Legal Status Table:

Gazette Date	Code	INPADOC Legal Status Impact
2022-03-21	MAFP	+
Description: MAINTENANCE FEE PAYMENT FEE PAYMENT YEAR 8 PAYMENT OF MAINTENANCE FEE, 8TH YR, SMALL ENTITY (ORIGINAL EVENT CODE: M2552); ENTITY STATUS OF PATENT OWNER: SMALL ENTITY		
2020-06-16	IPR	-
Description: AIA TRIAL PROCEEDING FILED BEFORE THE PATENT AND APPEAL BOARD: INTER PARTES REVIEW TRIAL NO: IPR2020-00894 2020-05-12		
2020-05-14	STCF	-
Description: INFORMATION ON STATUS: PATENT GRANT PATENTED CASE		

2020-05-14	MAFP	+
Description: MAINTENANCE FEE PAYMENT FEE PAYMENT YEAR 4 PAYMENT OF MAINTENANCE FEE, 4TH YR, SMALL ENTITY (ORIGINAL EVENT CODE: M2551); ENTITY STATUS OF PATENT OWNER: SMALL ENTITY		
2020-05-14	FEPP	-
Description: FEE PAYMENT PROCEDURE PETITION RELATED TO MAINTENANCE FEES FILED (ORIGINAL EVENT CODE: PMFP); ENTITY STATUS OF PATENT OWNER: SMALL ENTITY		
2020-05-14	FEPP	-
Description: FEE PAYMENT PROCEDURE SURCHARGE, PETITION TO ACCEPT PYMT AFTER EXP, UNINTENTIONAL. (ORIGINAL EVENT CODE: M2558); ENTITY STATUS OF PATENT OWNER: SMALL ENTITY		
2020-05-14	FEPP	-
Description: FEE PAYMENT PROCEDURE PETITION RELATED TO MAINTENANCE FEES GRANTED (ORIGINAL EVENT CODE: PMFG); ENTITY STATUS OF PATENT OWNER: SMALL ENTITY		
2020-05-11	PRDP	+
Description: PATENT REINSTATED DUE TO THE ACCEPTANCE OF A LATE MAINTENANCE FEE 2020-05-14		
2019-02-15	AS	-
Description: ASSIGNMENT EQUITABLE IP HOLDINGS, LLC, PENNSYLVANIA ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNORS:FARRE, ENRIQUE BATALLA; CUADRADO, ANTONIO CUEVAS; PARERA, ALEJANDRO PLANELLAS; AND OTHERS; REEL/FRAME:048344/0979 2018-11-08		
2019-02-15	AS	-
Description: ASSIGNMENT MICHIGAN MOTOR TECHNOLOGIES LLC, MICHIGAN ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:EQUITABLE IP HOLDINGS, LLC; REEL/FRAME:048348/0432 2019-02-15		
2019-02-05	FP	-
Description: LAPSED DUE TO FAILURE TO PAY MAINTENANCE FEE 2018-12-09		
2019-01-14	STCH	-
Description: INFORMATION ON STATUS: PATENT DISCONTINUATION PATENT EXPIRED DUE TO NONPAYMENT OF MAINTENANCE FEES UNDER 37 CFR 1.362		
2019-01-14	LAPS	-
Description: LAPSE FOR FAILURE TO PAY MAINTENANCE FEES PATENT EXPIRED FOR FAILURE TO PAY MAINTENANCE FEES (ORIGINAL EVENT CODE: EXP.); ENTITY STATUS OF PATENT OWNER: SMALL ENTITY		

2018-08-31	AS	-
Description: ASSIGNMENT BATALLA-FARRE, ENRIQUER, SPAIN ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:PORTABELLA, ALBERTO MASO; REEL/FRAME:046769/0071 2018-08-29		
2018-08-31	AS	-
Description: ASSIGNMENT CUEVAS-CUADRADO, ANTONIO, SPAIN ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:PORTABELLA, ALBERTO MASO; REEL/FRAME:046769/0071 2018-08-29		
2018-08-31	AS	-
Description: ASSIGNMENT PLANELLAS-PARERA, ALEJANDRO, SPAIN ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:PORTABELLA, ALBERTO MASO; REEL/FRAME:046769/0071 2018-08-29		
2018-08-31	AS	-
Description: ASSIGNMENT VIDAL-PUIG, JOSE MARIA, SPAIN ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:PORTABELLA, ALBERTO MASO; REEL/FRAME:046769/0071 2018-08-29		
2018-07-23	FEPP	-
Description: FEE PAYMENT PROCEDURE MAINTENANCE FEE REMINDER MAILED (ORIGINAL EVENT CODE: REM.)		

Post-Issuance (US): REIN Delayed Maintenance Fee 2020-05-14 2020 2020-06-09 2020 Patent reinstated due to acceptance of delayed payment of maintenance fee | EXPI Expiration 2018-12-09 2018 2019-02-05 2019 Patent expired due to failure to pay maintenance fees

Reassignment (US) Table:

Assignee	Assignor	Date Signed	Reel/Frame	Date
MICHIGAN MOTOR TECHNOLOGIES LLC,SYLVAN LAKE,MI,US	EQUITABLE IP HOLDINGS, LLC	2019-02-15	048348/0432	2019-02-15
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).				
Corresponent: DEVLIN LAW FIRM LLC 1306 N. BROOM ST. SUITE 1 WILMINGTON, DE 19806				
EQUITABLE IP HOLDINGS LLC,VILLANOVA,PA,US	FARRÉ, ENRIQUE BATALLA	2018-11-08	048344/0979	2019-02-15
	CUADRADO, ANTONIO CUEVAS	2018-11-08		
	PARERA, ALEJANDRO PLANELLAS	2018-11-08		
	PUIG, JOSÉ MARÍA VIDAL	2018-11-08		

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).				
Corresponent: DEVLIN LAW FIRM LLC 1306 N. BROOM ST. SUITE 1 WILMINGTON, DE 19806				
BATALLA-FARRÉ ENRIQUER,BARCELONA,ES	PORTABELLA, ALBERTO MASO	2018-08-29	046769/0071	2018-08-31
CUEVAS-CUADRADO ANTONIO,IGUALADA - BARCELONA,ES				
PLANELLAS-PARERA ALEJANDRO,GRANOLLERS - BARCELONA,ES				
VIDAL-PUIG JOSÉ MARÍA,BARCELONA,ES				
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).				
Corresponent: ARIEL REINITZ FISHERBROYLES, LLP 445 PARK AVENUE, NINTH FLOOR NEW YORK, NY 10022 ARIEL REINITZ FISHERBROYLES, LLP 445 PARK AVENUE, NINTH FLOOR NEW YORK, NY 10022 ARIEL REINITZ FISHERBROYLES, LLP 445 PARK AVENUE, NINTH FLOOR NEW YORK, NY 10022 ARIEL REINITZ FISHERBROYLES, LLP 445 PARK AVENUE, NINTH FLOOR NEW YORK, NY 10022				

Maintenance Status (US): R1

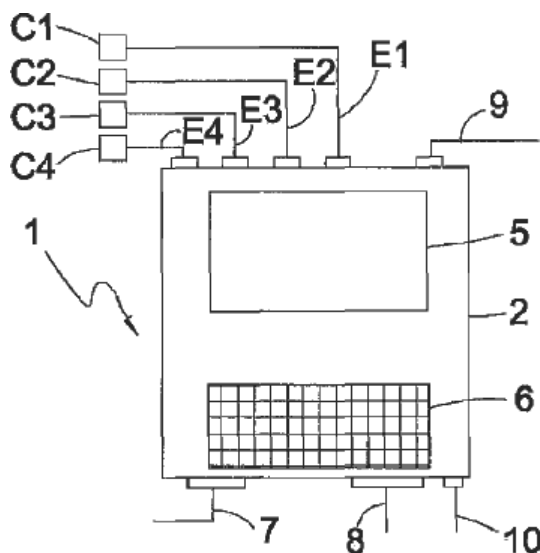
Litigation (US): 2022-07-29 2022 Michigan Motor Technologies LLC Mercedes-Benz USA, LLC
N.D. Illinois 1:22cv03957 | 2022-07-22 2022 Michigan Motor Technologies, LLC Bayerische
Motoren Werke AG BMW of North America, LLC N.D. Illinois 1:22cv03804 | 2021-07-02 2021
Michigan Motor Technologies LLC Tata Motors Ltd. Jaguar Land Rover North America, LLC E.D.
Texas 4:21cv00512 | 2019-02-18 2019 Michigan Motor Technologies LLC Volkswagen
Aktiengesellschaft E.D. Michigan 2:19cv10485

Opposition (EP):

License (EP):

EPO Procedural Status:

Front Page Drawing:



Priority Number - DWPI: ES20082159A

Priority Date - DWPI: 2008-07-18

Assignee - Current US: MICHIGAN MOTOR TECHNOLOGIES LLC



Copyright 2007-2022 CLARIVATE



United States Patent and Trademark Office

Office of the Commissioner for Patents

DEVICE FOR MEASURING POWER CONSUMPTION AND PERFORMANCE
WITH RESPECT TO THE ENVIRONMENT OF A POWER-CONSUMING UNIT

PATENT #

8909482

APPLICATION #

13054355

FILING DATE

01/14/2011

ISSUE DATE

12/09/2014

Payment Window Status

WINDOW

7.5 Year

STATUS

Closed

FEES

Paid

Maintenance fee has
already been paid.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	12/09/2017	06/12/2018	12/10/2018	Closed	Paid
7.5 Year	12/09/2021	06/10/2022	12/09/2022	Closed	Paid
11.5 Year	12/09/2025	06/10/2026	12/09/2026	Not Open	Not Due

Patent Holder Information

Customer #

163393

Entity Status

SMALL

Phone Number

3024499010

Address

Michigan Motor Tech
c/o Devlin Law Firm LLC
1526 Gilpin Ave.
Wilmington, DE 19806
UNITED STATES