

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court _____ for the Eastern District of Tennessee _____ on the following
☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:19-cv-137	DATE FILED 7/26/2019	U.S. DISTRICT COURT for the Eastern District of Tennessee
PLAINTIFF O.S.S. Holdings, LLC		DEFENDANT Thermal Defense Solutions, LLC and Ed Ellis, an individual doing business as Thermal Defense Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 Patent No. 8,286,750	10/16/2012	O.S.S. Holdings LLC
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT Stipulation of Dismissal filed 10/18/2019

CLERK John Medearis	(BY) DEPUTY CLERK s/A. Pape	DATE 10/21/2019
----------------------------	------------------------------------	------------------------

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

Case 2:19-cv-00137-HSM-CHS Document 32 Filed 10/21/19 Page 1 of 1 PageID #: 131

DOCKET NO. 2:19-cv-137	DATE FILED 7/26/2019	U.S. DISTRICT COURT for the Eastern District of Tennessee
PLAINTIFF O.S.S. Holdings, LLC		DEFENDANT Thermal Defense Solutions, LLC and Ed Ellis, an individual doing business as Thermal Defense Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 Patent No. 8,286,750	10/16/2012	O.S.S. Holdings LLC
2		
3		
4		
5		

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
-------	-------------------	------

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT3172627

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
O.S.S. HOLDINGS, LLC	12/10/2014
RECEIVING PARTY DATA	
Name:	OSS SUPPRESSORS LLC
Street Address:	5430 LBJ FREEWAY, SUITE 1480
City:	DALLAS
State/Country:	TEXAS
Postal Code:	75240
PROPERTY NUMBERS Total: 21	
Property Type	Number
Patent Number:	D639375
Patent Number:	8196701
Patent Number:	8790434
Patent Number:	8516941
Patent Number:	8826793
Patent Number:	8286750
Patent Number:	D642648
Patent Number:	D643087
Patent Number:	D642649
Patent Number:	D642650
Patent Number:	D674034
Patent Number:	D646345
Patent Number:	8671818
Application Number:	14326152
Application Number:	61303553
Application Number:	13309392
Application Number:	13275191
Application Number:	61393821
Application Number:	61418285
Application Number:	61418294

Property Type	Number
Application Number:	61418311

CORRESPONDENCE DATA

Fax Number: (214)661-6662
Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 214-953-5880
Email: phyndman@jw.com
Correspondent Name: PETE HYNDMAN
Address Line 1: 901 MAIN STREET, SUITE 6000
Address Line 4: DALLAS, TEXAS 75202

NAME OF SUBMITTER:	PETE HYNDMAN
SIGNATURE:	/Pete Hyndman/
DATE SIGNED:	01/07/2015
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 3
source=OSSHoldingsIntellectual Property Assignment#page1.tif
source=OSSHoldingsIntellectual Property Assignment#page2.tif
source=OSSHoldingsIntellectual Property Assignment#page3.tif

INTELLECTUAL PROPERTY ASSIGNMENT

For good and valuable consideration, the receipt of which is hereby acknowledged, O.S.S. Holdings, LLC, a Utah limited liability company having a place of business at 14051 Sage Hollow Drive, Draper, Utah 84020 (“Assignor”), hereby assigns, conveys and transfers to OSS Suppressors LLC, a Texas limited liability company, having a place of business at 5430 LBJ Freeway, Suite 1480, Dallas, Texas 75240 (“Assignee”), all of Assignor’s right, title and interest in and to the intellectual property set forth in the following clauses (A), (B) and (C) (the “Assigned Intellectual Property”) pursuant to that certain Asset Purchase Agreement, dated as of December 10, 2014 by and among Assignor, Assignee, Praeda, Inc., and Holliday Holding LLC (the “Asset Purchase Agreement”),

- (A) the patents, patent registrations and patent applications owned or purported to be owned by Assignor at the time immediately prior to the Closing, including, but not limited to, those patents, patent registrations and patent applications identified on Schedule A hereto as well as all inventions disclosed therein and all continuations, divisions, continuations-in-part, reissues, and extensions thereof, and all Letters Patent of the United States and any foreign country which may be granted thereon, and all rights to claim priority on the basis of any of the foregoing;
- (B) inventions, trademarks (and goodwill associated therewith), Internet domain names, copyrights, trade secrets and know-how, in each case which are owned or purported to be owned by Assignor at any time prior to the Closing; and
- (C) all agreements relating to intellectual property between Assignor and OSS (Operators Suppressor Systems Inc.), a Wyoming corporation (“**OSS**”), including but not limited to, that certain License Agreement dated August 4, 2012 by and between Assignor and OSS.

together with the goodwill of the business symbolized by the Assigned Intellectual Property, any future registrations of the Assigned Intellectual Property, and all common law rights associated with the Assigned Intellectual Property, and, any and all causes of action and other rights assertable under the Assigned Intellectual Property, including, without limitation, the right to sue for infringement, misappropriation of, or improper activities regarding the Assigned Intellectual Property, subject, in all cases, to the Asset Purchase Agreement referred to above, and the right to enjoy all of the monetary benefits obtained as a result of any such litigation, the same to be held and enjoyed by Assignee, its successors and assigns, as fully and entirely as the same would have been held and enjoyed by Assignor had this Intellectual Property Assignment not been made.

This Intellectual Property Assignment shall be governed by and construed in accordance with the laws (but not the rules governing conflicts of laws) of the State of Texas.

All capitalized terms used in this Intellectual Property Assignment, but not otherwise defined herein, are given the meanings set forth in the Asset Purchase Agreement.

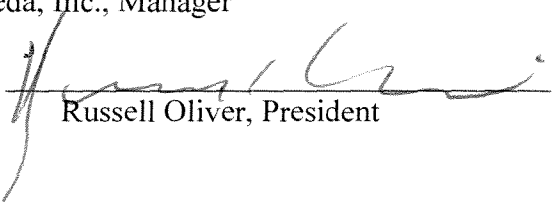
This Intellectual Property Assignment may be executed in any number of counterparts, all of which together shall constitute one and the same document. A photocopied or facsimile signature shall be deemed to be the functional equivalent of a manually executed original for all purposes.

This Intellectual Property Assignment shall be binding upon, and inure to the benefit of, and be enforceable by, Assignor, Assignee and their respective successors and assigns.

Executed as of the 10th day of December, 2014.

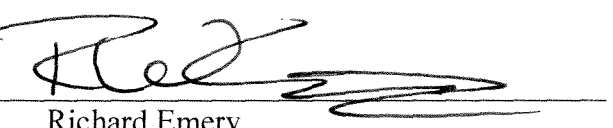
O.S.S. HOLDINGS, LLC

By: Praeda, Inc., Manager

By: 

Russell Oliver, President

OSS SUPPRESSORS LLC

By: 

Richard Emery,
CEO

SCHEDULE A**Issued Patents**

<u>Patent Title</u>	<u>Country</u>	<u>Patent No.</u>
Octagonal Firearm Suppressor	U.S.	D639,375
Firearm Suppressor	Canada	136645
Octagonal Firearm Suppressor	European Community	001742693-0001
Acoustic and Heat Control Device	U.S.	8,196,701
Particulate Capture from a High Energy Discharge Device	U.S.	8,790,434
Interchangeable, Modular Firearm Mountable Device	U.S.	8,516,941
Interchangeable, Modular Firearm Mountable Device	U.S.	8,826,793
Energy Capture and Control Device	U.S.	8,286,750
Hexagonal Firearm Suppressor	U.S.	D642,648
Nonagonal Firearm Suppressor	U.S.	D643,087
Heptagonal Firearm Suppressor	U.S.	D642,649
Decagonal Firearm Suppressor	U.S.	D642,650
Six-Sided Handrail for Firearms	U.S.	D674,034
Visual Signal Reducer	U.S.	D646,345
Firearm Discharge Gas Flow	U.S.	8,671,818

Pending Patents

<u>Patent Title</u>	<u>Country</u>	<u>Serial No.</u>
Particulate Capture from a High Energy Discharge Device	U.S.	14/326,152
Energy and Particulate Capture and Control Devices	U.S.	61/303,553
Augmented Handrail System for Firearm Accessory Mounting	U.S.	13/309,392
Augmented Handrail System for Firearm Accessory Mounting	U.S.	13/275,191
Augmented Handrail System for Firearm Accessory Mounting	U.S.	61/393,821
Sound Reduction Module	U.S.	61/418,285
Firearm Discharge Gas Flow Control	U.S.	61/418,294
Coupling Device, System, and Methods to Maintain Relative Position Between Two Components	U.S.	61/418,311

Closed or Expired Patents**Title**

Back Pressure Regulator for Firearms
Muzzle Integrated Laser Sight
Target Stand with Multiple Replaceable Targets

Trademark

Hexagonal Suppressor Configuration



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.
13/025,989	02/11/2011	Russell Oliver	3212-002.NP4	3886

20551	7590	04/12/2013
THORPE NORTH & WESTERN, LLP.		
P.O. Box 1219		
SANDY, UT 84091-1219		

EXAMINER	
PHILLIPS, FORREST M	

ART UNIT	PAPER NUMBER
2832	

NOTIFICATION DATE	DELIVERY MODE
04/12/2013	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):

causse@tnw.com
patentdocket@tnw.com
rich@tnw.com



THORPE NORTH & WESTERN, LLP.
P.O. Box 1219
SANDY UT 84091-1219

APR 12 2013

<i>In re</i> Application of:	:	
Russell OLIVER	:	DECISION ON PETITION TO
Serial No.: 13/025989	:	MAKE SPECIAL FOR NEW
Filed: 11 February 2011	:	APPLICATION UNDER 37
Title: ENERGY CAPTURE AND CONTROL	:	C.F.R. § 1.102 & M.P.E.P. § 708.2
DEVICE	:	

This is a decision on the petition filed on 11 February 2011 to make the above-identified application special for accelerated examination procedure under 37 C.F.R. § 1.102(d).

The petition to make the application special is **DENIED**.

REGULATION AND PRACTICE

A grantable petition to make special under 37 C.F.R. § 1.102(d) and pursuant to the "Change to Practice for Petitions in Patent Applications to Make Special and for Accelerated Examination" published in the Federal Register on June 26, 2006 (71 Fed. Reg. 36323), must satisfy the following conditions:

I. Conditions Regarding the Application:

1. the application must be a non-reissue utility or design application filed under 37 CFR 1.111(a);
2. the application, the petition and the required fees must be filed electronically using the USPTO's electronic filing system (EFS), or EFS-web; if not filed electronically, a statement asserting that EFS and EFS-web were not available during the normal business hours.
3. at the time of filing, the application must be complete under 37 CFR 1.51 and in condition for examination;
4. the application must contain three or fewer independent claims and twenty or fewer total claims and the claims must be directed to a single invention.

II. Conditions Regarding the Petition:

The petition must:

1. be filed with the application;
2. include a statement that applicant agrees not to separately argue the patentability of any independent claim during any appeal in the application;

3. include a statement that applicant agrees to make an election without traverse in a telephone interview;
4. include a statement that applicant agrees to conduct such an interview when requested by the examiner; and
5. include a statement, made based on a good faith belief, that a preexamination search in compliance with the following requirements, was conducted, including an identification of the field of search by United States class and subclass, where applicable, and for database searches, the search logic or chemical structure or sequence used as a query, the name of the file(s) searched and the database service, and the date of the search.

The preexamination search must:

- 5.1 involve U.S. patents and patent application publications, foreign patent documents, and non-patent literature, unless the applicant can justify with reasonable certainty that no references more pertinent than those already identified are likely to be found in the eliminated sources and includes such a justification with this statement;
- 5.2. be directed to the claimed invention and encompass all of the features of the claims, giving the claims the broadest reasonable expectation; and
- 5.3. encompass the disclosed features that may be claimed.

6. must provide in support of the petition an accelerated examination support document.

An accelerated examination support document must include:

- 6.1. an information disclosure statement (IDS) in compliance with 37 CFR 1.98 citing each reference deemed most closely related to the subject matter of each of the claims;
- 6.2. an identification of all the limitations in the claims that are disclosed by the reference specifying where the limitation is disclosed in the cited reference;
- 6.3. a detailed explanation of how each of the claims are patentable over the references cited with particularity required by 37 CFR 1.111(b) and (c);
- 6.4. a concise statement of the utility of the invention as defined in each of the independent claims (unless the application is a design application);
- 6.5. a showing of where each limitation of the claims finds support under 35 USC 112, first paragraph, in the written description of the specification. If applicable, the showing must also identify: (1) each means- (or step) plus-function claim element that invokes consideration under 35 USC 112, sixth paragraph; and (2) the structure, material, or acts in the specification that corresponds to each means- (or step) plus-function claim element that invokes consideration under 35 USC 112, sixth paragraph; if the application claims the benefit of one or more applications under title 35, United States Code, the showing must also include where each limitation of the claims finds support under 35 USC 112, first paragraph, in each such application in which such supports exists; and
- 6.6. an identification of any cited references that may be disqualified under 35 USC 103(c).

REVIEW OF FACTS

The petition appears on its face to be filed without recognition of the August 25, 2006 policy change to the petition to make special program. Any petition to make special, other than those based on applicant's health or age or the PPH pilot program, filed on or after the effective date must meet the requirements set forth in the Federal Register notice of June 26, 2006 (71 Fed. Reg. 36323). A statement that the claimed subject matter is directed to environmental quality, energy, or countering terrorism is only sufficient for waiving the petition fee set forth in 37 CFR 1.17(h). Petitioner's provided statement is sufficient for waiver of said fee. A copy of the June 26, 2006, Federal Register notice (71 Fed. Reg. 36323) may be found at www.USPTO.gov under the accelerated examination link.

The instant petition was not filed under the current petition to make special practice. Consequently, the application is not eligible for the accelerated examination under 37 C.F.R. § 1.102(d).

DECISION

For the above-stated reasons, the petition is **denied**. The application will remain in its regular status, and will be taken up by the examiner for action in its regular turn. Any inquiries regarding this decision should be directed to Quality Assurance Specialist (QAS) Michael Day at (571) 272-1568.

/Michael Day/

Michael Day, QAS
Technology Center 2800
Semiconductors, Electrical and Optical
Systems and Components



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.
13/025,989	02/11/2011	Russell Oliver	3212-002.NP4	3886
20551	7590	04/12/2013		
THORPE NORTH & WESTERN, LLP. P.O. Box 1219 SANDY, UT 84091-1219			EXAMINER PHILLIPS, FORREST M	
			ART UNIT 2832	PAPER NUMBER
			NOTIFICATION DATE 04/12/2013	DELIVERY MODE 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):

causse@tnw.com
patentdocket@tnw.com
rich@tnw.com



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

THORPE NORTH & WESTERN, LLP.
P.O. Box 1219
SANDY UT 84091-1219

APR 12 2013 5

<i>In re</i> Application of:	:	
Russell OLIVER	:	
Serial No.: 13/025989	:	DECISION ON PETITION TO
Filed: 11 February 2011	:	MAKE SPECIAL FOR NEW
Title: ENERGY CAPTURE AND CONTROL	:	APPLICATION UNDER 37
DEVICE	:	C.F.R. § 1.102 & M.P.E.P. § 708.2

This is a decision on the petition filed on 11 February 2011 to make the above-identified application special for accelerated examination procedure under 37 C.F.R. § 1.102(d).

The petition to make the application special is **DENIED**.

REGULATION AND PRACTICE

A grantable petition to make special under 37 C.F.R. § 1.102(d) and pursuant to the "Change to Practice for Petitions in Patent Applications to Make Special and for Accelerated Examination" published in the Federal Register on June 26, 2006 (71 Fed. Reg. 36323), must satisfy the following conditions:

I. Conditions Regarding the Application:

1. the application must be a non-reissue utility or design application filed under 37 CFR 1.111(a);
2. the application, the petition and the required fees must be filed electronically using the USPTO's electronic filing system (EFS), or EFS-web; if not filed electronically, a statement asserting that EFS and EFS-web were not available during the normal business hours.
3. at the time of filing, the application must be complete under 37 CFR 1.51 and in condition for examination;
4. the application must contain three or fewer independent claims and twenty or fewer total claims and the claims must be directed to a single invention.

II. Conditions Regarding the Petition:

The petition must:

1. be filed with the application;
2. include a statement that applicant agrees not to separately argue the patentability of any independent claim during any appeal in the application;

3. include a statement that applicant agrees to make an election without traverse in a telephone interview;
4. include a statement that applicant agrees to conduct such an interview when requested by the examiner; and
5. include a statement, made based on a good faith belief, that a preexamination search in compliance with the following requirements, was conducted, including an identification of the field of search by United States class and subclass, where applicable, and for database searches, the search logic or chemical structure or sequence used as a query, the name of the file(s) searched and the database service, and the date of the search.

The preexamination search must:

- 5.1 involve U.S. patents and patent application publications, foreign patent documents, and non-patent literature, unless the applicant can justify with reasonable certainty that no references more pertinent than those already identified are likely to be found in the eliminated sources and includes such a justification with this statement;
 - 5.2. be directed to the claimed invention and encompass all of the features of the claims, giving the claims the broadest reasonable expectation; and
 - 5.3. encompass the disclosed features that may be claimed.
6. must provide in support of the petition an accelerated examination support document. An accelerated examination support document must include:
- 6.1. an information disclosure statement (IDS) in compliance with 37 CFR 1.98 citing each reference deemed most closely related to the subject matter of each of the claims;
 - 6.2. an identification of all the limitations in the claims that are disclosed by the reference specifying where the limitation is disclosed in the cited reference;
 - 6.3. a detailed explanation of how each of the claims are patentable over the references cited with particularity required by 37 CFR 1.111(b) and (c);
 - 6.4. a concise statement of the utility of the invention as defined in each of the independent claims (unless the application is a design application);
 - 6.5. a showing of where each limitation of the claims finds support under 35 USC 112, first paragraph, in the written description of the specification. If applicable, the showing must also identify: (1) each means- (or step) plus-function claim element that invokes consideration under 35 USC 112, sixth paragraph; and (2) the structure, material, or acts in the specification that corresponds to each means- (or step) plus-function claim element that invokes consideration under 35 USC 112, sixth paragraph; if the application claims the benefit of one or more applications under title 35, United States Code, the showing must also include where each limitation of the claims finds support under 35 USC 112, first paragraph, in each such application in which such supports exists; and
 - 6.6. an identification of any cited references that may be disqualified under 35 USC 103(c).

REVIEW OF FACTS

The petition appears on its face to be filed without recognition of the August 25, 2006 policy change to the petition to make special program. Any petition to make special, other than those based on applicant's health or age or the PPH pilot program, filed on or after the effective date must meet the requirements set forth in the Federal Register notice of June 26, 2006 (71 Fed. Reg. 36323). A statement that the claimed subject matter is directed to environmental quality, energy, or countering terrorism is only sufficient for waiving the petition fee set forth in 37 CFR 1.17(h). Petitioner's provided statement is sufficient for waiver of said fee. A copy of the June 26, 2006, Federal Register notice (71 Fed. Reg. 36323) may be found at www.USPTO.gov under the accelerated examination link.

The instant petition was not filed under the current petition to make special practice. Consequently, the application is not eligible for the accelerated examination under 37 C.F.R. § 1.102(d).

DECISION

For the above-stated reasons, the petition is **denied**. The application will remain in its regular status, and will be taken up by the examiner for action in its regular turn. Any inquiries regarding this decision should be directed to Quality Assurance Specialist (QAS) Michael Day at (571) 272-1568.

/Michael Day/

Michael Day, QAS
Technology Center 2800
Semiconductors, Electrical and Optical
Systems and Components

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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)			Complete if Known	
			Application Number	13/025,989
			Filing Date	2/11/2011
			First Named Inventor	Russell Oliver
			Art Unit	2832
			Examiner Name	Forrest M. Phillips
Sheet		of	Attorney Docket Number	3212-002.NP4

[illegible][illegible]

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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 (1-800-786-9199) and select option 2.

Substitute for form 1449/PTO

Complete if Known

Application Number	13/025,989
Filing Date	2/11/2011
First Named Inventor	Russell Oliver
Art Unit	2832
Examiner Name	Forrest M. Phillips
Attorney Docket Number	3212-002,NP4

Sheet		of	
-------	--	----	--

[illegible]

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

1. Applicant's unique citation designation number (optional). 2. Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 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 2 hours 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, 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.**

017

Electronic Acknowledgement Receipt

EFS ID:	14093667
Application Number:	13025989
International Application Number:	
Confirmation Number:	3886
Title of Invention:	ENERGY CAPTURE AND CONTROL DEVICE
First Named Inventor/Applicant Name:	Russell Oliver
Customer Number:	20551
Filer:	Erik Sun Ericksen/Eileen Fuessel
Filer Authorized By:	Erik Sun Ericksen
Attorney Docket Number:	3212-002.NP4
Receipt Date:	29-OCT-2012
Filing Date:	11-FEB-2011
Time Stamp:	10:19:49
Application Type:	Utility under 35 USC 111(a)

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		ids.pdf	261673 1dd8c7d4ccf718608a4f9c2895efe3a85753bc46	yes	6

	Multipart Description/PDF files in .zip description								
	Document Description		Start	End					
	Transmittal Letter		1	4					
	Information Disclosure Statement (IDS) Form (SB08)		5	6					
Warnings:									
Information:									
2	Non Patent Literature	954.pdf	545316	no	17				
			6fd3ce176d6991b4742026bb720a54e943d67d72						
Warnings:									
Information:									
Total Files Size (in bytes):			806989						
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.									

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

ART UNIT: 2832 EXAMINER: Forrest M. Phillips FIRST NAMED INVENTOR: Russell Oliver SERIAL NO.: 13/025,989 FILED: 2/11/2011 CONF. NO.: 3886 FOR: ENERGY CAPTURE AND CONTROL DEVICE DOCKET NO.: 3212-002.NP4	<u>CERTIFICATE OF MAILING</u> <u>UNDER 37 C.F.R. § 1.8</u> DATE OF DEPOSIT: <u>10-29-2012</u> I hereby certify that this paper or fee (along with any paper or fee referred to as being attached or enclosed) is being submitted on the date indicated above via: ☒ EFS Web ☐ facsimile to _____ ☐ the United States Postal Service with sufficient postage as first class mail addressed to: Mail Stop _____, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450. _____/EileenFuessel/ Eileen Fuessel
---	---

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. §§ 1.56, 1.97 and 1.98

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

Dear Sir/Madam:

Pursuant to the duty of disclosure under 37 C.F.R. §§ 1.56, 1.97 and 1.98, the Applicant requests consideration of this Information Disclosure Statement, which is being submitted in accordance with:

- ☒ 37 C.F.R. § 1.97(b)(1) or (3), within three months of the filing date of the application, or before a first office action on the merits, whichever occurs last;
- ☐ 37 C.F.R. § 1.97(c), after a first office action on the merits, but before a Final Office Action or a Notice of Allowance, whichever occurs first, and is accompanied by **EITHER** a statement in accordance with 37 C.F.R. § 1.97(e), **OR** the fee set forth in 37 C.F.R. § 1.17(p); or
- ☐ 37 C.F.R. § 1.97(d), after a Final Office Action or Notice of Allowance, whichever occurs first, but on or before payment of the issue fee, and is accompanied by **BOTH** a statement

in accordance with 37 C.F.R. § 1.97(e), **AND** the fee set forth in 37 C.F.R. § 1.17(p).

SUBMISSIONS

Please find enclosed, pursuant to 37 C.F.R. §§ 1.97 and 1.98:

- ☒ Form **PTO/SB/08A** and/or **PTO/SB/08B** listing the references submitted for consideration, which contains a list of all patents, publications and all other items that have come to the attention of one or more of the individuals designated in 37 C.F.R. § 1.56(c).
- ☒ Legible copies of the listed non-patent documents, unpublished U.S. applications and foreign documents or their relevant portions are included.
- ☐ All English translations of each non-English reference, if any, within the possession, custody, control or availability of anyone designated in 37 C.F.R. § 1.56(c) (see 37 C.F.R. § 1.98 are included.
- ☐ For all listed references that are not either in the English language, or accompanied by a translation into English, a concise explanation of relevance as required under 37 C.F.R. § 1.98(a)(3) is enclosed attached to each.

Copies of references listed on the enclosed PTO/SB/08A and/or PTO/SB/08B are **not** enclosed:

- ☐ because, under 37 C.F.R. § 1.98.(d), they were previously cited by or submitted to the Office in application number _____, which is relied upon for an earlier filing date under 37 C.F.R. § 1.20.
- ☐ because they are substantially cumulative of an enclosed reference.

STATEMENT IN ACCORDANCE WITH 37 C.F.R. § 1.97(e)

☐ I hereby certify that each item contained in the information disclosure statement was first cited in a 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.

☐ I hereby certify that no item 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 §1.56(c) more than three months prior to the filing of the information disclosure statement.

REMARKS

While no representation is made that any of these references may be "prior art" within the meaning of that term in accordance with 37 C.F.R. §§ 102 or 103, the enclosed list of references is disclosed so as to comply with the duty of disclosure set forth in 37 C.F.R. § 1.56.

Moreover, while no representation is made that a specific search of office files or patent office records has been conducted or that no better art exists, the undersigned attorney of record believes that the references listed, together with any other references which may have been previously submitted or listed, are the closest to the claimed invention (taken in its entirety) of which the undersigned is presently aware, and no art which is closer to the claimed invention (taken in its entirety) has been knowingly withheld.

☐ Check No. ____ in the amount of \$ ____ (amount in § 1.17(p)) constituting the submission fee set forth in 37 C.F.R. § 1.17(p) is enclosed.

In the event that 37 C.F.R. § 1.97(c) applies and the Examiner is not satisfied that the Statement meets the requirements of 37 C.F.R. § 1.97(e), or in any other event remediable by a fee, please credit any

over payment or charge any additional fees to Deposit Account No. 20-0100 of the undersigned.

Dated this 29th day of October, 2012.

Respectfully submitted,

/ErikSEricksen/

Erik S. Ericksen, M.S.
Attorney for Applicant
Registration No. 48954

THORPE NORTH & WESTERN, LLP
Customer No. 20,551
P.O. Box 1219
Sandy, Utah 84091-1219
Telephone: (801) 566-6633



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.
13/025,989	10/16/2012	8286750	3212-002.NP4	3886

20551 7590 09/26/2012
THORPE NORTH & WESTERN, LLP.
P.O. Box 1219
SANDY, UT 84091-1219

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 0 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):

Russell Oliver, Sandy, UT;

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.

Receipt date: 05/25/2011

13025989 - GAU: 2832

PTO/SB/08A (08-03)

Approved for use through 07/31/2006. OMB 0651-0031

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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Complete if Known	
		Application Number	13/025,989
		Filing Date	2/11/2011
		First Named Inventor	Russell Oliver
		Art Unit	2855
		Examiner Name	To Be Determined
Sheet 1 of 2	Attorney Docket Number	3212-002.NP4	

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
/FP/		6732628	05-11-2004	Coburn et al.	
		6298764	10-09-2001	Sherman et al.	
		5777258	07-07-1998	Soon	
		1462158	07-17-1923	Wildner	
		2010/0048752	02-25-2010	Vignola et al.	
		2009/0235568	09-24-2009	Auvine	
		5486425	01-23-1996	Seibert	
		6376565	04-23-2002	Dyer et al.	
		7207258	04-24-2007	Scanlon	
		4576083	03-18-1986	Seberger, Jr.	
		6575074	06-10-2003	Gaddini	
		1773443	08-19-1930	Wilman	
		1427802	09-05-1922	Goodwin	
		1736319	11-19-1929	Maxim	
		748157	12-29-1903	Bouton	
		5679916	10-21-1997	Weichert	
		7237467	07-03-2007	Melton	
		7412917	08-19-2008	Vais	
		7308967	12-18-2007	Hoel	
		5164535	11-17-1992	Leasure	
		6079311	06-27-2000	O'Quinn et al.	
		4501189	02-26-1985	Brandl et al.	
		916885	03-30-1909	Maxim	
		5029512	07-09-1991	Latka	
		4907488	03-13-1990	Seberger	
		6302009	10-16-2001	O'Quinn et al.	
		7661349	02-16-2010	Brittingham	
		5698810	12-16-1997	Rose	
		7587969	09-15-2009	Silvers	
		5036747	08-06-1991	McClain, III	
		7707762	05-04-2010	Swan	
		7353740	04-08-2008	Hoffman	
		6792711	09-21-2004	Battaglia	
		5590484	01-07-1997	Mooney et al	
		2007/0256347	11-08-2007	Fitzpatrick et al	
		7676976	03-16-2010	Dueck et. al.	
		7216451	05-15-2007	Troy	
		6499245	12-31-2002	Swan	
		5433133	07-18-1995	La France	
		7036259	05-02-2006	Beretta	
		6490822	12-10-2002	Swan	
		4510843	04-16-1985	Rabatin	
		7610710	11-03-2009	Brittingham	
		6959509	11-01-2005	Vais	
		2010/0199834	08-12-2010	Dueck et al	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /FP/

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)

20,551

Thorpe North & Western, LLP
P.O. Box 1219
Sandy, UT 84091-1219

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.

Andrea C. Phillips	(Depositor's name)
/andreacphillips/	(Signature)
September 12, 2012	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/025,989	2/11/2011	Russell Oliver	3212-002.NP4	3886

TITLE OF INVENTION: Energy Capture and Control Device

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$870	\$0	\$0	\$870.00	09/12/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
PHILLIPS, FORREST M	2832	181-223000

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 THORPE NORTH & WESTERN LLP

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)

O.S.S. Holdings, LLC

Murray, Utah

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 credit any overpayment, to Deposit Account Number 20-0100 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /eriksericksen/

Date September 12, 2012

Typed or printed name Erik S. Ericksen, M.S.

Registration No. 48954

This collection of information 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.

Electronic Patent Application Fee Transmittal

Application Number:	13025989			
Filing Date:	11-Feb-2011			
Title of Invention:	ENERGY CAPTURE AND CONTROL DEVICE			
First Named Inventor/Applicant Name:	Russell Oliver			
Filer:	Erik Sun Ericksen/Andrea Phillips			
Attorney Docket Number:	3212-002.NP4			
Filed as Small Entity				
Utility under 35 USC 111(a) 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	870	870
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				870

Electronic Acknowledgement Receipt

EFS ID:	13726130
Application Number:	13025989
International Application Number:	
Confirmation Number:	3886
Title of Invention:	ENERGY CAPTURE AND CONTROL DEVICE
First Named Inventor/Applicant Name:	Russell Oliver
Customer Number:	20551
Filer:	Erik Sun Ericksen/Andrea Phillips
Filer Authorized By:	Erik Sun Ericksen
Attorney Docket Number:	3212-002.NP4
Receipt Date:	12-SEP-2012
Filing Date:	11-FEB-2011
Time Stamp:	17:08:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$870
RAM confirmation Number	4787
Deposit Account	
Authorized User	

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)	Transmittal.pdf	38401 6da6dc7a08bf9f4a00d62ce0210761883b7c1a8f	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30177 ea6cab3fd8c3e9ed44830f13648aa66223da708f	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			68578		
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.					



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

20551 7590 06/12/2012
THORPE NORTH & WESTERN, LLP.
P.O. Box 1219
SANDY, UT 84091-1219

EXAMINER

PHILLIPS, FORREST M

ART UNIT

PAPER NUMBER

2832

DATE MAILED: 06/12/2012

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

13/025,989

02/11/2011

Russell Oliver

3212-002.NP4

3886

TITLE OF INVENTION: ENERGY CAPTURE AND CONTROL DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$870	\$0	\$0	\$870	09/12/2012

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 SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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.

20551 7590 06/12/2012
THORPE NORTH & WESTERN, LLP.
P.O. Box 1219
SANDY, UT 84091-1219

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.
-----------------	-------------	----------------------	---------------------	------------------

13/025,989	02/11/2011	Russell Oliver	3212-002.NP4	3886
------------	------------	----------------	--------------	------

TITLE OF INVENTION: ENERGY CAPTURE AND CONTROL DEVICE

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

nonprovisional	YES	\$870	\$0	\$0	\$870	09/12/2012
----------------	-----	-------	-----	-----	-------	------------

EXAMINER	ART UNIT	CLASS-SUBCLASS
----------	----------	----------------

PHILLIPS, FORREST M	2832	181-223000
---------------------	------	------------

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, 1 _____
- (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. 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 credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information 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.



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.
13/025,989	02/11/2011	Russell Oliver	3212-002.NP4	3886

20551 7590 06/12/2012
THORPE NORTH & WESTERN, LLP.
P.O. Box 1219
SANDY, UT 84091-1219

EXAMINER

PHILLIPS, FORREST M

ART UNIT	PAPER NUMBER
----------	--------------

2832

DATE MAILED: 06/12/2012

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

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 Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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.

Notice of Allowability	Application No.	Applicant(s)	
	13/025,989	OLIVER, RUSSELL	
	Examiner	Art Unit	
	FORREST M. PHILLIPS	2832	

-- 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 amendment filed 5/29/12.
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 1-22.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - 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. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
 - (b) ☐ 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).**
7. ☐ 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)

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. ☐ Notice of References Cited (PTO-892) 2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date ____ 4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material | <ol style="list-style-type: none"> 5. ☐ Notice of Informal Patent Application 6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date ____. 7. ☐ Examiner's Amendment/Comment 8. ☒ Examiner's Statement of Reasons for Allowance 9. ☐ Other ____. |
|--|--|

/FORREST M PHILLIPS/
Examiner, Art Unit 2832

DETAILED ACTION

Response to Arguments

Applicant's arguments, see remarks, filed 5/29/12, with respect to claims 1-22 have been fully considered and are persuasive. The rejection of 2/8/12 has been withdrawn.

Allowable Subject Matter

Claims 1-22 are allowed.

The following is an examiner's statement of reasons for allowance: the prior art fails to disclose the invention in the combination as claimed.

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."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FORREST M. PHILLIPS whose telephone number is (571)272-9020. The examiner can normally be reached on Monday through Friday 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on 57127221990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2832

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.

/FORREST M PHILLIPS/
Examiner, Art Unit 2832

Search Notes 	Application/Control No. 13025989	Applicant(s)/Patent Under Reexamination OLIVER, RUSSELL
	Examiner FORREST M PHILLIPS	Art Unit 2832

SEARCHED			
Class	Subclass	Date	Examiner
181	223	9/23/11	FP
89	14.4	9/23/11	FP

SEARCH NOTES		
Search Notes	Date	Examiner
EAST inventor search conducted	9/23/11	FP
EAST search conducted see attached search history	9/23/11	FP
EAST search updated	2/1/12	FP
EAST search updated to reflect amendment	5/31/12	FP
EAST interference search conducted	5/31/12	FP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
181	223	5/31/12	FP
89	14.4	5/31/12	FP

/FORREST M PHILLIPS/ Examiner.Art Unit 2832	/FORREST M PHILLIPS/ Primary Examiner.Art Unit 2832
--	--

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	204	181/223.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/31 12:17
L5	381	(89/14.4).OCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/31 12:17

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L6	1	(89/14.4).OCLS.	UPAD	OR	OFF	2012/05/31 12:21
L7	125	181/223.ccls.	USPAT; UPAD	OR	OFF	2012/05/31 12:21
L8	46	sound with flash same suppressor	US-PGPUB; USPAT; UPAD	OR	OFF	2012/05/31 12:22
L9	226	silencer and deflector	US-PGPUB; USPAT; UPAD	OR	OFF	2012/05/31 12:23
L10	40	l9 and (high with energy firearm gun rifle)	US-PGPUB; USPAT; UPAD	OR	OFF	2012/05/31 12:23

5/ 31/ 2012 12:24:26 PM

C:\Users\ fphillips\ Documents\ EAST\ Workspaces\ 13025989.wsp

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.

Request for Continued Examination (RCE) Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	13/025,989
Filing Date	2/11/2011
First Named Inventor	Russell Oliver
Art Unit	2832
Examiner Name	Forrest M. Phillips
Attorney Docket Number	3212-002.NP4

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.

Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

- Submission required under 37 CFR 1.114** Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

 - ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.
 - ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
 - ☐ Other _____
 - ☒ Enclosed
 - ☒ Amendment/Reply
 - ☐ Affidavit(s)/ Declaration(s)
 - ☐ Information Disclosure Statement (IDS)
 - ☐ Other _____
- Miscellaneous**

 - ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)
 - ☐ Other _____
- Fees** The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Deposit Account No. _____.

 - ☐ RCE fee required under 37 CFR 1.17(e)
 - ☐ Extension of time fee (37 CFR 1.136 and 1.17)
 - ☐ Other _____
 - ☐ Check in the amount of \$ _____ enclosed
 - ☒ Payment by credit card (~~Form PTO-2038 enclosed~~)

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.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature	/eriksericksen/	Date	May 29, 2012
Name (Print/Type)	Erik S. Ericksen, M.S.	Registration No.	48954

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Signature	/andreacphillips/	Date	May 29, 2012
Name (Print/Type)	Andrea C. Phillips		

This collection of information is required by 37 CFR 1.114. 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: Mail Stop RCE, 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.

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.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) 3212-002.NP4
Application Number 13/025,989	Filed 2/11/2011
For Energy Capture and Control Device	
Art Unit 2832	Examiner Forrest M. Phillips

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	<u>Fee</u>	<u>Small Entity Fee</u>	
☒ One month (37 CFR 1.17(a)(1))	\$150	\$75	\$ <u>75.00</u>
☐ Two months (37 CFR 1.17(a)(2))	\$560	\$280	\$ _____
☐ Three months (37 CFR 1.17(a)(3))	\$1270	\$635	\$ _____
☐ Four months (37 CFR 1.17(a)(4))	\$1980	\$990	\$ _____
☐ Five months (37 CFR 1.17(a)(5))	\$2690	\$1345	\$ _____

☒ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☒ Payment by credit card. ~~Form PTO-2038 is attached.~~

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☐ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 20-0100.

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.

I am the ☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☒ attorney or agent of record. Registration Number 48954

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

/eriksericksen/	May 29, 2012
Signature	Date
Erik S. Ericksen, M.S.	801-566-6633
Typed or printed name	Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☒ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). 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 6 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.

Electronic Patent Application Fee Transmittal

Application Number:	13025989			
Filing Date:	11-Feb-2011			
Title of Invention:	Energy Capture and Control Device			
First Named Inventor/Applicant Name:	Russell Oliver			
Filer:	Erik Sun Ericksen/Andrea Phillips			
Attorney Docket Number:	3212-002.NP4			
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	2202	1	30	30
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 1 month with \$0 paid	2251	1	75	75
Miscellaneous:				
Request for continued examination	2801	1	465	465
Total in USD (\$)				570

Electronic Acknowledgement Receipt

EFS ID:	12881510
Application Number:	13025989
International Application Number:	
Confirmation Number:	3886
Title of Invention:	Energy Capture and Control Device
First Named Inventor/Applicant Name:	Russell Oliver
Customer Number:	20551
Filer:	Erik Sun Ericksen/Andrea Phillips
Filer Authorized By:	Erik Sun Ericksen
Attorney Docket Number:	3212-002.NP4
Receipt Date:	29-MAY-2012
Filing Date:	11-FEB-2011
Time Stamp:	18:50:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$570
RAM confirmation Number	7360
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
-----------------	----------------------	-----------	-------------------------------------	------------------	------------------

1	Amendment Submitted/Entered with Filing of CPA/RCE	Amendment.PDF	235897 b6c03c12ec4c6fe3b290db53652759df5cbd3bb9	no	19
Warnings:					
Information:					
2	Request for Continued Examination (RCE)	Transmittal.pdf	51228 f61ec6848c00f6f31080d2e7063d2a2c3c903719	no	1
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
3	Extension of Time	Extension.pdf	298682 8f5f4a2850ca59011843ef9804dba4d2b0074fbf	no	1
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	33579 aa7050743aec0d602b91014fb4b073c6c97dc61c	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			619386		
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.					

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

ART UNIT: 2832 EXAMINER: Forrest M. Phillips FIRST NAMED INVENTOR: Russell Oliver SERIAL NO.: 13/025,989 FILED: 2/11/2011 CONF. NO.: 3886 FOR: ENERGY CAPTURE AND CONTROL DEVICE DOCKET NO.: 3212-002.NP4	<u>CERTIFICATE OF MAILING</u> <u>UNDER 37 C.F.R. § 1.8</u> DATE OF DEPOSIT: <u>May 29, 2012</u> I hereby certify that this paper or fee (along with any paper or fee referred to as being attached or enclosed) is being submitted on the date indicated above via: ☒ EFS Web ☐ facsimile to _____ ☐ the United States Postal Service with sufficient postage as first class mail addressed to: Mail Stop _____, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450. _____ /andreacphillips/ Andrea C. Phillips
---	---

THORPE NORTH & WESTERN, LLP
Customer No. 20,551
P.O. Box 1219
Sandy, Utah 84091-1219

AMENDMENT / RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Office Action, dated February 8, 2012, Applicant offers the following Amendment and Request for Continued Examination (RCE) and requests reconsideration of the above-captioned application. Pursuant to 37 C.F.R. § 1.136(a), it is respectfully requested that the shortened statutory period be extended one month.

This listing of claims will replace all prior versions, and listings, of claims in the application:

CLAIM AMENDMENTS

1. (currently amended) An energy capture and control device, comprising:
 - a) a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet;
 - b) ~~an~~ a common off axis chamber oriented within the outer shell in fluid communication with the central chamber and having a fluid outlet and multiple internal walls ~~defining configured to produce~~ a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine and which dissipates energy transferred from the high energy material; ~~and~~
 - c) a plurality of deflectors oriented in series along the central axis of the central chamber and configured to deflect the energy from the high energy material to the common off axis chamber.
2. (original) The device of claim 1, wherein the central chamber further comprises a locking block oriented at the inlet, said locking block having an engagement surface configured to attach to the high energy outlet and a hollow interior along the central axis, said hollow interior having a reducing throat portion and a flared outlet.
3. (currently amended) The device of claim 1, wherein ~~the central chamber further comprises a plurality of deflectors oriented in series along the central axis,~~ the plurality of deflectors each comprise comprising a frustoconical shape ~~and~~ having a hollow interior along the central axis and ~~each having~~ a flared exit portion.
4. (original) The device of claim 3, wherein the plurality of deflectors include a primary deflector, a secondary deflector, and at least one tertiary deflector.

5. (original) The device of claim 4, wherein at least one tertiary deflector is at least partially engaged within the flared exit portion of an adjacent deflector.
6. (original) The device of claim 3, wherein the plurality of deflectors span substantially the entire central axis along the central chamber.
7. (original) The device of claim 1, wherein the multiple internal walls are formed to produce a radially serpentine fluid pathway.
8. (previously presented) The device of claim 1, wherein the multiple internal walls are formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces between each adjacent tube, and having alternating ends offset so as to produce the axially serpentine fluid annular pathway.
9. (previously presented) The device of claim 8, wherein the multiple concentric tubes include an innermost tube which includes orifices oriented to allow fluid to pass from the central chamber into a first annular space adjacent the innermost tube and through the annular spaces of progressively larger diameter.
10. (original) The device of claim 9, wherein the annular spaces further include a helical wall oriented within at least one of the annular spaces to direct fluids along a helical path within the at least one annular space.
11. (original) The device of claim 10, wherein the helical wall has a quadrilateral cross-section or a circular cross-section.
12. (original) The device of claim 10, wherein the helical wall has a winding ratio (windings : diameter) of about 3:1 to about 8:1.

13. (currently amended) The device of claim 1, wherein the common off axis chamber further includes an annular dampening chamber oriented about the central chamber and being filled with an energy absorbent material.
14. (original) The device of claim 13, wherein the dampening chamber is oriented adjacent the outer shell.
15. (original) The device of claim 13, wherein the energy absorbent material is selected from the group consisting of powder tungsten filament, heavy metal powder, graphite, polymer, aluminum, stainless steel, carbon steels, iron, copper, tantalum, titanium, vanadium, chromium, zirconium, carbides of these, alloys of these, and combinations thereof.
16. (currently amended) The device of claim 1, wherein the outer shell includes an end cap assembly at an outlet end of the central chamber and which allows fluid to escape from the common off axis chamber through the fluid outlet, the fluid outlet being only accessible to the fluid in the common off axis chamber.
17. (currently amended) An energy capture and control device, comprising:
 - a) a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet;
 - b) ~~an~~ a common off axis chamber oriented within the outer shell in fluid communication with the central chamber via a plurality of orifices and further includes a fluid outlet, the common off axis chamber comprising a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine; and
 - c) a plurality of deflectors oriented in series along the central axis of the central chamber, wherein a position of multiple individual deflectors of the plurality of deflectors corresponds with the individual orifices of the plurality of orifices to the common off axis chamber.

18. (currently amended) The device of claim 17, wherein the common off axis chamber further comprises at least one helical wall defining the axially serpentine fluid pathway, the at least one helical wall being configured to produce an axially serpentine fluid pathway which helically spirals around the central chamber and which dissipates energy transferred from the high energy material.
19. (previously presented) The device of claim 17, further comprising multiple internal walls defining the axially serpentine fluid pathway, the multiple internal walls being formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces between each adjacent tube, and having alternating ends offset so as to produce a serpentine fluid annular pathway.
20. (currently amended) A method for energy capture and control from a high energy device, comprising:
- a) discharging a high energy material from the high energy device through an energy capture and control device comprising a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet, and ~~an~~ a common off axis chamber oriented within the outer shell in fluid communication with the central chamber, the common off axis chamber comprising an axially serpentine fluid pathway and a fluid outlet; and
 - b) capturing energy within the common off axis chamber via a plurality of orifices from the central chamber using the axially serpentine fluid pathway, the energy being associated with discharge of the high energy material from the high energy discharge device.
21. (currently amended) The device of claim 4, wherein the fluid communication between the common off axis chamber and the central chamber occurs only at the primary deflector, the secondary deflector and a first tertiary deflector.

22. (new) The device of claim 1, wherein the common off axis chamber comprises a plurality of sub-chambers defined by the plurality of deflectors, each with the radially serpentine fluid pathway, and wherein the radially serpentine fluid pathways of each of the deflectors are axially non-linearly interconnected along an outermost portion of the plurality of sub-chambers.

REMARKS

Applicant expresses appreciation to the Examiner for consideration of the subject patent application. Claims 1-21 were previously presented. Claims 1, 3, 13, 16-18, and 20-21 have been amended. Claim 22 has been added. Therefore, Claims 1-22 are now pending.

This Amendment and Request for Continued Examination (RCE) is in response to the Final Office Action dated February 8, 2012, in which the following actions were taken:

(1) Claims 1-7, 16 and 20 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 7,987,944 (hereinafter “Brittingham”) in view of U.S. Patent No. 6,425,310 (hereinafter “Champion”) and U.S. Patent No. 1,341,363 (hereinafter “Fiala”).

(2) Claims 8-9 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion and Fiala as applied to Claim 1, and further in view of U.S. Patent No. 7,207,258 (hereinafter “Scanlon”) and U.S. Patent No. 5,952,625 (hereinafter “Huff”).

(3) Claims 10-12 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion, Scanlon and Huff as applied to Claim 8, further in view of U.S. Patent No. 2,029,512 (hereinafter “Latka”).

(4) Claims 13-15 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion and Fiala as applied to Claim 1, further in view of U.S. Patent No. 6,796,214 (hereinafter “Hausken”).

(5) Claim 19 was rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion and Fiala as applied to Claim 17, further in view of Scanlon and Huff.

(6) Claim 21 was objected to as being dependent upon a rejected base claim, but was indicated as allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The indication of allowable subject matter in claim 21, if rewritten in independent form, is acknowledged with appreciation.

Reconsideration of the application is respectfully requested in view of the claim amendments and the following responsive remarks.

Amendments

Claims 1, 3, 13, 16-18, and 20-21 were amended. Support for the amendments to the claims is found in the originally filed specification at page 8, line 30 through page 9, line 1; page 10, lines 7-9; Page 11, lines 14-16; page 14, lines 15-19; and FIGs. 1-2 and 14. Claim 22 was added. Support for claim 22 is found in originally filed FIG. 14 and the associated text in the specification.

Invention

Applicant wishes to also emphasize the terminology and nature of the claimed invention. Specifically, each of the independent claims requires “at least one of an axially serpentine and radially serpentine” fluid pathway. Axially serpentine refers to a serpentine fluid flow forward and back along the length of the off axis chamber. Figure 1a illustrates one version of this arrangement where fluid flow goes lefts and right switching directions at the end of each concentric tube. This axially serpentine flow is different from radially serpentine flow in which fluid would flow back and forth from clockwise to counter-clockwise around the longitudinal axis as described in page 7, lines 20-22 and shown in Figure 14 (see units 500, 505 and 510).

In addition, the amended claims specify that the off axis chamber is a “common” off axis chamber into which a plurality of deflectors direct energy. Thus, the off axis chamber spans and is connected to multiple deflectors and the corresponding energy and gas which is redirected from the central chamber.

Furthermore, each of the independent claims requires that the off axis chamber includes “a fluid outlet.” This is a separate element from the fluid communication with the central chamber and presents an outlet for fluids to escape the off axis chamber and the device *without* returning to the central chamber. This allows fluids to escape from the device without creating excessive back pressure in the host weapon.

Claim Rejections - 35 U.S.C. § 103

The issue under § 103 is whether the PTO has stated a case of *prima facie* obviousness. "The PTO has the burden under § 103 to establish a *prima facie* case of obviousness." In re Fine, 837 F.2d

1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). To satisfy this burden, the PTO must meet the criteria set out in M.P.E.P. § 706.02(j):

. . . three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Moreover, the obviousness analysis must comply with the statutory scheme as explained by the Supreme Court in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966), namely, consideration must be given to: (1) the scope and content of the prior art, (2) the differences between the prior art and the claimed invention, (3) the level of ordinary skill in the pertinent art, and (4) additional evidence, which may serve as indicia of non-obviousness.

In order to do this by combining references, the prior art must provide some reason or motivation to make the claimed compositions, *In re Dillon*, 16 U.S.P.Q.2d 1897, 1901 (Fed. Cir. 1990). As aptly stated in *In re Jones*, 21 U.S.P.Q.2d 1941, 1943-44 (Fed. Cir. 1992):

"Before the PTO may combine the disclosure of two or more prior art references in order to establish *prima facie* obviousness, there must be some suggestion for doing so, found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art... Conspicuously missing from this record is any *evidence*, other than the PTO's speculation (if it be called evidence) that one of ordinary skill in the...art would have been motivated to make the modifications of the prior art necessary to arrive at the claimed (invention)."

An excellent summary of how the prior art must be considered to make a case of *prima facie* obviousness is contained in *In re Ehrreich et al.*, 220 U.S.P.Q. 504, 509-511 (CCPA 1979). There the court states that a reference must not be considered in a vacuum, but against the background of the other references of record. It is stated that the question of a § 103 case is what the reference(s) would "collectively suggest" to one of ordinary skill in the art. However, the court specifically cautioned that the Examiner must consider the entirety of the disclosure made by the reference and avoid combining them indiscriminately.

In finding that the "subject matter as a whole" would not have been obvious in *Ehrreich* the court concluded:

"Thus, we are directed to no combination of prior art references which would have rendered the claimed subject matter as a whole obvious to one of ordinary skill in the art at the time the invention was made. The PTO has not shown the existence of all the claimed limitations in the prior art or any suggestion leading to their combination in the manner claimed by applicants." (underlining added)

It has been widely recognized that virtually every invention is a combination of elements and that most, if not all, of these will be found somewhere in an examination of the prior art. This reasoning lead the court, in *Connell v. Sears, Roebuck & Co.*, 220 U.S.P.Q. 193, 199 (Fed. Cir. 1983) to state:

"...it is common to find elements or features somewhere in the prior art. Moreover, most if not all elements perform their ordained and expected function. The test is whether the claimed invention as a whole, in light of all the teachings of the references in their entirety, would have been obvious to one of ordinary skill in the art at the time the invention was made." (underlining added)

In re Sernaker, 217 U.S.P.Q. 1, 5-6, (Fed. Cir. 1983) states a test to determine whether a rejection of an invention based on a combination of prior art elements is appropriate as follows:

"The lesson of this case appears to be that prior art references in combination do not make an invention obvious unless something in the prior art references would suggest the advantage to be derived from combining their teachings...The board never showed how the teaching of the prior art could be combined to make the invention." (underlining added)

Further, according to the Supreme Court "[r]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (S. Ct. 2007) citing *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006). With this background in mind, Applicant respectfully submits that the asserted combinations of references fail to establish a *prima facie* case of obviousness.

Obviousness over Brittingham in view of Champion and Fiala

Claims 1-7, 16 and 20 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Brittingham in view of Champion and Fiala. Applicant respectfully disagrees that the combination of Brittingham, Champion, and Fiala teaches each and every element of the claims.

Specifically, assuming *arguendo*, that these references were properly combined, the Examiner recognizes that Brittingham fails to teach a fluid outlet or a serpentine fluid pathway. Champion is used to purportedly teach these limitations. Applicant notes that Champion does include exit vent slots 28 from the plenum 25. However, notably Champion has absolutely no axial or radial serpentine pathways. The diversion chambers in Champion are limited to the plenums 25. The internal surfaces of these plenums appears to be generally conical but have no baffles or other walls which direct gases back and forth either axially or back and forth radially. At best, Champion includes an annular recess 26 into which gases pass and then bounce off of reaction wall surface 27 to then exit via vent slots 28. The bouncing of gases within the annular recess forces gases back into the same path from which they came. This is not a serpentine flow pathway defined by walls and structure. A physically serpentine pathway directs fluids back and forth along distinct physical serpentine paths, not merely bouncing fluids back into the same physical path. Claim 1 recites that the internal walls define the serpentine fluid pathway. Because the flow path of Champion is not serpentine and Champion fails to disclose a serpentine fluid pathway defined by internal walls, the combination of Champion with Brittingham and Fiala fails to establish a *prima facie* case for obviousness.

Furthermore, the combination of references fails to disclose a *common* off axis chamber oriented within the outer shell in fluid communication with the central chamber and having a fluid outlet, and a plurality of deflectors oriented in series along the central axis of the central chamber and configured to deflect the energy from the high energy material to the common off axis chamber. Brittingham teaches a baffle stack 90 with baffles 10 having flow apertures 80 opening to blast chambers 24 (see Brittingham FIG. 8). However, the blast chambers are isolated from one another (see Brittingham FIGs. 8 and 18). Thus, Brittingham fails to disclose the limitations of claim 1 regarding a common off axis chamber (common to the multiple deflectors) for receiving deflected energy from the central chamber via the multiple deflectors. Champion

discloses annular recesses 26 into which gases pass to exit via vent slots 28 (see Champion FIG.

2). Similar to Brittingham, Champion fails to disclose the limitations of claim 1 regarding a common off axis chamber (common to the multiple deflectors) for receiving deflected energy from the central chamber via the multiple deflectors. For this reason alone, the cited references fail to render the claimed invention obvious. However, there are additional compelling reasons why the claimed invention is patentably distinct from the cited references.

The Office Action cites Fiala as disclosing an energy capture and control device comprising a central passageway along a central axis and chambers offset from the central axis, wherein the chambers produce an axially serpentine flow between the walls thereof, the offset chambers having an outlet and which serve to dissipate energy transferred from the high energy material. However, Fiala does not disclose the alleged offset chambers. Fiala discloses a single chamber with a spiral shell therein (see Fiala page 1, lines 90-99). The spiral within the Fiala chamber does not form additional chambers. The spiral shell of Fiala also does not form a series of deflectors. Fiala fails to disclose a common off axis chamber for receiving energy deflected from multiple deflectors. Thus, combination of Fiala with Brittingham and Champion fails to establish a *prima facie* case for obviousness for the limitations of claim 1.

Applicant further disputes the obviousness of the combination of Fiala with Brittingham and Champion. For example, each of Brittingham and Champion disclose highly specialized structures which would be destroyed by combination with the spiral shell of Fiala. Use of the spiral shell of Fiala would reduce the amount of gases flowing to the Champion annular recesses and provide a barrier to flow of the gases toward a muzzle end of the barrel, thus obviating the need for the plenum structure 25 with the reaction wall surface 27 and destroying the entire purpose of the Champion device to counter recoil forces (Abstract; col. 1, lines 41-45 and 63; col. 2, lines 42-47, 56-60 and 63-65; and throughout). Use of the spiral shell of Fiala with the Brittingham baffles would destroy purpose of the flow disruption grooves which are intended to create a turbulent flow because the Fiala spiral is long and continuous (see Fiala page 2, line 13) and smoothly directs the flow. The combination of Fiala with Brittingham and/or Champion would also not be made by one of ordinary skill in the art because both Brittingham and Champion are highly segmented structures which obtain their described functionality from the segmentation. In contrast, Fiala is entirely unsegmented and cannot be combined into the

segmentations of Brittingham or Champion without dramatically affecting the function of either device, if such modifications can even be envisioned. Applicant submits that the combination of Fiala with Brittingham and Champion simply cannot be made without fundamental, destructive alterations to the structure and performance of any of the involved devices.

Applicant disputes the obviousness of the combination of Brittingham with Champion. Brittingham teaches firearm sound suppressor baffles (see Brittingham Title), while Champion discloses a muzzle brake to counter recoil forces of firearm discharge (see Champion Title and col. 2, lines 45-46). It is not clear why one of ordinary skill in the art would combine sound suppression with anti-recoil to attempt to arrive at the presently claimed features.

Applicant also submits that the combination of references as set forth in the Office Action constitutes impermissible hindsight.

The fact that a claimed product is within the broad field of the prior art and one might arrive at it by selecting specific items and conditions does not render the product obvious in the absence of some directions or reasons for making such selection. *Ex parte Kuhn*, 132 U.S.P.Q.2d 1958 (Bd. App. 1961).

Where the prior art gives no indication of which parameters are critical and no direction as to which of many possible choices is likely to be successful, the fact that the claimed combination falls within the scope of possible combinations taught therein does not render it obvious. *In re O'Farrell*, 853 F.2d 894 (Fed. Cir. 1988).

In other words, the need to "pick and choose" from the available prior art should set off a warning light that hindsight reconstruction was in use. As an early embodiment of the Fed. Cir. clearly stated in *W.L. Gore and Associates v. Garlock, Inc.*:

To imbue one of ordinary skill in the art with knowledge of the invention in suit when no prior art reference[s] ...of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher. 721 F.2d 1550, 1553 (Fed. Cir. 1983).

Even though KSR made it clear that the teaching, motivation or suggestion (the "TSM test") to make the invention need not reside solely in the prior art, the Court did not disturb decades of jurisprudence holding that the claim cannot provide the rationale to combine elements

from the prior art to recreate it. As stated in *Gore*, the Examiner is not entitled to use the claim as a "frame" and to employ "individual naked parts of separate prior art references...as a mosaic to recreate a facsimile of the claimed invention." *Id.* at 1552. See also *In re Warner*, 379 F.2d 1011 (C.C.P.A. 1967) cert. den'd. 389 U.S. 1057 (1968). ("[W]e note that it is impermissible to use the claimed invention as an instruction manual or 'template' to piece together isolated disclosures and teachings of the prior art so that the claimed invention may be rendered obvious.")

The Examiner must review the Specification and ascertain if the limitation in question is disclosed as serving any advantage or particular purpose, or whether it solves a stated problem. The Examiner also should explain the reasoning used to determine that the prior art would have performed equally as well as the claimed invention. These two steps help present the aforementioned "convincing line of reasoning." *Ex parte Clapp*, 227 USPQ at 973."

A statement that modifications of the prior art to meet the claimed invention would have been " 'well within the ordinary skill of the art at the time the claimed invention was made' " because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See also *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000).

Applicant notes that each of the statements of reasoning for why the references cited would be combined throughout the Office Action fail to demonstrate anything other than the Examiner's attempting to pick and choose among available art to put together a piecemeal rejection. The Office Action recites no teaching, suggestion, motivation, or other reasoning actually from any of the cited art in support of the Examiner's hindsight reasoning. The Office Action repeatedly provides subjective reasoning of the Examiner, but entirely fails to provide any objective reasons from the prior art to combine the teachings of the references.

For the foregoing reasons, Applicant submits that the combination of references fails to disclose or render obvious the limitations of claim 1, that one having ordinary skill in the art would not be motivated to make the combination, the combination is not possible without destroying the structure and functionality of the devices involved, and the combination is not

proper. Any one of these assertions is sufficient to overcome the current rejections. Therefore, Applicant respectfully requests that the rejection be withdrawn.

Regarding claim 5, Brittingham fails to disclose that the tertiary deflector is at least partially engaged within the flared exit portion of an adjacent deflector. Brittingham discloses that the baffles 10 in the baffle stack 90 are adjacent to one another (Brittingham FIG. 8), but none of the Brittingham baffles are engaged within a flared exit portion. FIG. 18 of Brittingham illustrates the opposite—that a baffle is inserted within an entrance portion of an adjacent baffle. Therefore, Applicant submits that claim 5 is distinguishable over the combination of references and respectfully requests that the rejection be withdrawn.

With regards to claim 7, nothing in any of Brittingham, Champion, or Fiala teaches or suggests radially serpentine pathways (i.e. alternating clockwise and counterclockwise flow). The Office Action states that element 25 of Champion is radially outward. Assuming, *arguendo*, that element 25 of champion is radially outward, claim 7 recites a radially serpentine pathway, not a pathway that is simply radially outward. Therefore, Applicant submits that claim 7 is distinguishable over the combination of references and respectfully requests that the rejection be withdrawn.

Regarding claim 16, Fiala fails to disclose an end-cap assembly which allows fluid to escape from the off axis chamber because Fiala fails to disclose an off axis chamber, as has been set forth above. Additionally, claim 16 recites that the fluid outlet is only accessible to the fluid in the common off axis chamber. The Fiala outlets are not for off axis chambers and are accessible to the single central chamber. Therefore, Applicant submits that claim 16 is distinguishable over the combination of references and respectfully requests that the rejection be withdrawn.

With regards to claim 17, the combination fails to disclose the claimed limitations at least for the reasons set forth regarding claim 1 above. Claim 17 further recites a plurality of orifices to the common off axis chamber with corresponding deflectors. Therefore, the combination of references fails to disclose the limitations of claim 17.

With regards to claim 18, Applicant disputes the obviousness of the combination as well as the combinability of the references to include the Fiala off axis Chamber with Brittingham or Champion for the reasons set forth above. Additionally, Applicant notes that the Office Action

cited the helical shell of Fiala for the off axis chamber and again cites the same shell for a feature within the chamber. These positions are contradictory and not consistent. The off axis chamber of claim 18 is a structurally axial serpentine pathway with a helical wall therein to cause energy dissipation in a spiral path while simultaneously traversing the axial serpentine pathway. The present application at page 7, lines 18-20 states “an axially serpentine fluid pathway... causes fluids received in the off axis chamber to travel back and forth along a length of the off axis chamber”. Fiala discloses a spiral pathway that extends in one direction, not back and forth in a serpentine fashion. Therefore, Applicant submits that claim 18 is distinguishable over the combination of references and respectfully requests that the rejection be withdrawn.

Obviousness over Brittingham in view of Champion, Fiala, Scanlon and Huff

Claims 8-9 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion and Fiala as applied to Claim 1, and further in view of Scanlon and Huff. Applicant submits that the same arguments apply to this rejection as applied above to Brittingham, Champion, and Fiala alone. The addition of Scanlon and Huff do not remedy the defects noted.

Specifically, Scanlon introduces vortex chambers but fails to teach or suggest axially or radially serpentine pathways defined by walls. Turning to Huff, Applicant notes that axially serpentine pathways are indeed present. However, Huff is directed toward automobile mufflers rather than firearm silencers of Brittingham, Champion and Scanlon. The question of whether a reference is combinable with other references initially rests on whether it is analogous art or would be reasonably pertinent to the problem being solved. Unfortunately, Huff cannot be said to be reasonably pertinent to solving problems with explosive discharge of firearms. For this reason alone, Huff is not combinable with the other references.

Further, the disclosure of Huff states unambiguously that the chamber must be closed with *no* outlet. Specifically, Huff states “[o]ne of the underpinnings of the invention is the recognition that a side branch can be constructed to be folded over to extend parallel to the length of a straight through muffler...[t]hat is the sound wave must travel unimpeded through the passage to generate a reflection wave that in turn can travel back through sound passage 30 to cancel out the sound wave.” Col. 10, lines 55-58 and 61-65. Huff uses cancellation of sound waves from reflected waves to provide effective muffling of sound. Reflection is created by dead-ended

passages with no outlet. From this it is clear that introduction of a fluid outlet would destroy the functionality of Huff. Thus, not only is Huff non-analogous art, one skilled in the art would be discouraged from combining these references since doing so would produce a seemingly inoperative automotive muffler. The Federal Circuit has made it clear that such seemingly inoperative devices provide a strong teaching away which prevents a finding of obviousness. See McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1354 (Fed. Cir. 2001).

For any one of these three reasons, the combination of Brittingham, Champion, Fiala, Scanlon, and Huff fail to create a sustainable case of obviousness over Claims 8 and 9. Furthermore, none of these references remedies the deficiencies noted above with respect to teachings related to providing a *common* off axis chamber for a plurality of deflectors.

Obviousness over Brittingham in view of Champion, Fiala Scanlon, Huff and Latka

Claims 10-12 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion, Fiala, Scanlon and Huff as applied to Claim 8, further in view of Latka. Applicant submits that the addition of Latka to the combination of four other references fails to remedy the defects outlined above with respect to Brittingham, Champion, and Fiala alone or with the addition of Scanlon and Huff.

Further, the combination of these references must result in the invention as claimed. Applicant's own claims cannot be used as a roadmap to construct a rejection to meet the limitations. For example, the spiral (helical) passage taught in Latka is integral to the baffles used. Combination with the annular passages resulting from a modified version of Brittingham and Huff would not produce helical passages within the annular spaces. Rather, one might place annular passages exterior to the spiral passages. Regardless it seems difficult to imagine what type of device would honestly be suggested by looking at those references in combination. The purported reasoning to obtain "increased distance travelled by the sound" would not necessarily result in helical passages placed within annular spaces. Applicant submits that there is no motivation to mix the spiral and annular passages of each reference in the manner proposed. Therefore, Applicant respectfully requests that this rejection also be withdrawn.

Obviousness over Brittingham in view of Champion, Fiala, and Hausken

Claims 13-15 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion and Fiala as applied to Claim 1, further in view of Hausken. Applicant submits that the addition of Hausken to the combination of Brittingham, Champion, and Fiala fails to remedy the defects outlined above with respect to Brittingham, Champion, and Fiala alone. Therefore, Applicant respectfully requests that this rejection also be withdrawn.

Obviousness over Brittingham in view of Champion, Fiala, Scanlon and Huff

Claim 19 was rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion and Fiala as applied to Claim 1, further in view of Scanlon and Huff. Applicant submits that the addition of Scanlon and Huff to the combination of Brittingham, Champion, and Fiala fails to remedy the defects outlined above with respect to Brittingham, Champion, and Fiala alone. Therefore, Applicant respectfully requests that this rejection also be withdrawn.

New Claim 22

New Claim 22 is drawn towards a device where the common off axis chamber includes sub-chambers defined by the deflectors, each with the radially serpentine fluid pathway, and wherein the radially serpentine fluid pathways of each of the deflectors are axially non-linearly interconnected along an outermost portion of the plurality of sub-chambers. Nothing in any of the cited references teaches or suggests such a staged and limited access to the off axis chamber. As such, Applicant submits that this claim should be allowed.

CONCLUSION

In light of the above, Applicant respectfully submits that pending claims 1-22 are in condition for allowance. Therefore, Applicant requests that the rejections and objections be withdrawn, and that the claims be allowed and passed to issue. If any impediment to the allowance of these claims remains after entry of this Amendment, the Examiner is strongly encouraged to call Erik Ericksen at (801) 566-6633 so that such matters may be resolved as expeditiously as possible.

Payment in the amount of \$570.00 is enclosed pursuant to 37 C.F.R. § 1.17(a), for a one month extension of time, for a Request for Continued Examination (RCE), and for one additional dependent claim (claim 22).

The Commissioner is hereby authorized to charge any additional fee or to credit any overpayment in connection with this Amendment to Deposit Account No. 20-0100.

DATED this 29th day of May, 2012.

Respectfully submitted,

/eriksericksen/

Erik S. Ericksen, M.S.
Registration No. 48954

THORPE NORTH & WESTERN, LLP
Customer No. 20,551
P.O. Box 1219
Sandy, Utah 84091-1219
Telephone: (801) 566-6633

EE/RA

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 13/025,989		Filing Date 02/11/2011		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)		SMALL ENTITY ☒ OR			OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$	=		X \$	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		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 \$250 (\$125 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			TOTAL				
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)		SMALL ENTITY OR			OTHER THAN SMALL ENTITY		
AMENDMENT	05/29/2012	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 22	Minus	** 21	= 1	X \$30 =	30	OR	X \$ =	
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X \$125 =	0	OR	X \$ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
					TOTAL ADD'L FEE	30	OR	TOTAL ADD'L FEE		
(Column 1)			(Column 2)		SMALL ENTITY OR			OTHER THAN SMALL ENTITY		
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	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))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
					TOTAL ADD'L FEE		OR	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 number found in the appropriate box in column 1.										

Legal Instrument Examiner:
/MONIQUE BRUNSON/

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.



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.
13/025,989	02/11/2011	Russell Oliver	3212-002.NP4	3886
20551 7590 02/08/2012 THORPE NORTH & WESTERN, LLP. P.O. Box 1219 SANDY, UT 84091-1219			EXAMINER PHILLIPS, FORREST M	
			ART UNIT	PAPER NUMBER
			2832	
			NOTIFICATION DATE	DELIVERY MODE
			02/08/2012	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):

rich@tnw.com
cause@tnw.com
patentdocket@tnw.com

Office Action Summary	Application No. 13/025,989	Applicant(s) OLIVER, RUSSELL	
	Examiner FORREST M. PHILLIPS	Art Unit 2832	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ 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.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1-21 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-20 is/are rejected.
- 8) ☒ Claim(s) 21 is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
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)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) ☒ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) ☒ Information Disclosure Statement(s) (PTO/SB/08) | 5) ☐ Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/02/11</u> . | 6) ☐ Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7,16, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brittingham (US7987944) in view of Champion (US6425310) and Fiala (US1341363).

With respect to claim 1 Brittingham discloses an energy capture and control device comprising:

A central chamber (defined by the walls of the baffles) oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet (that is a bullet from a gun);

An off axis chamber (chamber 24 connected by chamber 76) oriented within the outer shell (see figure 8) in fluid communications with the central chamber.

Brittingham does not disclose wherein the off axis chamber has a fluid outlet and multiple internal walls configured to produce a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine and which dissipates energy transferred from the high energy material.

Champion discloses a silencer which includes off axis chambers comprising a fluid outlet and multiple internal walls configured to produce a serpentine fluid pathway which dissipates energy transferred from the high energy material (see chambers 25).

Fiala discloses an energy capture and control device comprising a central passageway along a central axis, and chambers offset from the central axis, wherein the chambers produce an axially serpentine flow between the walls thereof the offset chambers having an outlet and which serve to dissipate energy transferred from the high energy material (see figure 1 and figure 3).

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Fiala to provide an axially serpentine pathway with offset chambers, with the offset chambers of Champion and the silencer device of Brittingham, the motivation for doing so, would be to enhance the sound reduction created by the longer pathway forced by the radially serpentine pathway.

With respect to claim 2 Brittingham further discloses wherein the central chamber further comprises a locking block oriented at the inlet (that is the first baffle or so called blast baffle), said locking block having an engagement surface configured to attach to the high energy outlet and a hollow interior along the central axis, said hollow interior having a reducing through portion (at the so called waist) and a flared portion (as shown on each baffle which expands outward from the waist).

With respect to claim 3 Brittingham further discloses wherein the central chamber further comprises a plurality of deflectors (each of the plurality of baffles see figure 8) oriented in series along the central axis, the plurality of deflectors comprising a

frustoconical shape (see figure 8) and having a hollow interior along the central axis and each having a flared end portion.

With respect to claim 4 Brittingham further discloses wherein the plurality of deflectors include a primary deflector, a secondary deflector and at least one tertiary deflector (shown are three, discussed are any number of baffles, as such any number of baffles aka deflectors would have been obvious to one of ordinary skill).

With respect to claim 5 Brittingham further discloses wherein at least one tertiary deflector is at least partially engaged within the flared exit portion of an adjacent deflector (that is the central portion is within the mouth portion formed at the intersection of the adjacent deflectors).

With respect to claim 6 Brittingham further discloses wherein the plurality of deflectors span substantially the entire central axis of the central chamber (refer to figure 8).

With respect to claim 7 Champion and Fiala disclose wherein the multiple internal walls are formed to produce a radially serpentine fluid pathway (see representation figure of Champion, element 25 is radially outward).

With respect to claim 16 Fiala further discloses wherein the outer shell includes an end cap assembly at an outlet end of the central chamber and which allows fluid to escape from the off axis chamber (refer to figure 3).

With respect to claim 17 Brittingham discloses an energy capture and control device comprising:

A central chamber (defined by the walls of the baffles) oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet (that is a bullet from a gun);

An off axis chamber (chamber 24 connected by chamber 76) oriented within the outer shell (see figure 8) in fluid communications with the central chamber.

Brittingham does not disclose wherein the off axis chamber has a fluid outlet and multiple internal walls configured to produce a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine and which dissipates energy transferred from the high energy material.

Champion discloses a silencer which includes off axis chambers comprising a fluid outlet and multiple internal walls configured to produce a serpentine fluid pathway which dissipates energy transferred from the high energy material (see chambers 25).

Fiala discloses an energy capture and control device comprising a central passageway along a central axis, and chambers offset from the central axis, wherein the chambers produce an axially serpentine flow between the walls thereof the offset chambers having an outlet and which serve to dissipate energy transferred from the high energy material (see figure 1 and figure 3).

With respect to claim 18 Fiala further discloses wherein the off axis chamber further comprises at least one helical wall (see M) defining the axially serpentine fluid pathway, the at least one helical wall being configured to produce an axially serpentine fluid pathway which helically spirals around the central chamber and which dissipates energy transferred from the high energy material.

With respect to claim 20 Brittingham as modified discloses both an apparatus and the method of use of the apparatus, the method steps of discharging, and capturing are taught by the use of the device.

2. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brittingham (US7987944) in view of Champion (US6425310) and Fiala (US1341363) as applied to claim 1 above, and further in view of Scanlon (US7207258) and Huff (US5952625).

With respect to claim 8 Brittingham as modified discloses the invention as claimed except wherein the multiple internal walls are formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces between each adjacent tube, and having alternating ends offset so as to produce an axially serpentine fluid annular pathway.

Scanlon discloses the use of concentric tubes to form a tortuous pathway for the discharge of gases from a firearm silencer.

Huff discloses the use of a plurality of concentric tubes to form a serpentine pathway for gases to pass through and dissipate the noise therefrom (see figure 5, also abstract).

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Huff to provide a serpentine pathway by means of concentric tubes and the teachings of Scanlon to provide concentric tubes as a silencing means for a firearm, with the silencer of Brittingham as modified, including the

pathway having its own outlet as taught by Champion and Fiala to enhance sound reduction without necessitating a significant size increase.

With respect to claim 9 Huff further discloses wherein the multiple concentric tubes include an innermost tube which includes orifices oriented to allow fluid to pass from the central chamber into a first annular space adjacent the innermost tube and through the annular spaces of progressively larger diameter (see figure 5).

3. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brittingham (US7987944) in view of Champion (US6425310) in view of Fiala (US1341363) in view of Scanlon (US7207258) and Huff (US5952625) as applied to claims 8 above, and further in view of Latka (US 2029512).

With respect to claim 10 Brittingham as modified discloses the invention as claimed except wherein the annular spaces further include a helical wall oriented within at least one of the annular spaces to direct fluids along a helical path within the at least one annular space.

Latka discloses the use of helical wall to lengthen the distance traveled by sound, thus furthering sound reduction (see figure 1).

At the time of the invention it would have been obvious to one of ordinary skill in the art to apply the teachings of Latka to place a winding helical passage within an annular chamber, with at least one of the annular chambers formed by the modification to Brittingham by Huff. The motivation to do so would be the further the sound reduction due to the increased distance travelled by the sound.

With respect to claim 11 Latka further discloses wherein the helical wall has a circular cross section (see figure 2).

With respect to claim 12 while not expressly disclosing a winding ratio of between 3:1 and 8:1 the winding ratio is shown in figure 5 to approximate 5:1. The selection of a specific winding ratio would have been obvious to one of ordinary skill in the art in order to optimize and tune the system. Further it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

With respect to claim 19

4. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brittingham (US7987944) in view of Champion (US6425310) and Fiala (US1341363) as applied to claim 1 above, and further in view of Hausken (US6796214).

With respect to claim 13 Brittingham as modified discloses the invention as claimed except wherein the off axis chamber further includes an annular dampening chamber oriented about the central chamber and being filled with an energy absorbent material.

Hausken discloses an off axis chamber further including an annular dampening chamber (chambers 1-5) oriented about the central chamber and being filled with an energy absorbent material (14).

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Hausken to provide dampening material in a

Art Unit: 2832

chamber surrounding the central chamber of a firearm silencer with the silencer of Brittingham as modified to enhance sound reduction by bulk absorption.

With respect to claim 14 Hausken further discloses wherein the dampening chamber is oriented adjacent the outer shell (see figures, is radially just inward of the shell).

With respect to claim 15 Hausken further discloses wherein the energy absorbent material is selected from the group consisting of powder tungsten filament, heavy metal powder, graphite, polymer, aluminum (aluminum chips are taught), stainless steel, carbon steel, iron, copper, tantalum, titanium, vanadium, chromium, zirconium, carbides of these, alloys of these, and combinations thereof.

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brittingham (US7987944) in view of Champion (US6425310) and Fiala (US1341363) as applied to claim 17 above, and in further view of Scanlon (US7207258) and Huff (US5952625).

With respect to claim 19 Brittingham as modified discloses the invention as claimed except comprising multiple internal walls defining an axially serpentine fluid pathway, with multiple internal walls being formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces between each adjacent tube, and having alternating ends offset so as to produce a serpentine fluid annular pathway.

Scanlon discloses the use of concentric tubes to form a tortuous pathway for the discharge of gases from a firearm silencer.

Huff discloses the use of a plurality of concentric tubes to form a serpentine pathway for gases to pass through and dissipate the noise therefrom (see figure 5, also abstract).

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Huff to provide a serpentine pathway by means of concentric tubes and the teachings of Scanlon to provide concentric tubes as a silencing means for a firearm, with the silencer of Bittingham as modified to enhance sound reduction without necessitating a significant size increase.

Allowable Subject Matter

Claim 21 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to disclose the arrangement of the fluid pathway in regards to the deflectors as claimed. The prior art discloses wherein all chambers are in communication, and wherein all chambers are separated but fails to disclose a portion of the chambers in the manner claimed being connected while the remaining chambers are separate.

Response to Arguments

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FORREST M. PHILLIPS whose telephone number is (571)272-9020. The examiner can normally be reached on Monday through Friday 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on 57127221990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2832

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.

/FORREST M PHILLIPS/
Primary Examiner, Art Unit 2832

Notice of References Cited	Application/Control No. 13/025,989	Applicant(s)/Patent Under Reexamination OLIVER, RUSSELL	
	Examiner FORREST M. PHILLIPS	Art Unit 2832	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-1,341,363	05-1920	ANTHONY FIALA	181/223
	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.

<i>Index of Claims</i> 	Application/Control No. 13025989	Applicant(s)/Patent Under Reexamination OLIVER, RUSSELL
	Examiner FORREST M PHILLIPS	Art Unit 2832

✓	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	09/23/2011	02/01/2012						
	1	✓	✓						
	2	✓	✓						
	3	✓	✓						
	4	✓	✓						
	5	✓	✓						
	6	✓	✓						
	7	✓	✓						
	8	✓	✓						
	9	✓	✓						
	10	✓	✓						
	11	✓	✓						
	12	✓	✓						
	13	✓	✓						
	14	✓	✓						
	15	✓	✓						
	16	✓	✓						
	17	✓	✓						
	18	✓	✓						
	19	✓	✓						
	20	✓	✓						
	21		O						

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	198	181/223.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/02/02 15:07
L3	25	("0812140" "0971083" "1018720" "1190107" "1229675" "1331474" "2448382" "2801416" "4126077" "4501189").PN. OR ("5033356").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/02/02 15:09
L4	377	(89/14.4).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/02/02 15:12
S3	176	("20090235568" "20100199834" "4501189" "4510843" "5433133" "6499245" "7707762" "20070107982" "3667570" "0822127" "5164535" "5486425" "5777258" "6298764" "7308967" "7412917" "7481157" "7610710" "7676976" "5078043" "7987944" "4530417" "1773443" "20100048752" "5036747" "6732628" "7000547" "7036259" "7207258" "7412917" "4907488" "5661255" "5698810" "5860242" "1427802" "4576083" "5679916" "6302009" "6376565" "7059233" "7823314" "5952625" "3693750" "1462158" "5590484" "6490822" "6959509" "7216451" "7587969" "4576083" "6425310" "2514996" "4454798" "20070256347" "4974489" "6079311" "6575074" "7131228" "5029512" "7207258" "7905319" "4482027" "5656166" "7325474" "5010676" "5029512" "6792711" "7237467" "7353740" "7661349" "0916885" "6796214" "7308967").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/02/01 15:49
S4	24	("0823115" "4006793" "4046219" "4185715" "4220219" "4557349" "4790409" "4848513" "5129793" "5168132" "5350888" "5413189" "5502283" "5659158").PN. OR ("5952625").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/02/01 15:53
S5	33	("0916885" "1017003" "1341363" "2792760" "2925755" "3500955"	US-PGPUB; USPAT;	OR	OFF	2012/02/01 15:54

	"3667570" "3748956" "4291610" "4576083" "4588043").PN. OR ("5029512").URPN.	USOCR			
--	---	-------	--	--	--

EAST Search History (Interference)

< This search history is empty >

2/ 2/ 2012 3:23:16 PM
C:\ Users\ fphillips\ Documents\ EAST\ Workspaces\ 13025989.wsp

Substitute for form 1449/PTO

(Use as many sheets as necessary)

Application Number	13/025,989
--------------------	------------

Filing Date	2/11/2011
-------------	-----------

Filing Date	2/11/2011
-------------	-----------

First Named Inventor	Russell Oliver
----------------------	----------------

Art Unit	2832
----------	------

Examiner Name	Forrest M. Phillips
---------------	---------------------

Attorney Docket Number	3212-002.NP4
------------------------	--------------

Sheet

ofExaminer
Initials*

Cite
No.¹

Include name of author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.

 T^2

RP

US Application 13/025,973; filing date 02/11/2011; Russell Oliver; office action issued 10/03/2011

Examiner
Signature

/Forrest Phillips/

Date
Considered

02/01/2012

¹Applicant's unique citation designation number (optional). ²Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 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 2 hours 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, 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 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /FP/

Search Notes 	Application/Control No. 13025989	Applicant(s)/Patent Under Reexamination OLIVER, RUSSELL
	Examiner FORREST M PHILLIPS	Art Unit 2832

SEARCHED			
Class	Subclass	Date	Examiner
181	223	9/23/11	FP
89	14.4	9/23/11	FP

SEARCH NOTES		
Search Notes	Date	Examiner
EAST inventor search conducted	9/23/11	FP
EAST search conducted see attached search history	9/23/11	FP
EAST search updated	2/1/12	FP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

	/ FORREST M PHILLIPS/ Primary Examiner. Art Unit 2832
--	--

Receipt date: 11/02/2011

13025989 - GAU: 2832

PTO/SB/08A (08-03)

Approved for use through 07/31/2006. OMB 0651-0031

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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Complete if Known		
		Application Number	13/025,989	
		Filing Date	2/11/2011	
		First Named Inventor	Russell Oliver	
		Art Unit	2832	
		Examiner Name	Forrest M. Phillips	
Sheet		of	Attorney Docket Number	3212-002.NP4

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
/FP/ ↓ ↓ ↓		822127	05/1906	Hufnagel	
		2514996	07/1950	Faust Jr.	
		3693750	09/1972	Takkunen	
		4454798	06/1984	Shea et al	
		4482027	11/1984	Gould	
		4530417	07/1985	Daniel	
		5656166	08/1997	Linnersten et al.	
		7325474	02/2008	Yoshimura et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ³ - Number ⁴ - Kind Code ⁵ (if known)				

Examiner Signature	/Forrest Phillips/	Date Considered	02/01/2012
-----------------------	--------------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered.

Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /FP/

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

ART UNIT: 2832 EXAMINER: Phillips, Forrest M. FIRST NAMED INVENTOR: Russell Oliver SERIAL NO.: 13/025,989 FILED: 02/11/2011 CONF. NO.: 3886 FOR: ENERGY CAPTURE AND CONTROL DEVICE DOCKET NO.: 3212-002.NP4	<u>CERTIFICATE OF MAILING</u> <u>UNDER 37 C.F.R. § 1.8</u> DATE OF DEPOSIT: <u>December 30, 2011</u> I hereby certify that this paper or fee (along with any paper or fee referred to as being attached or enclosed) is being submitted on the date indicated above via: ☒ EFS Web ☐ facsimile to _____ ☐ the United States Postal Service with sufficient postage as first class mail addressed to: Mail Stop _____, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450. _____ /andreacphillips/ Andrea C. Phillips
---	--

THORPE NORTH & WESTERN, LLP
Customer No. 20,551
P.O. Box 1219
Sandy, Utah 84091-1219

AMENDMENT and RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Office Action, mailed September 30, 2011, Applicant offers the following Amendment and requests reconsideration of the above-captioned application.

CLAIM AMENDMENTS

Please amend the claims as follows:

1. (currently amended) An energy capture and control device, comprising:
 - a) a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet;
 - b) an off axis chamber oriented within the outer shell in fluid communication with the central chamber and having a fluid outlet and multiple internal walls configured to produce a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine and which dissipates energy transferred from the high energy material.
2. (original) The device of claim 1, wherein the central chamber further comprises a locking block oriented at the inlet, said locking block having an engagement surface configured to attach to the high energy outlet and a hollow interior along the central axis, said hollow interior having a reducing throat portion and a flared outlet.
3. (original) The device of claim 1, wherein the central chamber further comprises a plurality of deflectors oriented in series along the central axis, the plurality of deflectors comprising a frustoconical shape and having a hollow interior along the central axis and each having a flared exit portion.
4. (original) The device of claim 3, wherein the plurality of deflectors include a primary deflector, a secondary deflector, and at least one tertiary deflector.
5. (original) The device of claim 4, wherein at least one tertiary deflector is at least partially engaged within the flared exit portion of an adjacent deflector.

6. (original) The device of claim 3, wherein the plurality of deflectors span substantially the entire central axis along the central chamber.
7. (original) The device of claim 1, wherein the multiple internal walls are formed to produce a radially serpentine fluid pathway.
8. (currently amended) The device of claim 1, wherein the multiple internal walls are formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces between each adjacent tube, and having alternating ends offset so as to produce ~~an~~ the axially serpentine fluid annular pathway.
9. (currently amended) The device of ~~claim 9~~ claim 8, wherein the multiple concentric tubes include an innermost tube which includes orifices oriented to allow fluid to pass from the central chamber into a first annular space adjacent the innermost tube and through the annular spaces of progressively larger diameter.
10. (original) The device of claim 9, wherein the annular spaces further include a helical wall oriented within at least one of the annular spaces to direct fluids along a helical path within the at least one annular space.
11. (original) The device of claim 10, wherein the helical wall has a quadrilateral cross-section or a circular cross-section.
12. (original) The device of claim 10, wherein the helical wall has a winding ratio (windings : diameter) of about 3:1 to about 8:1.
13. (original) The device of claim 1, wherein the off axis chamber further includes an annular dampening chamber oriented about the central chamber and being filled with an energy absorbent material.

14. (original) The device of claim 13, wherein the dampening chamber is oriented adjacent the outer shell.
15. (original) The device of claim 13, wherein the energy absorbent material is selected from the group consisting of powder tungsten filament, heavy metal powder, graphite, polymer, aluminum, stainless steel, carbon steels, iron, copper, tantalum, titanium, vanadium, chromium, zirconium, carbides of these, alloys of these, and combinations thereof.
16. (original) The device of claim 1, wherein the outer shell includes an end cap assembly at an outlet end of the central chamber and which allows fluid to escape from the off axis chamber.
17. (currently amended) An energy capture and control device, comprising:
 - a) a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet;
 - b) an off axis chamber oriented within the outer shell in fluid communication with the central chamber and further includes a fluid outlet, the off axis chamber comprising a winding a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine.
18. (currently amended) The device of claim 17, wherein the off axis chamber further comprises ~~a fluid outlet and~~ at least one helical wall defining the ~~winding~~ axially serpentine fluid pathway, the at least one helical wall being configured to produce an axially serpentine helical fluid pathway which helically spirals around the central chamber and which dissipates energy transferred from the high energy material.
19. (currently amended) The device of claim 17, further comprising multiple internal walls defining ~~an~~ the axially serpentine fluid pathway, the multiple internal walls being formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces

between each adjacent tube, and having alternating ends offset so as to produce a serpentine fluid annular pathway.

20. (currently amended) A method for energy capture and control from a high energy device, comprising:
- a) discharging a high energy material from the high energy device through an energy capture and control device comprising a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet, and an off axis chamber oriented within the outer shell in fluid communication with the central chamber, the off axis chamber comprising ~~a winding~~ an axially serpentine fluid pathway and a fluid outlet; and
 - b) capturing energy within the off axis chamber using the ~~winding~~ axially serpentine fluid pathway, the energy being associated with discharge of the high energy material from the high energy discharge device.
21. (new) The device of claim 4, wherein the fluid communication between the off axis chamber and the central chamber occurs only at the primary deflector, the secondary deflector and a first tertiary deflector.

REMARKS

Applicant expresses appreciation to the Examiner for consideration of the subject patent application. Claims 1-20 were originally presented. Claims 1, 8, 9 and 17-20 have been amended. Claim 21 has been added. Therefore, Claims 1-21 are now pending.

This amendment is in response to the Office Action mailed September 30, 2011, in which the following actions were taken:

(1) Claim 9 as rejected under 35 U.S.C. § 112, second paragraph since it depended from itself.

(2) Claims 17-18 and 20 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 5,029,512 (hereinafter “Latka”);

(3) Claims 1-7 and 20 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 7,987,944 (hereinafter “Brittingham”) in view of U.S. Patent No. 6,425,310 (hereinafter “Champion”).

(4) Claims 8-9 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion as applied to Claim 1, and further in view of U.S. Patent No. 7,207,258 (hereinafter “Scanlon”) and U.S. Patent No. 5,952,625 (hereinafter “Huff”).

(5) Claims 10-12 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion, Scanlon and Huff as applied to Claim 8, further in view of Latka.

(6) Claims 13-15 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion as applied to Claim 1, further in view of U.S. Patent No. 6,796,214 (hereinafter “Hausken”).

(7) Claim 16 was rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion as applied to Claim 1, further in view of U.S. Patent No. 5,078,043 (hereinafter “Stephens”).

Reconsideration of the application is respectfully requested in view of the claim amendments and the following responsive remarks.

Amendments

Claims 1, 8, 9 and 17-20 were amended. Claims 21- were added. The amendment to Claims 1, 17 and 20 introduce the limitation that the fluid pathway is at least one of axially serpentine, i.e. fluids travel back and forth along the length of the off axis chamber, and radially serpentine, i.e. fluids travel in an alternating clockwise to counterclockwise pattern. Support for this amendment related to axially serpentine can be found at page 7, lines 18-21, Figures 1a and 16, and throughout the filed specification. Support for radially serpentine flow can be found at page 7, lines 21-24 and FIG. 14.

Claims 8 and 18-19 were amended to conform antecedent basis in light of the amendments to the corresponding independent claims. Claim 9 was amended to correct improper dependency. Claim 18 was also amended to introduce limitations of both axial and helical fluid flow as described at page 8, lines 7-9 and Figure 1a.

Support for new Claim 21 can be found in FIG. 1a and FIG. 2. Notice that access to the off axis chamber only occurs just in front of the primary deflector 165, just in front of the secondary deflector 170 (via the circumferential holes shown in FIG. 2), and just in front of the first tertiary deflector 175 (via the circumferential holes shown in FIG. 2). The circumferential holes show in FIG. 1a right at the meeting of tube 135 and each of the deflectors 170 and 175.

As such, no new matter is introduced by these amendments.

Invention

Applicant wishes to also emphasize the terminology and nature of the claimed invention. Specifically, each of the independent claims requires “at least one of an axially serpentine and radially serpentine” fluid pathway. Axially serpentine refers to a serpentine fluid flow forward and back along the length of the off axis chamber. Figure 1a illustrates one version of this arrangement where fluid flow goes lefts and right switching directions at the end of each concentric tube. This axially serpentine flow is different from radially serpentine flow in which fluid would flow back and forth from clockwise to counter-clockwise around the axis as described in page 7, lines 20-22 and shown in Figure 14 (see units 500, 505 and 510).

Furthermore, each of the independent claims requires that the off axis chamber includes “a fluid outlet.” This is a separate element from the fluid communication with the central chamber

and presents an outlet for fluids to escape the off axis chamber and the device *without* returning to the central chamber. This allows fluids to escape from the device without creating excessive back pressure in the host weapon.

Claim Rejections - 35 U.S.C. § 102

Claims 17-18 and 20 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 5,029,512 (hereinafter “Latka”);

It is well established that “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.”

MPEP § 2131 (MPEP 8th Ed. Rev. 8 2010) (citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987)). “The identical invention must be shown in as complete detail as is contained in the...claim.” MPEP § 2131 (MPEP 8th Ed. Rev. 8 2010) (citing *Richardson v. Suzuki Motor Co.*, 9 USPQ 2d 1913, 1920 (Fed. Cir. 1989)). Applicant submits that Latka fails to teach each and every element of the claimed device.

In order to most succinctly explain why the claims presented herein are allowable, Applicant will direct the following remarks primarily to the originally presented independent claim 1 with the understanding that once an independent claim is allowable, all claims depending therefrom are also allowable.

Applicant notes that Latka discloses a silencer device which includes multiple baffles each with a spiraled vein. As such, gases which diverge from the central axis into the baffles are directed into the spirals which all incline in the same direction. For example, a review of Fig. 1 and Fig. 2 shows that gases which enter these spiraled veins will travel in a clockwise pattern throughout the length of the silencer device. The maximum extent of the chambers as a continuous spiraled chamber which traverses left to right only.

The Office has stated that the Latka reference discloses and “axially helical fluid pathway.” See page 3 of Office action. Applicant agrees with this statement, but emphasizes that axially helical is substantially different from axially serpentine which requires that the fluid follows a serpentine (i.e. back and forth) movement along an axial direction. From a mathematical perspective this would be described by an oscillating velocity vector along the axial direction. Importantly, there are no baffles or chambers which would cause the gases to travel backwards

toward the inlet end of the device. As such, there are no “axially serpentine” fluid pathways in Latka. Consistent with the above description of the claimed invention, the helical flow in Latka is also not “radially serpentine” since the spiraled direction is only one direction (i.e. clockwise but not counterclockwise). The flow configuration in Latka can be described as helical but not serpentine in any respect.

Consequently, Latka cannot anticipate the current claims and Applicant respectfully requests that this rejection be withdrawn.

Claim Rejections - 35 U.S.C. § 103

The issue under § 103 is whether the PTO has stated a case of *prima facie* obviousness. "The PTO has the burden under § 103 to establish a *prima facie* case of obviousness." *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). To satisfy this burden, the PTO must meet the criteria set out in M.P.E.P. § 706.02(j):

. . . three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Moreover, the obviousness analysis must comply with the statutory scheme as explained by the Supreme Court in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966), namely, consideration must be given to: (1) the scope and content of the prior art, (2) the differences between the prior art and the claimed invention, (3) the level of ordinary skill in the pertinent art, and (4) additional evidence, which may serve as indicia of non-obviousness.

In order to do this by combining references, the prior art must provide some reason or motivation to make the claimed compositions, *In re Dillon*, 16 U.S.P.Q.2d 1897, 1901 (Fed. Cir. 1990). As aptly stated in *In re Jones*, 21 U.S.P.Q.2d 1941, 1943-44 (Fed. Cir. 1992):

"Before the PTO may combine the disclosure of two or more prior art references in order to establish *prima facie* obviousness, there must be some suggestion for doing so, found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art... Conspicuously missing from this record is any

evidence, other than the PTO's speculation (if it be called evidence) that one of ordinary skill in the...art would have been motivated to make the modifications of the prior art necessary to arrive at the claimed (invention)."

An excellent summary of how the prior art must be considered to make a case of *prima facie* obviousness is contained in *In re Ehrreich et al.*, 220 U.S.P.Q. 504, 509-511 (CCPA 1979). There the court states that a reference must not be considered in a vacuum, but against the background of the other references of record. It is stated that the question of a § 103 case is what the reference(s) would "collectively suggest" to one of ordinary skill in the art. However, the court specifically cautioned that the Examiner must consider the entirety of the disclosure made by the reference and avoid combining them indiscriminately.

In finding that the "subject matter as a whole" would not have been obvious in *Ehrreich* the court concluded:

"Thus, we are directed to no combination of prior art references which would have rendered the claimed subject matter as a whole obvious to one of ordinary skill in the art at the time the invention was made. The PTO has not shown the existence of all the claimed limitations in the prior art or any suggestion leading to their combination in the manner claimed by applicants." (underlining added)

It has been widely recognized that virtually every invention is a combination of elements and that most, if not all, of these will be found somewhere in an examination of the prior art. This reasoning lead the court, in *Connell v. Sears, Roebuck & Co.*, 220 U.S.P.Q. 193, 199 (Fed. Cir. 1983) to state:

"...it is common to find elements or features somewhere in the prior art. Moreover, most if not all elements perform their ordained and expected function. The test is whether the claimed invention as a whole, in light of all the teachings of the references in their entireties, would have been obvious to one of ordinary skill in the art at the time the invention was made." (underlining added)

In re Sernaker, 217 U.S.P.Q. 1, 5-6, (Fed. Cir. 1983) states a test to determine whether a rejection of an invention based on a combination of prior art elements is appropriate as follows:

"The lesson of this case appears to be that prior art references in combination do not make an invention obvious unless something in the prior art references would suggest the advantage to be derived from combining their teachings...The board never showed how the teaching of the prior art could be combined to make the invention." (underlining added)

Further, according to the Supreme Court “[r]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 , 1741 (S. Ct. 2007) citing *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006). With this background in mind, Applicant respectfully submits that the asserted combinations of references fail to establish a *prima facie* case of obviousness.

Obviousness over Brittingham in view of Champion

Claims 1-7 and 20 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Brittingham in view of Champion. Applicant respectfully disagrees that the combination of Brittingham and Champion teaches each and every element.

Specifically, assuming *arguendo*, that these two references were properly combined, the Examiner recognizes that Brittingham fails to teach a fluid outlet or a serpentine fluid pathway. Champion is used to purportedly teach these limitations. Applicant notes that Champion does include exit vent slots 28 from the plenum 25. However, notably Champion has absolutely no axial or radial serpentine pathways. The diversion chambers in Champion are limited to the plenums 25. The internal surfaces of these plenums appears to be generally conical but have no baffles or other walls which direct gases back and forth either axially or back and forth radially. At best, Champion includes an annular recess 26 into which gases pass and then bounce off of reaction wall surface 27 to then exit via vent slots 28. The bouncing of gases within the annular recess forces gases back into the same path from which they came. This is not a serpentine flow pathway defined by walls and structure. A serpentine pathway physically directs fluids back and forth along distinct serpentine paths, not merely bouncing fluids back into the same path. As such, even the combination of Brittingham and Champion fails to establish a *prima facie* case for obviousness.

Claim 7 in particular is especially distinct from this combination of references. Nothing in either Brittingham or Champion teaches or suggests radially serpentine pathways (i.e. alternating clockwise and counterclockwise flow). As such, Claim 7 should be allowed over these references for this additional reason.

With respect to Claim 10, neither Brittingham nor Champion teach or suggest a helical wall at all. This is especially distinct since Claim 10 (via Claim 8) also requires that the helical wall be within concentric tubes which further form an axially serpentine pathway. Thus, both of these distinct fluid flow elements are entirely missing from the combination of these two references. Applicant therefore respectfully requests that this rejection be withdrawn.

Obviousness over Brittingham in view of Champion, Scanlon and Huff

Claims 8-9 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion as applied to Claim 1, and further in view of Scanlon and Huff. Applicant submits that the same arguments apply to this rejection as applied above to Brittingham and Champion alone. The addition of Scanlon and Huff do not remedy the defects noted.

Specifically, Scanlon introduces vortex chambers but fails to teach or suggest axially or radially serpentine pathways defined by walls. Turning to Huff, Applicant notes that axially serpentine pathways are indeed present. However, Huff is directed toward automobile mufflers rather than firearm silencers of Brittingham, Champion and Scanlon. The question of whether a reference is combinable with other references initially rests on whether it is analogous art or would be reasonably pertinent to the problem being solved. Unfortunately, Huff cannot be said to be reasonably pertinent to solving problems with explosive discharge of firearms. For this reason alone, Huff is not combinable with the other references.

Further, the disclosure of Huff states unambiguously that the chamber must be closed with no outlet. Specifically, Huff states “[o]ne of the underpinnings of the invention is the recognition that a side branch can be constructed to be folded over to extend parallel to the length of a straight through muffler...[t]hat is the sound wave must travel unimpeded through the passage to generate a reflection wave that in turn can travel back through sound passage 30 to cancel out the sound wave.” Col. 10, lines 55-58 and 61-65. Huff uses cancellation of sound waves from reflected waves to provide effective muffling of sound. Reflection is created by dead-ended passages with no outlet. From this it is clear that introduction of a fluid outlet would destroy the functionality of Huff. Thus, not only is Huff non-analogous art, one skilled in the art would be discouraged from combining these references since doing so would produce a seemingly inoperative automotive muffler. The Federal Circuit has made it clear that such seemingly

inoperative devices provide a strong teaching away which prevents a finding of obviousness. See McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1354 (Fed. Cir. 2001).

For any one of these three reasons, the combination of Brittingham, Champion, Scanlon, and Huff fail to create a sustainable case of obviousness over Claims 8 and 9.

Obviousness over Brittingham in view of Champion, Scanlon, Huff and Latka

Claims 10-12 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion, Scanlon and Huff as applied to Claim 8, further in view of Latka. Applicant submits that the addition of Latka to the combination of four other references fails to remedy the defects outlined above with respect to Brittingham and Champion alone or with the addition of Scanlon and Huff.

Further, the combination of these references must result in the invention as claimed. Applicant's own claims cannot be used as a roadmap to construct a rejection to meet the limitations. For example, the spiral (helical) passage taught in Latka is integral to the baffles used. Combination with the annular passages resulting from a modified version of Brittingham and Huff would not produce helical passages within the annular spaces. Rather, one might place annular passages exterior to the spiral passages. Regardless it seems difficult to imagine what type of device would honestly be suggested by looking at those references in combination. The purported reasoning to obtain "increased distance travelled by the sound" would not necessarily result in helical passages placed within annular spaces. Applicant submits that there is no motivation to mix the spiral and annular passages of each reference in the manner proposed. Therefore, Applicant respectfully requests that this rejection also be withdrawn.

Obviousness over Brittingham in view of Champion and Hausken

Claims 13-15 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion as applied to Claim 1, further in view of Hausken. Applicant submits that the addition of Hausken to the combination of Brittingham and Champion fails to remedy the defects outlined above with respect to Brittingham and Champion alone. Therefore, Applicant respectfully requests that this rejection also be withdrawn.

Obviousness over Brittingham in view of Champion and Stephens

Claim 16 was rejected under 35 U.S.C. § 103(a) as allegedly obvious over Brittingham in view of Champion as applied to Claim 1, further in view of Stephens. Applicant submits that the addition of Stephens to the combination of Brittingham and Champion fails to remedy the defects outlined above with respect to Brittingham and Champion alone. Therefore, Applicant respectfully requests that this rejection also be withdrawn.

New Claim 21

New Claim 21 is drawn towards a device where fluid communication from the central chamber to the off axis chamber is limited to inlets at the first three deflectors rather than an entire length of the device (i.e. fourth and subsequent deflectors would be fluidly isolated from the off axis chamber). Nothing in any of the cited references teaches or suggests such a staged and limited access to the off axis chamber. As such, Applicant submits that this claim should be allowed.

CONCLUSION

In light of the above, Applicant respectfully submits that pending Claims 1-21 are now in condition for allowance. Therefore, Applicant requests that the rejections and objections be withdrawn, and that the claims be allowed and passed to issue. If any impediment to the allowance of these claims remains after entry of this Amendment, the Examiner is strongly encouraged to call Mr. Erik Ericksen at (801) 566-6633 so that such matters may be resolved as expeditiously as possible.

The Commissioner is hereby authorized to charge any additional fee or to credit any overpayment in connection with this Amendment to Deposit Account No. 20-0100.

DATED this 30th day of December, 2011.

Respectfully submitted,

/eriksericksen/

Erik S. Ericksen
Registration No. 48,954

THORPE NORTH & WESTERN, LLP
Customer No. 20,551
P.O. Box 1219
Sandy, Utah 84091-1219
Telephone: (801) 566-6633

Electronic Acknowledgement Receipt

EFS ID:	11740113
Application Number:	13025989
International Application Number:	
Confirmation Number:	3886
Title of Invention:	Energy Capture and Control Device
First Named Inventor/Applicant Name:	Russell Oliver
Customer Number:	20551
Filer:	Erik Sun Ericksen/Andrea Phillips
Filer Authorized By:	Erik Sun Ericksen
Attorney Docket Number:	3212-002.NP4
Receipt Date:	30-DEC-2011
Filing Date:	11-FEB-2011
Time Stamp:	19:10:52
Application Type:	Utility under 35 USC 111(a)

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	Amendment/Req. Reconsideration-After Non-Final Reject	Response.PDF	193241 63acc8171ec9f6c26d28434cac438dd816a1a48c	no	15

Warnings:

Information:

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.

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 13/025,989		Filing Date 02/11/2011		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY ☒ OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$	=	OR	X \$	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		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 \$250 (\$125 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))										
			TOTAL			TOTAL				
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	12/30/2011	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 21	Minus	** 20	= 1	X \$30 =	30	OR	X \$ =	
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X \$125 =	0	OR	X \$ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
					TOTAL ADD'L FEE	30	OR	TOTAL ADD'L FEE		
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	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))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
					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 number found in the appropriate box in column 1.										

Legal Instrument Examiner:
/TAMARA DARKO/

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.

Document code: WFEE

United States Patent and Trademark Office
Sales Receipt for Accounting Date: 01/11/2012

THARRELL	SALE	#00000001	Mailroom Dt:	12/30/2011	200100	13025989
		01	FC : 2202	30.00	DA	

Substitute for form 1449/PTO

(Use as many sheets as necessary)

Application Number	13/025,989
--------------------	------------

Filing Date	2/11/2011
-------------	-----------

First Named Inventor	Russell O.
----------------------	------------

Art Unit	2832
----------	------

Examiner Name	Forrest M. Phillips
---------------	---------------------

Attorney Docket Number	3212-002.NP4
------------------------	--------------

Sheet

of

Examiner
Initials*Cite
No.¹

Include name of author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.

$$\mathbf{T}^2$$

US Application 13/025,973; filing date 02/11/2011; Russell Oliver; office action issued 10/03/2011

Date

Considered

¹Applicant's unique citation designation number (optional). ²Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 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 2 hours 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, 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.**

106

Electronic Acknowledgement Receipt

EFS ID:	11318965
Application Number:	13025989
International Application Number:	
Confirmation Number:	3886
Title of Invention:	Energy Capture and Control Device
First Named Inventor/Applicant Name:	Russell Oliver
Customer Number:	20551
Filer:	Erik Sun Ericksen/kelley warner
Filer Authorized By:	Erik Sun Ericksen
Attorney Docket Number:	3212-002.NP4
Receipt Date:	02-NOV-2011
Filing Date:	11-FEB-2011
Time Stamp:	13:52:35
Application Type:	Utility under 35 USC 111(a)

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	Transmittal Letter	trans.PDF	79725 35d55076803c65f15774b75ac8f739e7753dc64f	no	4

Warnings:

Information:

2	Information Disclosure Statement (IDS) Form (SB08)	a.PDF	105925 13c8c79533d55f9ce730b4072ec5691ecb8a29ca	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Information Disclosure Statement (IDS) Form (SB08)	b.PDF	76467 79d061694321142486bbfe74cd53ecaf7558442c	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
4	Non Patent Literature	oa.pdf	3078409 ce6e05f0c16c7aea926a1dc2509c612fab1f36e0	no	19
Warnings:					
Information:					
Total Files Size (in bytes):			3340526		
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.					

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

ART UNIT: 2832 EXAMINER: Forrest M. Phillips FIRST NAMED INVENTOR: Russell Oliver SERIAL NO.: 13/025,989 FILED: 2/11/2011 CONF. NO.: 3886 FOR: ENERGY CAPTURE AND CONTROL DEVICE DOCKET NO.: 3212-002.NP4	<u>CERTIFICATE OF MAILING</u> <u>UNDER 37 C.F.R. § 1.8</u> DATE OF DEPOSIT: <u>11/02/2011</u> I hereby certify that this paper or fee (along with any paper or fee referred to as being attached or enclosed) is being submitted on the date indicated above via: ☒ EFS Web ☐ facsimile to _____ ☐ the United States Postal Service with sufficient postage as first class mail addressed to: Mail Stop _____, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450. _____ /Kelley Warner/ Kelley Warner
---	--

**SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. §§ 1.56, 1.97 and 1.98**

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

Dear Sir/Madam:

Pursuant to the duty of disclosure under 37 C.F.R. §§ 1.56, 1.97 and 1.98, the Applicant requests consideration of this Information Disclosure Statement, which is being submitted in accordance with:

- ☐ 37 C.F.R. § 1.97(b)(1) or (3), within three months of the filing date of the application, or before a first office action on the merits, whichever occurs last;
- ☒ 37 C.F.R. § 1.97(c), after a first office action on the merits, but before a Final Office Action or a Notice of Allowance, whichever occurs first, and is accompanied by **EITHER** a statement in accordance with 37 C.F.R. § 1.97(e), **OR** the fee set forth in 37 C.F.R. § 1.17(p); or
- ☐ 37 C.F.R. § 1.97(d), after a Final Office Action or Notice of Allowance, whichever occurs first, but on or before payment of the issue fee, and is accompanied by **BOTH** a statement in

accordance with 37 C.F.R. § 1.97(e), **AND** the fee set forth in 37 C.F.R. § 1.17(p).

SUBMISSIONS

Please find enclosed, pursuant to 37 C.F.R. §§ 1.97 and 1.98:

- ☒ Form **PTO/SB/08A** and/or **PTO/SB/08B** listing the references submitted for consideration, which contains a list of all patents, publications and all other items that have come to the attention of one or more of the individuals designated in 37 C.F.R. § 1.56(c).
- ☒ Legible copies of the listed non-patent documents, unpublished U.S. applications and foreign documents or their relevant portions are included.
- ☐ All English translations of each non-English reference, if any, within the possession, custody, control or availability of anyone designated in 37 C.F.R. § 1.56(c) (see 37 C.F.R. § 1.98 are included.
- ☐ For all listed references that are not either in the English language, or accompanied by a translation into English, a concise explanation of relevance as required under 37 C.F.R. § 1.98(a)(3) is enclosed attached to each.

Copies of references listed on the enclosed PTO/SB/08A and/or PTO/SB/08B are **not** enclosed:

- ☐ because, under 37 C.F.R. § 1.98.(d), they were previously cited by or submitted to the Office in application number _____, which is relied upon for an earlier filing date under 37 C.F.R. § 1.20.
- ☐ because they are substantially cumulative of an enclosed reference.

STATEMENT IN ACCORDANCE WITH 37 C.F.R. § 1.97(e)

☐ I hereby certify that each item contained in the information disclosure statement was first cited in a 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.

☒ I hereby certify that no item 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 §1.56(c) more than three months prior to the filing of the information disclosure statement.

REMARKS

While no representation is made that any of these references may be “prior art” within the meaning of that term in accordance with 37 C.F.R. §§ 102 or 103, the enclosed list of references is disclosed so as to comply with the duty of disclosure set forth in 37 C.F.R. § 1.56.

Moreover, while no representation is made that a specific search of office files or patent office records has been conducted or that no better art exists, the undersigned attorney of record believes that the references listed, together with any other references which may have been previously submitted or listed, are the closest to the claimed invention (taken in its entirety) of which the undersigned is presently aware, and no art which is closer to the claimed invention (taken in its entirety) has been knowingly withheld.

☐ Check No. ____ in the amount of \$ ____ (amount in § 1.17(p)) constituting the submission fee set forth in 37 C.F.R. § 1.17(p) is enclosed.

In the event that 37 C.F.R. § 1.97(c) applies and the Examiner is not satisfied that the Statement meets the requirements of 37 C.F.R. § 1.97(e), or in any other event remediable by a fee, please credit any over payment or charge any additional fees to Deposit Account No. 20-0100 of the undersigned.

Dated this 2nd day of November, 2011.

Respectfully submitted,

/Erik S. Ericksen/

Erik S. Ericksen, M.S.
Attorney for Applicant
Registration No. 48954

THORPE NORTH & WESTERN, LLP
Customer No. 20,551
P.O. Box 1219
Sandy, Utah 84091-1219
Telephone: (801) 566-6633

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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	13/025,989
				Filing Date	2/11/2011
				First Named Inventor	Russell Oliver
				Art Unit	2832
				Examiner Name	Forrest M. Phillips
Sheet		of		Attorney Docket Number	3212-002.NP4

[illegible][illegible]

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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. Confidentially is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours 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, 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.**



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.
-----------------	-------------	----------------------	---------------------	------------------

13/025,989

02/11/2011

Russell Oliver

3212-002.NP4

3886

20551 7590 09/30/2011
THORPE NORTH & WESTERN, LLP.
P.O. Box 1219
SANDY, UT 84091-1219

EXAMINER

PHILLIPS, FORREST M

ART UNIT

PAPER NUMBER

2832

NOTIFICATION DATE

DELIVERY MODE

09/30/2011

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):

rich@tnw.com
cause@tnw.com
patentdocket@tnw.com

Office Action Summary	Application No. 13/025,989	Applicant(s) OLIVER, RUSSELL	
	Examiner FORREST M. PHILLIPS	Art Unit 2832	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ 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.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1-20 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-20 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 11 February 2011 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
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)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) ☒ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) ☒ Information Disclosure Statement(s) (PTO/SB/08) | 5) ☐ Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/25/11</u> . | 6) ☐ Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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.

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As currently written, claim 9 depends from itself. This is considered to be a typographical error, and has been treated as reading on claim 8.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 17-18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Latka (US 2029512).

With respect to claim 17 Latka discloses an energy capture device comprising:

A central chamber oriented along a central axis (see figure 1 coaxial with 24), within an outer shell (12), said central chamber having an inlet configured to receive a high energy material from a high energy outlet (that is a bullet from a gun);

An off axis chamber (unnumbered, refer to figure 1 present between baffles and outer shell) oriented within the outer shell in fluid communication with the central axis chamber, the off axis chamber comprising a winding fluid pathway (see shape of walls as shown in figure 2).

With respect to claim 18 Latka further discloses wherein the off axis chamber further comprises a fluid outlet and at least one helical wall defining the winding fluid pathway (see figure 2, refer to walls in figure 2 and 1), the at least one helical wall being configured to produce an axially helical fluid pathway which dissipates energy transferred from the high energy material.

With respect to claim 20 Latka further discloses a method for energy capture and control from a high energy device, comprising:

Discharging a high energy material from the high energy device through an energy capture and control device comprising a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet (the bullet travels therethrough) and an off axis chamber oriented within the outer shell in fluid communication with the central chamber, the off axis chamber comprising a winding fluid pathway; and

Capturing energy with the off axis chamber using the winding fluid pathway, the energy being associated with discharge of the high energy material from the high energy discharge device (the method of using the silencer is taught, the structure is outlined in above rejection of claim 17).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brittingham (US7987944) in view of Champion (US6425310).

With respect to claim 1 Brittingham discloses an energy capture and control device comprising:

A central chamber (defined by the walls of the baffles) oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet (that is a bullet from a gun);

An off axis chamber (chamber 24 connected by chamber 76) oriented within the outer shell (see figure 8) in fluid communications with the central chamber.

Brittingham does not disclose wherein the off axis chamber has a fluid outlet and multiple internal walls configured to produce a serpentine fluid pathway which dissipates energy transferred from the high energy material.

Champion discloses a silencer which includes off axis chambers comprising a fluid outlet and multiple internal walls configured to produce a serpentine fluid pathway which dissipates energy transferred from the high energy material (see chambers 25).

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Champion to have fluid outlets connected to the

Art Unit: 2832

chambers for damping the sound with the chambers of Brittingham and further to modify the chambers to have an internal wall structure for providing a tortuous pathway of serpentine form to further dissipate energy.

With respect to claim 2 Brittingham further discloses wherein the central chamber further comprises a locking block oriented at the inlet (that is the first baffle or so called blast baffle), said locking block having an engagement surface configured to attach to the high energy outlet and a hollow interior along the central axis, said hollow interior having a reducing through portion (at the so called waist) and a flared portion (as shown on each baffle which expands outward from the waist).

With respect to claim 3 Brittingham further discloses wherein the central chamber further comprises a plurality of deflectors (each of the plurality of baffles see figure 8) oriented in series along the central axis, the plurality of deflectors comprising a frustoconical shape (see figure 8) and having a hollow interior along the central axis and each having a flared end portion.

With respect to claim 4 Brittingham further discloses wherein the plurality of deflectors include a primary deflector, a secondary deflector and at least one tertiary deflector (shown are three, discussed are any number of baffles, as such any number of baffles aka deflectors would have been obvious to one of ordinary skill).

With respect to claim 5 Brittingham further discloses wherein at least one tertiary deflector is at least partially engaged within the flared exit portion of an adjacent deflector (that is the central portion is within the mouth portion formed at the intersection of the adjacent deflectors).

With respect to claim 6 Brittingham further discloses wherein the plurality of deflectors span substantially the entire central axis of the central chamber (refer to figure 8).

With respect to claim 7 Champion discloses wherein the multiple internal walls are formed to produce a radially serpentine fluid pathway (see representation figure of Champion, element 25 is radially outward).

2. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brittingham (US7987944) in view of Champion (US6425310) as applied to claim 1 above, and further in view of Scanlon (US7207258) and Huff (US5952625).

With respect to claim 8 Brittingham as modified discloses the invention as claimed except wherein the multiple internal walls are formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces between each adjacent tube, and having alternating ends offset so as to produce an axially serpentine fluid annular pathway.

Scanlon discloses the use of concentric tubes to form a tortuous pathway for the discharge of gases from a firearm silencer.

Huff discloses the use of a plurality of concentric tubes to form a serpentine pathway for gases to pass through and dissipate the noise therefrom (see figure 5, also abstract).

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Huff to provide a serpentine pathway by means of concentric tubes and the teachings of Scanlon to provide concentric tubes as a

silencing means for a firearm, with the silencer of Brittingham as modified to enhance sound reduction without necessitating a significant size increase.

With respect to claim 9 Huff further discloses wherein the multiple concentric tubes include an innermost tube which includes orifices oriented to allow fluid to pass from the central chamber into a first annular space adjacent the innermost tube and through the annular spaces of progressively larger diameter (see figure 5).

3. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brittingham (US7987944) in view of Champion (US6425310) in view of Scanlon (US7207258) and Huff (US5952625) as applied to claim 8 above, and further in view of Latka (US 2029512).

With respect to claim 10 Brittingham as modified discloses the invention as claimed except wherein the annular spaces further include a helical wall oriented within at least one of the annular spaces to direct fluids along a helical path within the at least one annular space.

Latka discloses the use of helical wall to lengthen the distance traveled by sound, thus furthering sound reduction (see figure 1).

At the time of the invention it would have been obvious to one of ordinary skill in the art to apply the teachings of Latka to place a winding helical passage within an annular chamber, with at least one of the annular chambers formed by the modification

to Brittingham by Huff. The motivation to do so would be the further the sound reduction due to the increased distance travelled by the sound.

With respect to claim 11 Latka further discloses wherein the helical wall has a circular cross section (see figure 2).

With respect to claim 12 while not expressly disclosing a winding ratio of between 3:1 and 8:1 the winding ratio is shown in figure 5 to approximate 5:1. The selection of a specific winding ratio would have been obvious to one of ordinary skill in the art in order to optimize and tune the system. Further it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

4. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brittingham (US7987944) in view of Champion (US6425310) as applied to claim 1 above, and further in view of Hausken (US6796214).

With respect to claim 13 Brittingham as modified discloses the invention as claimed except wherein the off axis chamber further includes an annular dampening chamber oriented about the central chamber and being filled with an energy absorbent material.

Hausken discloses an off axis chamber further including an annular dampening chamber (chambers 1-5) oriented about the central chamber and being filled with an energy absorbent material (14).

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Hausken to provide dampening material in a

Art Unit: 2832

chamber surrounding the central chamber of a firearm silencer with the silencer of Brittingham as modified to enhance sound reduction by bulk absorption.

With respect to claim 14 Hausken further discloses wherein the dampening chamber is oriented adjacent the outer shell (see figures, is radially just inward of the shell).

With respect to claim 15 Hausken further discloses wherein the energy absorbent material is selected from the group consisting of powder tungsten filament, heavy metal powder, graphite, polymer, aluminum (aluminum chips are taught), stainless steel, carbon steel, iron, copper, tantalum, titanium, vanadium, chromium, zirconium, carbides of these, alloys of these, and combinations thereof.

5. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brittingham (US7987944) in view of Champion (US6425310) as applied to claim 1 above, and further in view of Stephens (US5078043).

With respect to claim 16 Brittingham discloses the invention as claimed except wherein the outer shell has an end cap assembly at an outlet end of the central chamber which allows fluid to escape from the off axis chamber.

Stephens discloses an end cap (134) having a plurality of openings which when mounted at the end of the central chamber allows for the escape of fluid from off axis chambers.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Stephens to capture within the outer shell and release at the end via holes in an end cap, the expanding gases from the high energy material, with the fluid openings and serpentine pathways of Brittingham as modified.

The motivation for doing so would be to allow for the expansion and release of the gases in a direction away from the user of the firearm.

6. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Latka (US 2029512) in view of Scanlon (US7207258) and Huff (US5952625).

With respect to claim 19 Latka discloses the invention as claimed except comprising multiple internal walls defining an axially serpentine fluid pathway, with multiple internal walls being formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces between each adjacent tube, and having alternating ends offset so as to produce a serpentine fluid annular pathway.

Scanlon discloses the use of concentric tubes to form a tortuous pathway for the discharge of gases from a firearm silencer.

Huff discloses the use of a plurality of concentric tubes to form a serpentine pathway for gases to pass through and dissipate the noise therefrom (see figure 5, also abstract).

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Huff to provide a serpentine pathway by means of concentric tubes and the teachings of Scanlon to provide concentric tubes as a

Art Unit: 2832

silencing means for a firearm, with the silencer of Latka as modified to enhance sound reduction without necessitating a significant size increase.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Vais (US7412917) discloses a sound suppressor for a firearm; Hoel discloses a suppressor for a firearm including a plurality of concentric baffles; WerBell (US3667570) discloses a silencer for a firearm or internal combustion engine, thus establishing the analogous nature of the exhaust thereof; Seberger (US4576083) discloses a silencing device for a fire arm including baffles and absorption material; Sullivan (US7905319) discloses a silencer having a plurality of interconnected chambers formed by baffles of concentric and overlapping nature; and Sullivan (US20070107982) discloses a multi-concentric tubular silencer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FORREST M. PHILLIPS whose telephone number is (571)272-9020. The examiner can normally be reached on Monday through Friday 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on 57127221990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2832

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.

/FORREST M PHILLIPS/
Primary Examiner, Art Unit 2832

Notice of References Cited	Application/Control No. 13/025,989		Applicant(s)/Patent Under Reexamination OLIVER, RUSSELL	
	Examiner FORREST M. PHILLIPS		Art Unit 2832	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-3,667,570 A	06-1972	WerBell, III, Mitchell L.	181/223
*	B	US-4,576,083 A	03-1986	Seberger, Jr., Oswald P.	89/14.4
*	C	US-5,029,512 A	07-1991	Latka, Gregory S.	89/14.4
*	D	US-5,078,043 A	01-1992	Stephens, Mark L.	89/14.4
*	E	US-5,952,625 A	09-1999	Huff, Ronald G.	181/265
*	F	US-6,425,310 B1	07-2002	Champion, Edwin J.	89/14.3
*	G	US-6,796,214 B2	09-2004	Hausken et al.	89/14.4
*	H	US-7,207,258 B1	04-2007	Scanlon, Michael V.	89/198
*	I	US-2007/0107982 A1	05-2007	Sullivan, John Timothy	181/249
*	J	US-7,308,967 B1	12-2007	Hoel, Thomas Trail	181/223
*	K	US-7,412,917 B2	08-2008	Vais, George	89/14.4
*	L	US-7,905,319 B2	03-2011	Sullivan, John T.	181/250
*	M	US-7,987,944 B1	08-2011	Brittingham et al.	181/223

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: 05/25/2011

13025989 - GAU: 2832

PTO/SB/08A (08-03)

Approved for use through 07/31/2006. OMB 0651-0031

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.

Substitute for form 1449/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Application Number	13/025,989
		Filing Date	2/11/2011
		First Named Inventor	Russell Oliver
		Art Unit	2855
		Examiner Name	To Be Determined
Sheet 1 of 2	Attorney Docket Number	3212-002.NP4	

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
/FP/		6732628	05-11-2004	Coburn et al.	
		6298764	10-09-2001	Sherman et al.	
		5777258	07-07-1998	Soon	
		1462158	07-17-1923	Wildner	
		2010/0048752	02-25-2010	Vignola et al.	
		2009/0235568	09-24-2009	Auvine	
		5486425	01-23-1996	Seibert	
		6376565	04-23-2002	Dyer et al.	
		7207258	04-24-2007	Scanlon	
		4576083	03-18-1986	Seberger, Jr.	
		6575074	06-10-2003	Gaddini	
		1773443	08-19-1930	Wilman	
		1427802	09-05-1922	Goodwin	
		1736319	11-19-1929	Maxim	
		748157	12-29-1903	Bouton	
		5679916	10-21-1997	Weichert	
		7237467	07-03-2007	Melton	
		7412917	08-19-2008	Vais	
		7308967	12-18-2007	Hoel	
		5164535	11-17-1992	Leasure	
		6079311	06-27-2000	O'Quinn et al.	
		4501189	02-26-1985	Brandl et al.	
		916885	03-30-1909	Maxim	
		5029512	07-09-1991	Latka	
		4907488	03-13-1990	Seberger	
		6302009	10-16-2001	O'Quinn et al.	
		7661349	02-16-2010	Brittingham	
		5698810	12-16-1997	Rose	
		7587969	09-15-2009	Silvers	
		5036747	08-06-1991	McClain, III	
		7707762	05-04-2010	Swan	
		7353740	04-08-2008	Hoffman	
		6792711	09-21-2004	Battaglia	
		5590484	01-07-1997	Mooney et al	
		2007/0256347	11-08-2007	Fitzpatrick et al	
		7676976	03-16-2010	Dueck et. al.	
		7216451	05-15-2007	Troy	
		6499245	12-31-2002	Swan	
		5433133	07-18-1995	La France	
		7036259	05-02-2006	Beretta	
		6490822	12-10-2002	Swan	
		4510843	04-16-1985	Rabatin	
		7610710	11-03-2009	Brittingham	
		6959509	11-01-2005	Vais	
		2010/0199834	08-12-2010	Dueck et al	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /FP/

Receipt date: 05/25/2011

13025989 - GAU: 2832

PTO/SB/08A (08-03)

Approved for use through 07/31/2006. OMB 0651-0031

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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Complete if Known	
		Application Number	13/025,989
		Filing Date	2/11/2011
		First Named Inventor	Russell Oliver
		Art Unit	2855
		Examiner Name	To Be Determined
Sheet 2	of 2	Attorney Docket Number	3212-002.NP4

/FP/		5860242	01-19-1999	O'Neil	
↓		7823314	11-02-2010	Wheatley	
		4974489	12-04-1990	Fishbaugh	
		7131228	11-07-2006	Hochstrate et al	
		7059233	06-13-2006	Amick	
		5010676	04-30-1991	Kennedy	
↓		7000547	02-21-2006	Amick	
		5661255	08-26-1997	Webb, III	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ² - Number ⁴ - Kind Code ⁵ (if known)	MM-DD-YYYY			
/FP/		GB-2287780-A	09-27-1995	Rheinmetall Industrie GmbH		
↓		GB-2288007-A	10-04-1995	Rheinmetall Industrie GmbH		
		WO-99/02826	01-21-1999	Nelson Industries, Inc.		
↓		GB-743111-A	11-01-1956	Birmingham Small Arms Co LTD		

Examiner Signature	/Forrest Phillips/	Date Considered	09/23/2011
--------------------	--------------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /FP/

Receipt date: 05/25/2011

13025989 - GAU: 2832

Approved for use through 07/31/2006. OMB 0651-0031

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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	13/025,989
				Filing Date	2/11/2011
				First Named Inventor	Russell Oliver
				Art Unit	2855
Examiner Name	To Be Determined				
Sheet	1	of	1	Attorney Docket Number	3212-002.NP4

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
/FP/		WIKIPEDIA, Supressor, http://en.wikipedia.org/wiki/Suppressor , Retrieved January 26, 2010, pages 1-14.	
		"JBU 6.5 inch Modular Silencer and Flash Hider System". Web. April 6, 2011. http://www.airsoftatlanta.com/JBU_6_5_inch_Modular_Silencer_and_Flash_Hider_p/52319.htm .	
		"3.5 MSS (Modular Suppressor System) - (Barrel Extension) by JBU - Airsoft Guns Trinity Airsoft". Web. April 7, 2011. http://www.trinityairsoft.com/p-1451-35-mss-modular-suppressor-system-barrel-extension-by-jbu.aspx .	
		OLIVER, RUSSELL, U.S. Provisional Patent Application No. 61/418,311 entitled "Coupling Device, System, and Methods to Maintain Relative Positions Between Two Components", filed November 30, 2010.	
		OLIVER, RUSSELL, U.S. Patent Application No. 13/025,954, filed February 11, 2011.	
		OLIVER, RUSSELL, U.S. Patent Application No. 13/025,941, filed February 11, 2011.	
		OLIVER, RUSSELL, U.S. Patent Application No. 13/025,973, filed February 11, 2011.	

Examiner Signature	/Forrest Phillips/	Date Considered	09/23/2011
--------------------	--------------------	-----------------	------------

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹Applicant's unique citation designation number (optional). ²Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 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 2 hours 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, 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 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /FP/

<i>Index of Claims</i> 	Application/Control No. 13025989	Applicant(s)/Patent Under Reexamination OLIVER, RUSSELL
	Examiner FORREST M PHILLIPS	Art Unit 2832

✓	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	09/23/2011							
	1	✓							
	2	✓							
	3	✓							
	4	✓							
	5	✓							
	6	✓							
	7	✓							
	8	✓							
	9	✓							
	10	✓							
	11	✓							
	12	✓							
	13	✓							
	14	✓							
	15	✓							
	16	✓							
	17	✓							
	18	✓							
	19	✓							
	20	✓							

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	132	("1427802" "1462158" "1773443" "20070256347" "20090235568" "20100048752" "20100199834" "4501189" "4510843" "4576083" "4907488" "4974489" "5010676" "5029512" "5036747" "5164535" "5433133" "5486425" "5590484" "5661255" "5679916" "5698810" "5777258" "5860242" "6079311" "6298764" "6302009" "6376565" "6490822" "6499245" "6575074" "6732628" "6792711" "6959509" "7000547" "7036259" "7059233" "7131228" "7207258" "7216451" "7237467" "7308967" "7353740" "7412917" "7481157"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/09/23 12:42

		"7587969" "7610710" "7661349" "7676976" "7707762" "7823314" "0916885").PN.				
L2	193	(181/223).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/09/23 12:42
L3	369	(89/14.4).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/09/23 12:42
L4	13	((RUSSELL) near2 (OLIVER)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2011/09/23 12:43
L5	34	("1017003" "1087397" "1111202" "1173687" "1229675" "1773443" "3667570" "3677132" "3713362" "4291610" "4530417" "4576083" "4584924" "4588043" "5164535" "6079311").PN. OR ("6425310").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/09/23 13:35
L6	30	("0916885" "1017003" "1341363" "2792760" "2925755" "3500955" "3667570" "3748956" "4291610" "4576083" "4588043").PN. OR ("5029512").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/09/23 14:42

L7	21	("2916970" "4222456" "4291610" "4315560" "4335644" "4576083" "4584924" "4588043" "4685534" "4974489" "5164535" "5311907" "5315914" "5679916").PN. OR ("7207258").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/09/23 14:48
L8	368	(181/212).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/09/23 15:18
L9	22	("20070107982" "20070151799" "2150768" "2176615" "2502709" "3677364" "4361206" "4673863" "5269132" "5530214" "5892186" "5952625" "6089347" "6105716" "6220387" "6832665" "7243757" "7331422" "7380639").PN. OR ("7905319").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/09/23 15:19

EAST Search History (Interference)

< This search history is empty >

9/ 23/ 2011 3:54:07 PM**H:\ Workspaces\ 13025989.wsp**

Search Notes 	Application/Control No. 13025989	Applicant(s)/Patent Under Reexamination OLIVER, RUSSELL
	Examiner FORREST M PHILLIPS	Art Unit 2832

SEARCHED			
Class	Subclass	Date	Examiner
181	223	9/23/11	FP
89	14.4	9/23/11	FP

SEARCH NOTES		
Search Notes	Date	Examiner
EAST inventor search conducted	9/23/11	FP
EAST search conducted see attached search history	9/23/11	FP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

	/ FORREST M PHILLIPS/ Primary Examiner. Art Unit 2832
--	--



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. 3886

SERIAL NUMBER 13/025,989	FILING or 371(c) DATE 02/11/2011 RULE	CLASS 181	GROUP ART UNIT 2832	ATTORNEY DOCKET NO. 3212-002.NP4	
APPLICANTS Russell Oliver, Sandy, UT; ** CONTINUING DATA ***** This appln claims benefit of 61/303,553 02/11/2010 and claims benefit of 61/418,285 11/30/2010 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 02/23/2011					
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /FORREST M Acknowledged PHILLIPS/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY UT	SHEETS DRAWINGS 10	TOTAL CLAIMS 20	INDEPENDENT CLAIMS 3
ADDRESS THORPE NORTH & WESTERN, LLP. P.O. Box 1219 SANDY, UT 84091-1219 UNITED STATES					
TITLE Energy Capture and Control Device					
FILING FEE RECEIVED 462	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		

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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Complete if Known			
		Application Number	13/025,989		
		Filing Date	2/11/2011		
		First Named Inventor	Russell Oliver		
		Art Unit	2855		
		Examiner Name	To Be Determined		
Sheet	1	of	2	Attorney Docket Number	3212-002.NP4

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
		6732628	05-11-2004	Coburn et al.	
		6298764	10-09-2001	Sherman et al.	
		5777258	07-07-1998	Soon	
		1462158	07-17-1923	Wildner	
		2010/0048752	02-25-2010	Vignola et al.	
		2009/0235568	09-24-2009	Auvine	
		5486425	01-23-1996	Seibert	
		6376565	04-23-2002	Dyer et al.	
		7207258	04-24-2007	Scanlon	
		4576083	03-18-1986	Seberger, Jr.	
		6575074	06-10-2003	Gaddini	
		1773443	08-19-1930	Wilman	
		1427802	09-05-1922	Goodwin	
		1736319	11-19-1929	Maxim	
		748157	12-29-1903	Bouton	
		5679916	10-21-1997	Weichert	
		7237467	07-03-2007	Melton	
		7412917	08-19-2008	Vais	
		7308967	12-18-2007	Hoel	
		5164535	11-17-1992	Leasure	
		6079311	06-27-2000	O'Quinn et al.	
		4501189	02-26-1985	Brandl et al.	
		916885	03-30-1909	Maxim	
		5029512	07-09-1991	Latka	
		4907488	03-13-1990	Seberger	
		6302009	10-16-2001	O'Quinn et al.	
		7661349	02-16-2010	Brittingham	
		5698810	12-16-1997	Rose	
		7587969	09-15-2009	Silvers	
		5036747	08-06-1991	McClain, III	
		7707762	05-04-2010	Swan	
		7353740	04-08-2008	Hoffman	
		6792711	09-21-2004	Battaglia	
		5590484	01-07-1997	Mooney et al	
		2007/0256347	11-08-2007	Fitzpatrick et al	
		7676976	03-16-2010	Dueck et. al.	
		7216451	05-15-2007	Troy	
		6499245	12-31-2002	Swan	
		5433133	07-18-1995	La France	
		7036259	05-02-2006	Beretta	
		6490822	12-10-2002	Swan	
		4510843	04-16-1985	Rabatin	
		7610710	11-03-2009	Brittingham	
		6959509	11-01-2005	Vais	
		2010/0199834	08-12-2010	Dueck et al	

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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Complete if Known			
		Application Number	13/025,989		
		Filing Date	2/11/2011		
		First Named Inventor	Russell Oliver		
		Art Unit	2855		
		Examiner Name	To Be Determined		
Sheet	2	of	2	Attorney Docket Number	3212-002.NP4

		5860242	01-19-1999	O'Neil	
		7823314	11-02-2010	Wheatley	
		4974489	12-04-1990	Fishbaugh	
		7131228	11-07-2006	Hochstrate et al	
		7059233	06-13-2006	Amick	
		5010676	04-30-1991	Kennedy	
		7000547	02-21-2006	Amick	
		5661255	08-26-1997	Webb, III	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ³ - Number ⁴ - Kind Code ⁵ (if known)				
		GB-2287780-A	09-27-1995	Rheinmetall Industrie GmbH		
		GB-2288007-A	10-04-1995	Rheinmetall Industrie GmbH		
		WO-99/02826	01-21-1999	Nelson Industries, Inc.		
		GB-743111-A	11-01-1956	Birmingham Small Arms Co LTD		

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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 (1-800-786-9199) and select option 2.

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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known		
				Application Number	13/025,989	
				Filing Date	2/11/2011	
				First Named Inventor	Russell Oliver	
				Art Unit	2855	
				Examiner Name	To Be Determined	
Sheet	1	of	1	Attorney Docket Number		3212-002.NP4

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		WIKIPEDIA, Suppressor, http://en.wikipedia.org/wiki/Suppressor , Retrieved January 26, 2010, pages 1-14.	
		"JBU 6.5 inch Modular Silencer and Flash Hider System". Web. April 6, 2011. http://www.airsoftatlanta.com/JBU_6_5_inch_Modular_Silencer_and_Flash_Hider_p/52319.htm .	
		"3.5 MSS (Modular Suppressor System) - (Barrel Extension) by JBU - Airsoft Guns Trinity Airsoft". Web. April 7, 2011. http://www.trinityairsoft.com/p-1451-35-mss-modular-suppressor-system-barrel-extension-by-jbu.aspx .	
		OLIVER, RUSSELL, U.S. Provisional Patent Application No. 61/418,311 entitled "Coupling Device, System, and Methods to Maintain Relative Positions Between Two Components", filed November 30, 2010.	
		OLIVER, RUSSELL, U.S. Patent Application No. 13/025,954, filed February 11, 2011.	
		OLIVER, RUSSELL, U.S. Patent Application No. 13/025,941, filed February 11, 2011.	
		OLIVER, RUSSELL, U.S. Patent Application No. 13/025,973, filed February 11, 2011.	

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹Applicant's unique citation designation number (optional). ²Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 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 2 hours 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, 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 (1-800-786-9199) and select option 2.

RECEIVED COPY

PATENT SPECIFICATION 743,111

Inventor :—DONALD ARTHUR OLIVER.



Date of filing Complete Specification : Oct. 6, 1950.

Application Date : Oct. 6, 1949. No. 25666/49.

Complete Specification Published : Jan. 11, 1956.

Index at Acceptance :—Class 92, B6(A : F), B7E.

COMPLETE SPECIFICATION.

Improvements in or relating to Firearms.

We, THE BIRMINGHAM SMALL ARMS COMPANY LIMITED, a Company duly incorporated under the laws of Great Britain, of Armoury Road, Small Heath, Birmingham, do hereby
5 declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

10 This invention relates to firearms and more particularly to the larger weapons such as ordnance or artillery.

According to this invention a barrel or barrel-liner of a firearm is made from inter-
15 connected sections, at least one of said sections being manufactured from molybdenum and/or tungsten or from alloys rich in either of or both these metals which has or have been subjected to a vacuum arc melting
20 process.

It has been found that by the use of a vacuum arc melting process the aforesaid metals are better suited to resist the heat and corrosion occurring in the barrels of firearms.

25 Preferably, according to one form of this invention, all the sections are of molybdenum which has previously been melted by a vacuum arc process. Alternatively, according to another form of the invention, all the
30 sections are of a molybdenum-rich alloy which has previously been melted by a vacuum arc process.

The sections usually are in the form of forgings, but it will be appreciated that if the
35 metals used are difficult to forge and if castings would have sufficient strength for the particular gun concerned castings may be employed. The sections are conveniently of complete ring formation, but they may, particularly in the case of large barrels, be in the
40 form of parts of a ring or other suitably-shaped sections.

The sections are joined together by any convenient method. Preferably any suitable

welding process may be employed, such as
45 pressure welding, resistance welding or an upset welding method such as flash-butt welding or by direct arc welding (e.g. gas-shielded type). For instance, we have
50 found in practice that no exceptional difficulties are encountered when flash-butt welding together two of the said molybdenum sections. Furthermore, only a slight amount of oxidation occurs during the welding process. Alternatively, or in combination with a welding process, mechanical
55 joints, such as keyed joints, wedge joints, dove-tail joints or screwed rings, may be employed.

According to a preferred form of the invention the united sections form the complete
60 liner of the gun barrel, the liner being shrouded by a sleeve made from steel, for example, any of the steels employed in the manufacture of gun barrels.
65

In an alternative, and less expensive, form of the invention the barrel or its liner is made from the molybdenum or tungsten metals above referred to only at that part or parts
70 where the heat and corrosive products resulting from firing the gun have the most damaging effects. Thus a small part of the breech end (if not subject to heat and corrosive products) may be made from a normal
75 gun steel (i.e. one including 2½% nickel with small additions of chromium, molybdenum and vanadium), the next part of the barrel (or the lining of that part) made from the heat-resisting metals above referred to and the succeeding part of the barrel (i.e. towards
80 the muzzle end of the barrel) made from a normal gun steel. The gun steel parts and the heat-resisting part or parts are joined together in any convenient manner, for example, by butt or pressure welding, in
85 combination, if necessary, with mechanical joints. We have found that no great difficulty arises in flash butt welding a molyb-

[Price 3s. 0d.]

W/120 257

denum section to one of gun steel, despite the disparity in their properties. Where the heat-resisting part comprises a liner this may be constructed and shrouded as above described in connection with complete barrel liners.

Any rifling or other machining of the barrel which may be required is preferably effected after the component parts have been assembled together.

What we claim is :—

1. A barrel or barrel liner of a firearm made from interconnected sections, at least one of said sections being manufactured from molybdenum, or from an alloy rich in molybdenum, which has been subjected to a vacuum arc melting process.

2. A barrel or barrel liner of a firearm as claimed in Claim 1, wherein molybdenum is wholly or in part replaced by tungsten.

3. A barrel or barrel liner of a firearm as claimed in Claim 1, wherein all the sections are manufactured from molybdenum.

4. A barrel or barrel liner of a firearm as

claimed in Claim 1, wherein all the sections are manufactured from a molybdenum-rich alloy.

5. A barrel or barrel liner of a firearm as claimed in Claim 1, wherein some of the sections are made from molybdenum and the remainder of the sections are made from a steel including 2½% nickel with small additions of chromium, molybdenum and vanadium.

6. A barrel or barrel liner of a firearm as claimed in any one of the previous claims, wherein the sections are joined together by flash-butt welding.

7. A barrel or barrel liner of a firearm as claimed in Claim 4, wherein the sections are additionally connected together by mechanical joints.

8. A barrel liner as claimed in any one of the previous claims shrouded by a steel sleeve.

NORMAN F. BUCKLEY,
Chartered Patent Agent.

PROVISIONAL SPECIFICATION.

Improvements in or relating to Firearms.

We, THE BIRMINGHAM SMALL ARMS COMPANY LIMITED, a Company duly incorporated under the laws of Great Britain, of Armoury Road, Small Heath Birmingham, do hereby declare the nature of this invention to be as follows :—

This invention relates to firearms and more particularly to the larger weapons such as ordnance or artillery.

According to this invention barrels or barrel-liners of firearms or parts of such barrels or liners are made from sections which are manufactured from molybdenum and/or tungsten or from alloys rich in either or both of these metals, the molybdenum and/or tungsten or their alloys having, in their initial preparation, been subjected to a vacuum arc melting process.

It has been found that by the use of a vacuum arc melting process the metals are better suited to resist the heat and corrosion occurring in the barrels of firearms.

Preferably, according to one form of this invention, the sections are in the form of forgings, but castings may be employed in those cases where the metals are difficult to forge and where the castings have sufficient strength for the particular gun concerned. The sections are conveniently of complete ring formation but they may, particularly in the case of large barrels, be in the form of parts of a ring or other suitably-shaped sections.

The sections are joined together by any

convenient method. Preferably any suitable welding process may be employed, such as pressure welding, resistance welding or an upset welding method such as flash-butt welding or by direct arc welding (e.g. gas-shielded type). Alternatively, or in combination with a welding process, mechanical joints, such as keyed joints, wedge joints, dove-tail joints or screwed rings, may be employed.

According to a preferred form of the invention the united sections form the complete liner of the gun barrel, the liner being shrouded by a sleeve made from steel, for example, any of the steels employed in the manufacture of gun barrels.

In an alternative, and less expensive, form of the invention the barrel or its liner is made from the molybdenum or tungsten metals above referred to only at that part or parts where the heat and corrosive products resulting from firing the gun have the most damaging effects. Thus a small part of the breech end (if not subject to heat and corrosive products) may be made from a normal gun steel, the next part of the barrel (or the lining of that part) made from the heat-resisting metals above referred to and the succeeding part of the barrel (i.e. towards the muzzle end of the barrel) made from a normal gun steel. The gun steel parts and the heat-resisting part or parts are joined together in any convenient manner, for example, by butt or pressure welding, in combination, if necessary, with mechanical

joints. Where the heat-resisting part comprises a liner this may be constructed and shrouded as above described in connection with complete barrel liners.

effected after the component parts have been assembled together.

Dated this 5th day of October, 1949.

5 Any rifling or other machining of the barrel which may be required is preferably

NORMAN H. BUCKLEY,
Chartered Patent Agent.

Abingdon: Printed for Her Majesty's Stationery Office, by Burgess & Son (Abingdon), Ltd.—1955.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2,
from which copies may be obtained.

(12) UK Patent Application (19) GB (11) 2 287 780 (13) A

(43) Date of A Publication 27.09.1995

(21) Application No 9505816.0

(22) Date of Filing 22.03.1995

(30) Priority Data

(31) 4410625 (32) 26.03.1994 (33) DE

(71) Applicant(s)

Rheinmetall Industrie GmbH

(Incorporated in the Federal Republic of Germany)

Pampelfurtstrasse 1, 40880 Ratingen,
Federal Republic of Germany

(72) Inventor(s)

Herbert Krumm
Heinz Gunter Breuer
Johann Lorenz
Gunter Stoffler

(51) INT CL⁶

F41A 21/30

(52) UK CL (Edition N)

F3C CLA

(56) Documents Cited

GB 2192977 A GB 0574215 A WO 94/07103 A

US 5020631 A US 4920854 A US 4576083 A

US 4530417 A US 3713362 A

(58) Field of Search

UK CL (Edition N) F1B BFB , F3C CBB CLA CLX CPM

CPX CTA CTB CTF CTN

INT CL⁶ F01N , F41A

ONLINE :WPI

(74) Agent and/or Address for Service

Kings Patent Agency Limited
73 Farringdon Road, LONDON, EC1M 3JB,
United Kingdom

(54) Silencer for weapons

(57) A silencer for large-calibre weapons is arranged separate from the weapon barrel but positioned adjacent the muzzle and comprises a tubular hollow body into which the muzzle partially projects through a front face wall (16). The silencer (1) has modules (2, 3, 4), each comprising a housing (5, 6, 7) which contains elements (29, 31, 34, 35) which dampen the sound either solely by resonance (resonator module), reflection (reflector module) or absorption (absorption module). The construction allows the silencer parameters with respect to sound radiation to be controlled and adjusted by different arrangements of resonance, reflection and absorption modules. This enables special properties of different weapon systems and special requirements regarding the sound emission to be taken into account.

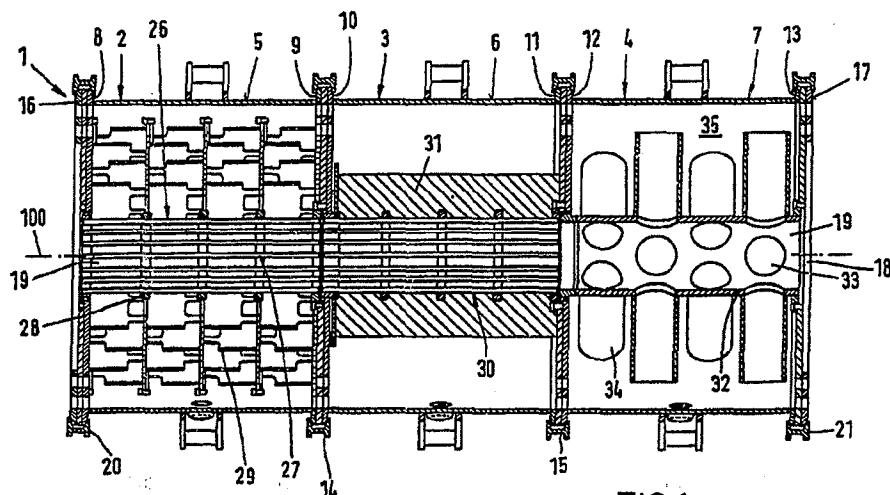


FIG.1

GB 2 287 780 A

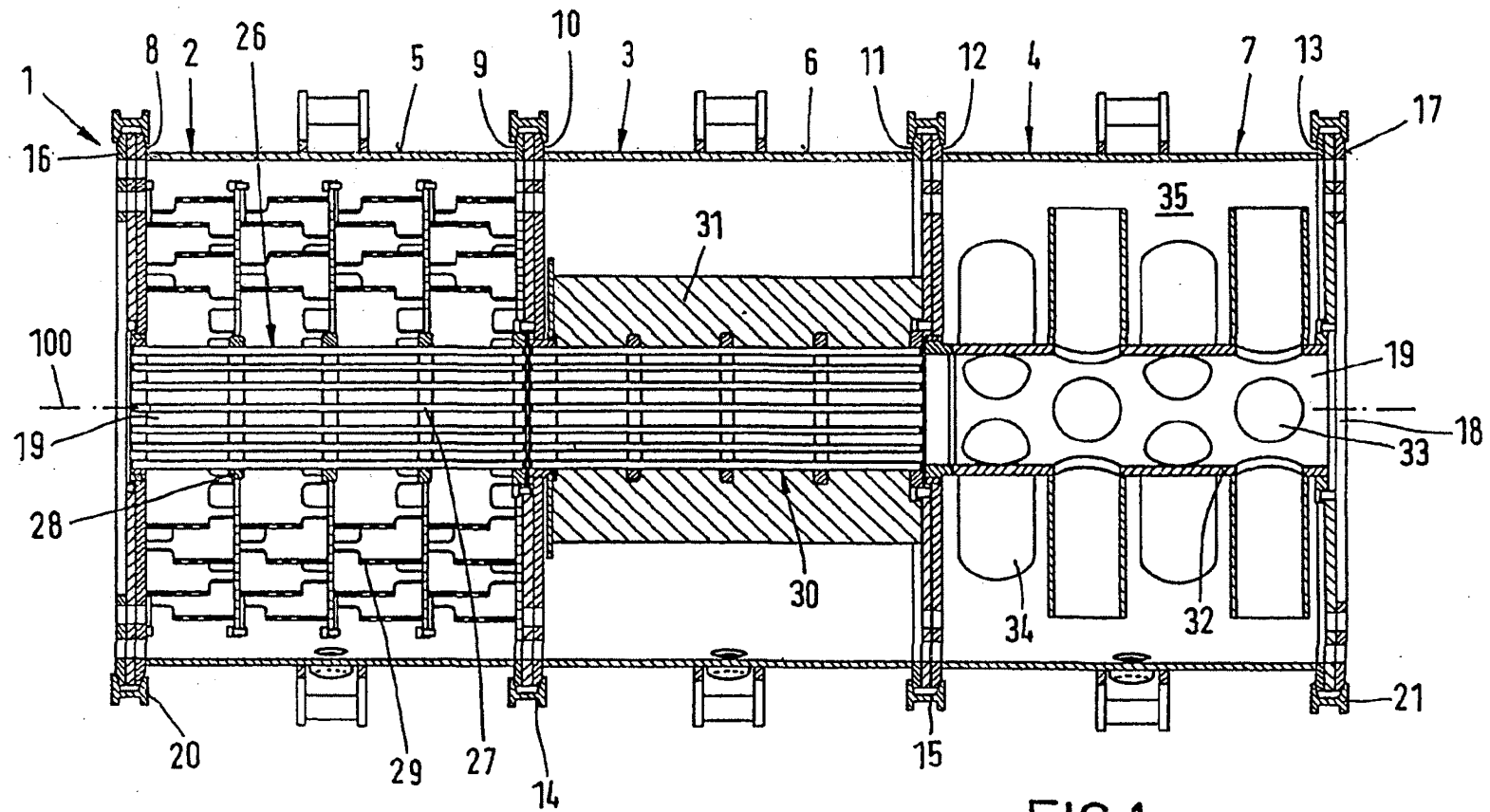
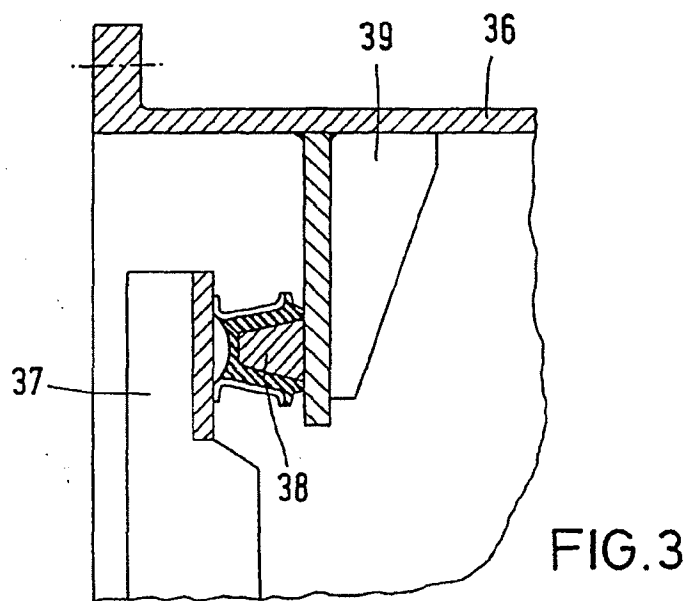
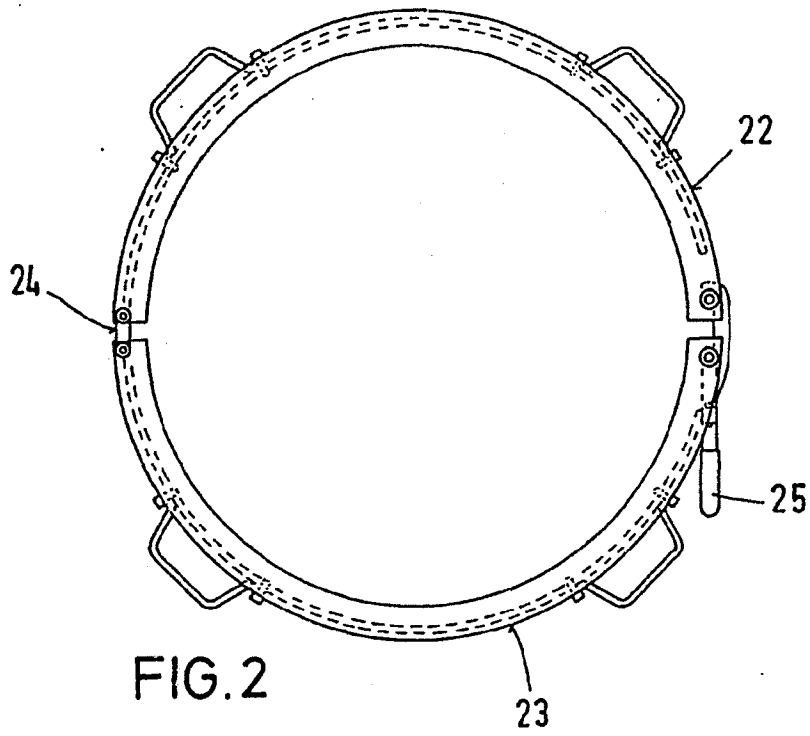


FIG.1

-1/2-



2287780

- 1 -

TITLE

Silencer for Weapons

This invention relates to a silencer for a weapon which is arranged on a mounting device which is separate from the weapon barrel itself.

The construction and mode of action of silencers, particularly for small arms and hand-held firearms, are known from DE-OS 1 553 874, DE-OS 2 127 877, US 3,713,362 and US 4,576,083 for example. Essentially, in the known silencers, a throttled expansion of the propellant gases through the projectile outlet opening on the front face wall of the silencer is achieved by means of several chambers arranged behind each other and sealed-off from the outside. Appropriately, wire grids are arranged in the chambers, which are intended to bring about either an absorption of the energy of the propellant gases or an extensive reflection of the pressure waves in the interior of the chambers (see DE-OS 2 127 877 for example). Generally speaking the individual silencers are fixed directly to the weapon and adapted to the sound emission of the weapon in question, so that they can seldom be used with different weapons.

The arrangement of known silencers directly on the

muzzle of the barrels of large-calibre weapon systems (combat tanks, armoured infantry combat vehicles, armoured anti-aircraft vehicles or artillery systems) has not proved satisfactory in practice since because of the large weapon calibre and the associated noise generation, the silencers must be of correspondingly large dimensions and thus also have a correspondingly heavy weight. To protect the public from noise in the case of firing practice on corresponding firing ranges an attempt was therefore made to deaden the sound only after it had been created, by means of sheds, earthworks, plants and the like, for example. Such structures are, however, very complicated in terms of construction and/or not very effective.

It has already been proposed to fix the silencer not on the weapon barrel itself as in the case of small-calibre arms but to arrange it on a separate silencer carriage mechanically decoupled from the barrel weapon, the carriage preferably being constructed in such a way that the silencer can be guided synchronously with the movement of the barrel (P 43 17 673.9).

This application also assumes that the particular silencer used is strictly assigned to a particular weapon system so that a change of weapon system automatically requires the replacement of the silencer and, if

applicable, of the carriage also.

One of the objects of this invention is therefore to provide a silencer, particularly for large-calibre weapons, which brings about a substantial reduction of the sound radiation, is simply constructed and can be used with different weapon systems which may have correspondingly different frequency spectra of the sound.

According to this invention there is provided a silencer for weapons, which is in use arranged on a mounting device which is separate from the weapon barrel, and which comprises a tubular hollow body for positioning in front of the muzzle of the weapon barrel and into which the weapon barrel partially projects through a front face wall, said body having an axial projectile channel and an opening in a rear face wall opposite the front face wall for passage therethrough of the projectile, the silencer comprising a plurality of modules arranged in axial progression with individual modules in each case comprising a housing which contains elements which dampen sound either solely by resonance, (resonator module), reflection (reflector module) or absorption (absorption module).

In this invention the arrangement is essentially based on the concept of constructing the silencer of individual interchangeable modules. The modules dampen

the sound in each case on the basis of different physical principles and are designed for different frequency ranges. A module can, for example, comprise a series of resonator elements which principally bring about a damping of individual discrete low frequencies (resonator module). In contrast, a further module can have a number of reflectors which bring about a damping of medium frequencies (reflector module), whilst finally, modules which work according to the absorption principle (absorption modules) can bring about a broad-band damping if correspondingly designed.

By combining the above-mentioned modules it is possible to dampen a very broad frequency spectrum and thus to adapt the silencer precisely to the particular sound emission spectrum of the corresponding weapon system. The individual modules of the silencer can be interchanged or combined with one another.

Although the modular construction of the silencer has proved particularly satisfactory with large-calibre weapons it can also be used with small-calibre weapons with equal success.

Securing straps may be provided in order to ensure that the modules are assembled quickly and in a durable manner. For this purpose, on their front faces the modules preferably have flanges which are conical on one

side and which are held together positively by means of a securing or tightening strap that it bi-conical on the inside. The tightening strap may comprise two or more segments which are connected in an articulated manner and are pre-tensioned by means of a tension lever or tension jacks. A play-free fit of the tightening strap and a minimal gap between the flanges is achieved by means of this tightening strap arrangement.

In the same way as the modules, the first and the last module in each case can also be connected to the corresponding front wall of the silencer with the aid of tightening straps.

Around the projectile channel the absorption module and/or the resonator module should preferably each contain a basket-shaped body which is fixed between the front sides of the corresponding module. The basket-shaped body comprises rods arranged in an axial direction. The high acoustic permeability of the basket-shaped body ensures that the sound is reduced in the damping material or in the reflection chamber and does not leave the silencer from the front or the rear.

The function of the basket-shaped body can also be achieved by means of a pipe with corresponding holes and/or slots in the casing, such as is customarily used for the resonator unit for example.

Irrespective of the calibre the elements (reflection units, damping units and the like) can be flexibly suspended in the housing with springs, rubber bearings, shock absorbers or with a combination of these elements. This flexible, damped suspension brings about a great reduction of the forces which are transferred to the silencer housing and hence, if applicable, to the carriage or the base.

Further particulars and advantages of this invention will now be described by reference to embodiments shown by way of example in the drawings, in which:

Figure 1 shows a cross-section through a silencer according to this invention comprising three modules,

Figure 2 shows the front view of a tightening strap means for fixing the modules, and

Figure 3 shows a partial view of a rubber bearing for the flexible suspension of elements in the modules.

Referring to the drawings and to Figure 1, 1 denotes a silencer which is composed of three modules 2, 3 and 4. The individual modules 2, 3, 4 each comprise a metal housing 5, 6, 7, and on their front sides they have flanges 8 to 13 which are conical on one side. The modules are positively and detachably interconnected

using securing means comprising tightening straps 14 and 15 which are biconical on the inside and are placed over the adjacent flanges 9, 10 and 11, 12.

On the side facing the muzzle of the barrel (not shown) the silencer 1 has a front face wall 16 into which the weapon barrel projects on firing as well as a rear face wall 17, opposite the front face wall, with an opening 18 through which the projectile, after passing through a projectile channel 19 in the interior of the silencer 1, leaves. Both the front and the rear face wall 16, 17 are also fixed to the modules 2 and 4 adjacent to them with tightening straps 20, 21.

Figure 2 shows the construction of a tightening strap 14 which mainly comprises two segments 22, 23 which are connected together via a joint 24 and a tension lever 25. To connect two modules the tension lever 25 is pivoted upwards, the tightening strap placed over the adjacent flanges and tightened by pivoting the tension lever 25 downwards.

Further brief details will now be given about the modules of which the silencer 1 is preferably composed:

The module designated as 2 in Figure 1 is a reflector module. In the interior of the module is a basket-shaped body 26 which is fixed between the front sides of the module and which surrounds the projectile

channel coaxially. The basket-shaped body 26 essentially comprises rods 27 which extend parallel to the longitudinal axis 100 of the silencer 1 as well as rings 28 which fix the rods 27. The high acoustic permeability ensures that the sound is largely destroyed in the reflection chambers 29.

The module designated as 3 in Figure 1 is an absorption module which also contains a basket-shaped body 30 which surrounds the projectile channel 19 coaxially, to ensure a high acoustic permeability. An insert 31 which dampens the sound is located on the side of the basket-shaped body 30 which faces away from the projectile channel 19.

Finally, the module designated as 4 in Figure 1 is a resonator module in which the projectile channel 19 is coaxially surrounded by a metal pipe 32. The metal pipe 32 has a number of holes through which the propellant charge gases reach the adjacent resonator chamber 35 via pipes 34. The dimensions of the resonator chamber 35 and the pipes 34 are selected in such a way that a maximum damping of the sound takes place at relatively low frequencies (such as 50 Hz).

In order to achieve a reduction of the forces which act on the fixing device of the silencer via the silencer 1, it is of advantage if the individual sound-damping

elements of the modules are at least partially flexibly connected to the relevant housing 5, 6, 7 of the modules 2, 3, 4 and/or to each other by means of springs, rubber bearings or the like. This is shown in Figure 3.

In Figure 3, 36 indicates the front part of a module housing in diagrammatic form. The front wall 37 is flexibly connected to a carrier 39 fixed to the inner wall of the housing through a rubber bearing 38. The actual elements damping the sound, for example the reflection chambers or the sound-damping inserts, are fixed to the rear part of the module housing between the wall 37 and a corresponding flexibly arranged wall.

CLAIMS

1. Silencer for weapons, which is in use arranged on a mounting device which is separate from the weapon barrel, and which comprises a tubular hollow body for positioning in front of the muzzle of the weapon barrel and into which the weapon barrel partially projects through a front face wall, said body having an axial projectile channel and an opening in a rear face wall opposite the front face wall for passage therethrough of the projectile, the silencer comprising a plurality of modules arranged in axial progression with individual modules in each case comprising a housing which contains elements which dampen sound either solely by resonance, (resonator module), reflection (reflector module) or absorption (absorption module).
2. Silencer according to Claim 1, wherein the individual modules have a flange in each case on a front face and are positively interconnected by securing means, preferably tightening straps.
3. Silencer according to Claim 2, wherein the flanges of the modules are conical on one side and the tightening straps are bi-conical on the inside.

4. Silencer according to Claim 2 or 3, wherein the tightening straps comprise at least two segments which are connected together in an articulated manner and which can be tensioned by means of a tension lever or tension jacks.

5. Silencer according to any one of Claims 1 to 4, wherein both the front and the rear face wall can be fixed to an adjacent module in each case by securing means such as tightening straps.

6. Silencer according to any one of Claims 1 to 5, wherein the silencer comprises reflection modules, absorption modules or resonator modules and/or a combination of these modules.

7. Silencer according to any one of Claims 1 to 6, wherein the absorption module and/or the reflector module each contain a basket-shaped body which surrounds the projectile channel coaxially and which is secured between front walls of the module in question, the basket-shaped body comprising rods arranged axially and a plurality of rings which secure the rods in a radial direction, sound-damping inserts or reflection chambers being arranged on the side of the basket-shaped body away from the

projectile channel in each case.

8. Silencer according to any one of Claims 1 to 7, wherein the individual elements of the modules are flexibly suspended in a relevant housing of the modules using springs and/or rubber bearings and/or shock absorbers.

9. Silencer for a weapon constructed and arranged to function as described herein and exemplified with reference to the drawings.

10. In combination a barrel weapon, a silencer according to any preceding claim positioned adjacent the muzzle, and a mounting therefor.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
The Search report)

Application number
GB 9505816.0

Relevant Technical Fields

(i) UK Cl (Ed.N) F3C (CBB, CLA/X, CPM/X, CTA/B/F/N);
F1B (BFB)

(ii) Int Cl (Ed.6) F01N, F41A

Search Examiner
TREVOR BERRY

Date of completion of Search
7 JUNE 1995

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE: WPI

Documents considered relevant
following a search in respect of
Claims :-
1 TO 10

Categories of documents

- | | |
|--|---|
| <p>X: Document indicating lack of novelty or of inventive step.</p> <p>Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.</p> <p>A: Document indicating technological background and/or state of the art.</p> | <p>P: Document published on or after the declared priority date but before the filing date of the present application.</p> <p>E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.</p> <p>&: Member of the same patent family; corresponding document.</p> |
|--|---|

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2192977 A	(GORMILL ENG)	1, 6
X	GB 0574215	(MORRIS)	1, 6
P,X	WO 94/07103	(HECKLER AND KOCH)	1, 6
X	US 5020631	(DEVIL SA)	1, 6
X	US 4920854	(US ARMY SEC)	1, 6
X	US 4576083	(SEBERGER) referred to in present application	1, 6
X	US 4530417	(DANIEL)	1, 6
X	US 3713362	(BANGOR PUNTA) referred to in present application	1-6

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

(12) UK Patent Application (19) GB (11) 2 288 007 (13) A

(43) Date of A Publication 04.10.1995

(21) Application No 9505831.9

(22) Date of Filing 22.03.1995

(30) Priority Data

(31) 4410624

(32) 26.03.1994

(33) DE

(71) Applicant(s)

Rheinmetall Industrie GmbH

(Incorporated in the Federal Republic of Germany)

Pempelfurtstrasse 1, 40880 Ratingen,
Federal Republic of Germany

(72) Inventor(s)

Eberhard Willeitner

Gunter Stoffler

Johann Lorenz

Herbert Krumm

Bernd Roggemann

Wolfgang Boer

(51) INT CL⁶

F41A 21/30

(52) UK CL (Edition N)

F3C CLA

(56) Documents Cited

GB 2192977 A

GB 0574215 A

US 5078043 A

US 5020631 A

US 4576083 A

US 4530417 A

US 4454798 A

(58) Field of Search

UK CL (Edition N) F1B BFB , F3C CBB CLA CLX CPM

CPX CTA CTB CTF CTN

INT CL⁶ F01N , F41A

ONLINE :WPI

(74) Agent and/or Address for Service

Kings Patent Agency Limited

73 Farringdon Road, LONDON, EC1M 3JB,

United Kingdom

(54) Silencer for weapons

(57) A silencer (1) for large-calibre weapons is arranged separate from the weapon barrel (4) but positioned adjacent the muzzle. The silencer comprises a tubular hollow body into which the barrel (4) partially projects through a front face wall (20). The silencer has a vessel of boiler-shape (5) which may be made up of at least two modules (6, 7, 8). A separate damper insert on which the sound-absorbing material (9 to 14) is arranged is located in each module (6, 7, 8). For use with weapon systems with muzzle brakes, further modules may be arranged laterally so that the secondary gases generated by the muzzle brake are absorbed separately.

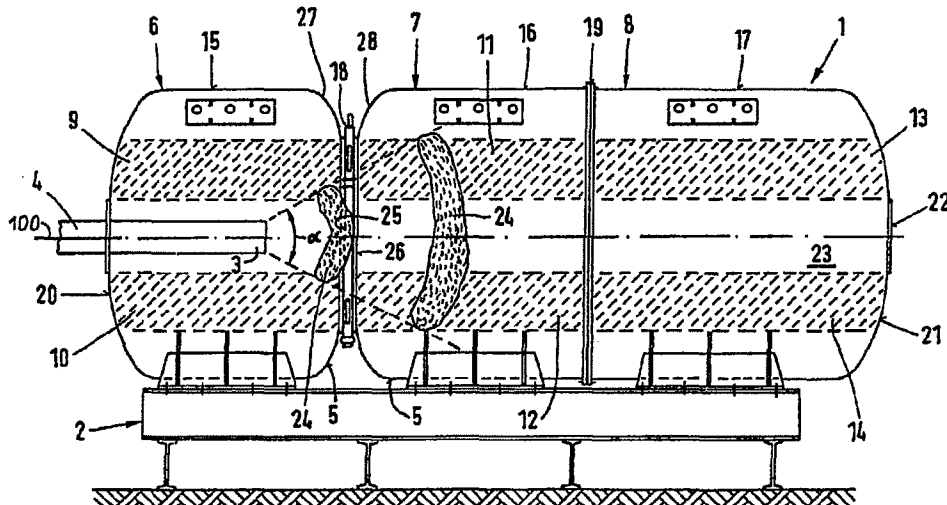


FIG.1

GB 2 288 007 A

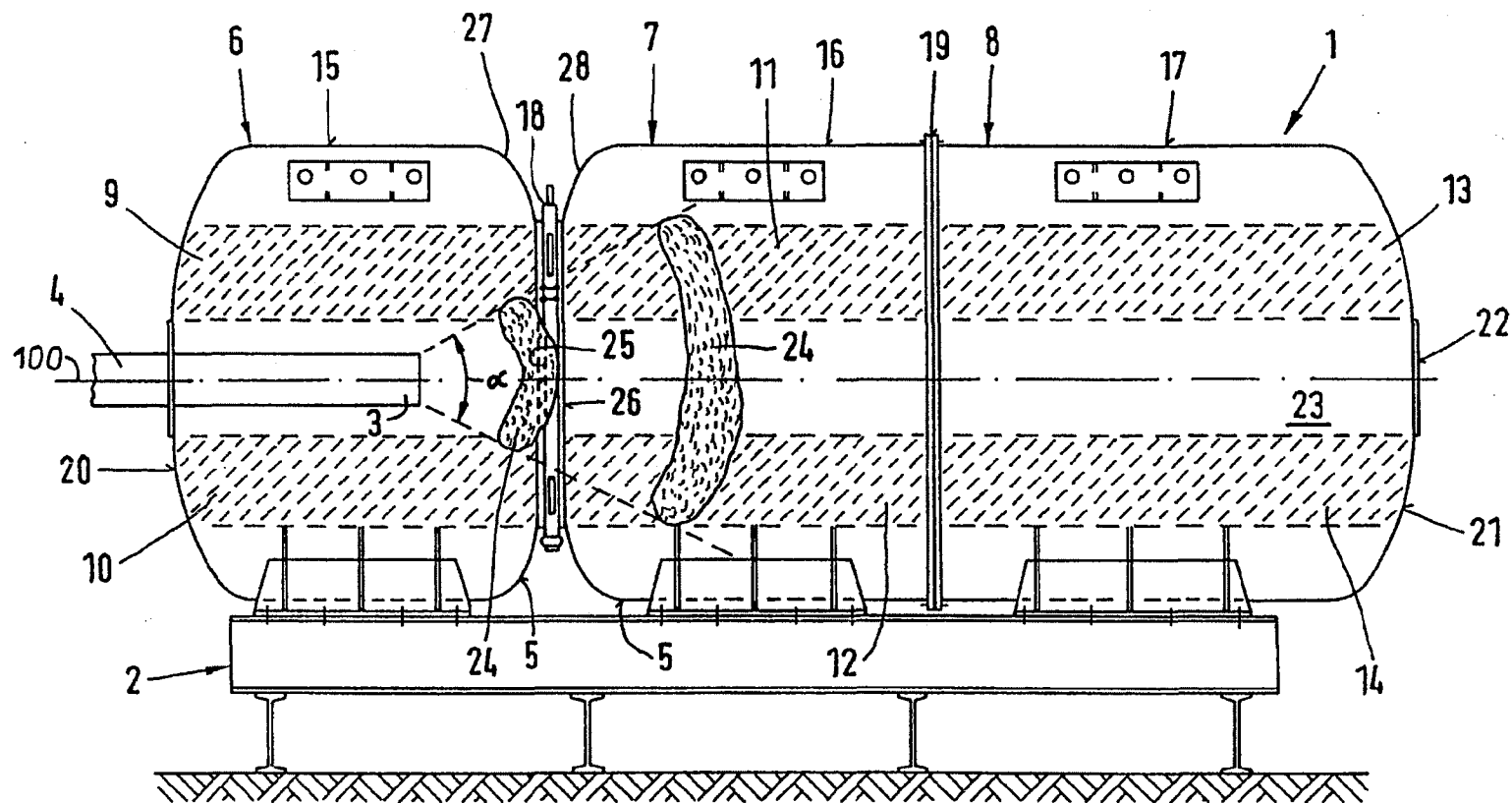


FIG.1

-1/5-



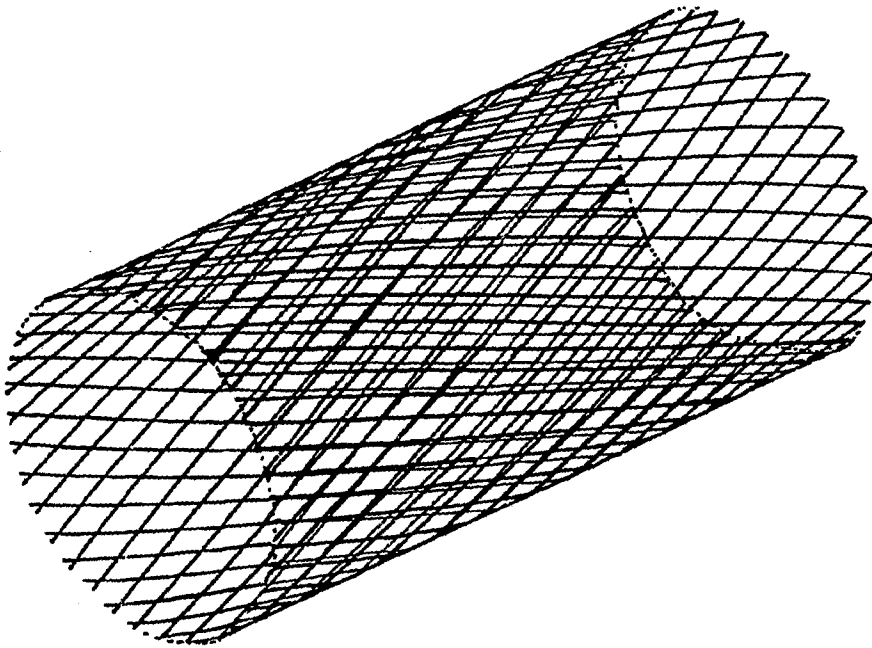
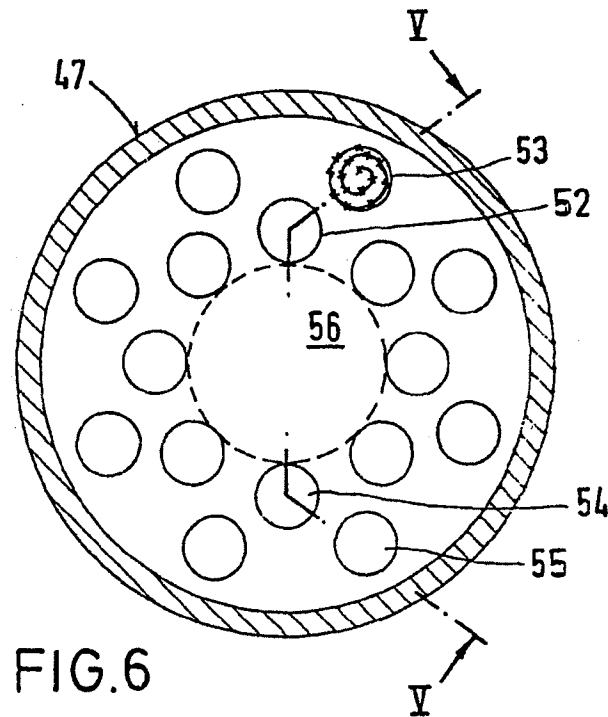
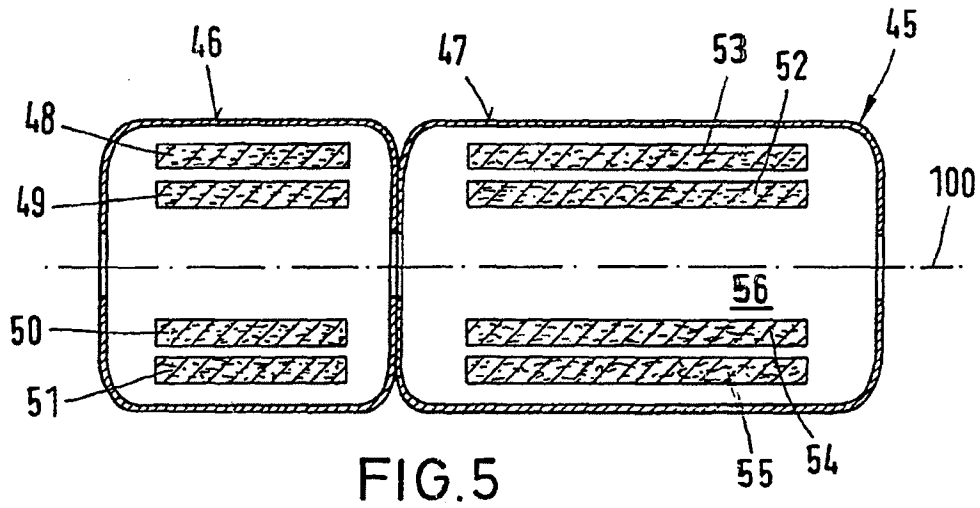
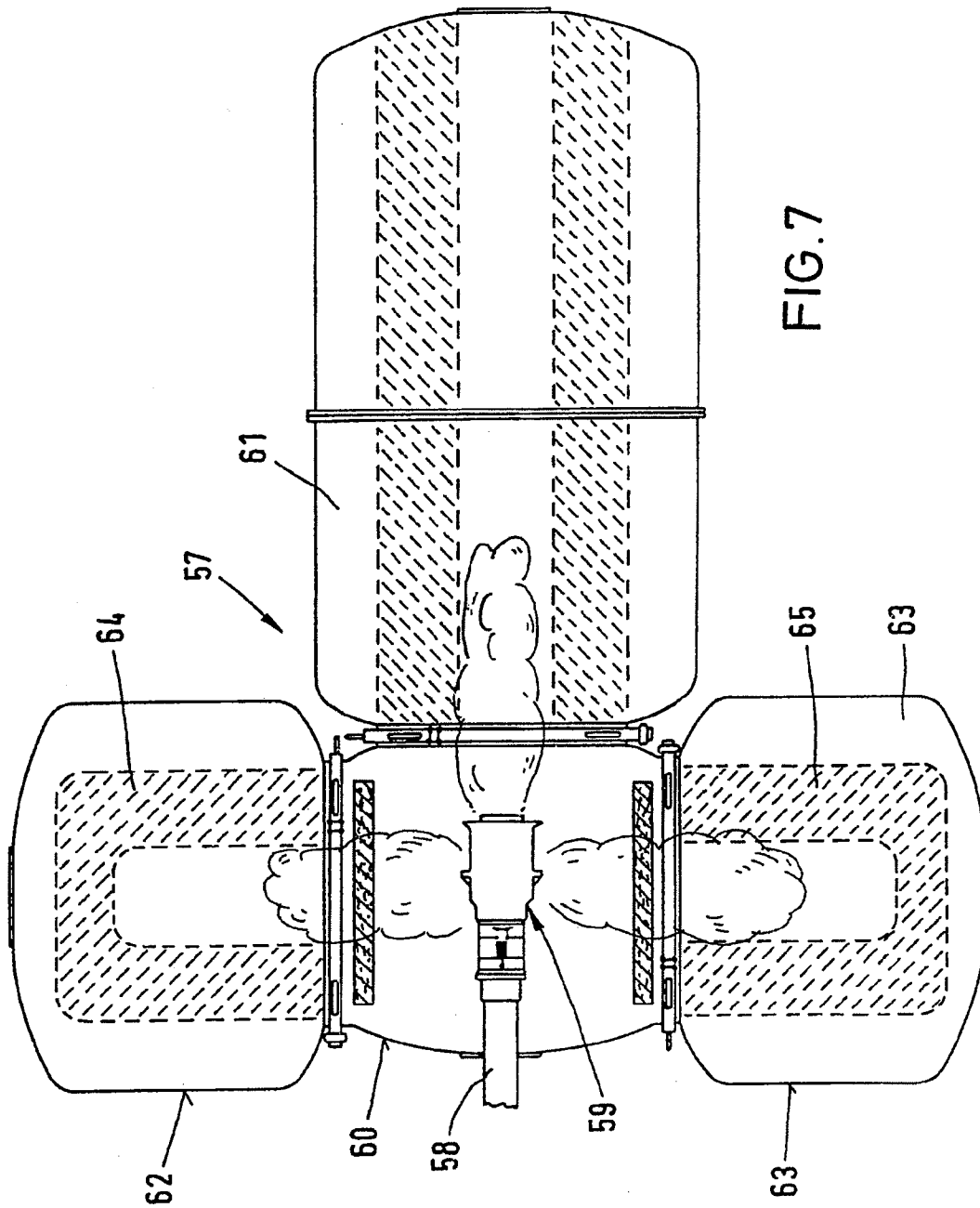


FIG.4





TITLESilencer for Weapons

This invention relates to a silencer for a weapon which is arranged on a mounting device which is separate from the weapon barrel itself.

The construction and mode of action of silencers, particularly for small arms and hand-held firearms, are known from DE-OS 1 553 874, DE-OS 2 127 877, US 3,713,362 and US 4,576,083 for example. Essentially, in the known silencers, a throttled expansion of the propellant gases through the projectile outlet opening on the front face wall of the silencer is achieved by means of several chambers arranged behind each other and sealed-off from the outside. Appropriately, wire grids are arranged in the chambers, which are intended to bring about either an absorption of the energy of the propellant gases or an extensive reflection of the pressure waves in the interior of the chambers (see DE-OS 2 127 877 for example). Generally speaking the individual silencers are fixed directly to the weapon and adapted to the sound emission of the weapon in question, so that they can seldom be used with different weapons.

The arrangement of known silencers directly on the

muzzle of the barrels of large-calibre weapon systems (combat tanks, armoured infantry combat vehicles, armoured anti-aircraft vehicles or artillery systems) has not proved satisfactory in practice since because of the large weapon calibre and the associated noise generation, the silencers must be of correspondingly large dimensions and thus also have a correspondingly heavy weight. To protect the public from noise in the case of firing practice on corresponding firing ranges an attempt was therefore made to deaden the sound only after it had been created, by means of sheds, earthworks, plants and the like, for example. Such structures are, however, very complicated in terms of construction and/or not very effective.

It has already been proposed to fix the silencer not on the weapon barrel itself as in the case of small-calibre arms but to arrange it on a separate silencer carriage mechanically decoupled from the barrel weapon, the carriage preferably being constructed in such a way that the silencer can be guided synchronously with the movement of the barrel (P 43 17 673.9).

This application also assumes that the particular silencer used is strictly assigned to a particular weapon system so that a change of weapon system automatically requires the replacement of the silencer and, if

applicable, of the carriage also.

One of the objects of this invention is therefore to provide a silencer, particularly for large-calibre weapons, which brings about a substantial reduction of the sound radiation, is simply constructed and can be used with different weapon systems which may have correspondingly different frequency spectra of the sound.

According to this invention there is provided a silencer for weapons which is in use arranged on a mounting device which is separate from the weapon barrel and which comprises a tubular hollow body for positioning in front of the muzzle of the weapon barrel and into which the weapon barrel partially projects through a front face wall, said body having an axial projectile channel and an opening in a rear face wall opposite the front face wall for passage therethrough of the projectile, a material absorbing sound being arranged around the projectile channel in the hollow body for sound silencing purposes, wherein the silencer comprises a vessel of boiler-shape which is formed of at least two module parts with a separate damper insert on which the sound-absorbing material is arranged, located in each said module.

In this invention the arrangement is essentially based on the concept of using as a silencer a vessel

comprising a boiler-shaped container of corresponding dimensions which is configured either in one piece or from at least two interconnected parts forming modules, a damper insert on which the sound-absorbing materials are arranged being located in each module.

The damper inserts preferably have compartments forming recesses in which the actual material absorbing the sound is located. Each individual compartment can be equipped with different materials and in different configurations according to the requirement regarding damping (variation of the gas permeability) and strength. In particular the sound-absorbing material can comprise a fibre mesh of arbitrary or defined fibre orientation and wound in a coil shape, such as barbed wire, wire mesh, expanded mesh or fibres embedded in a polymer matrix.

It has proved advantageous to arrange the damper inserts interchangeably in the vessel so that the silencer can be optimally matched to the weapon system in question by exchanging the damper inserts.

In respect of the usually very high stresses imposed on the vessel in the area of large-calibre weapons close to the muzzle, it has also proved particularly advantageous that the first module facing the weapon surrounds the muzzle area of the weapon barrel in such a way that the propellant charge gases moving laterally

from the barrel muzzle expand in this part and the energy of the lateral flow of gases which is formed is destroyed by the absorbers arranged in this part of the structure.

The high-energy initial expulsion of gases produced after the projectile has left the barrel, however, principally expand in the second vessel part, the energy of these gases being absorbed there. It is, however, a prerequisite for this that the depth of penetration of the barrel in the first module part and/or the openings of the projectile channel in the front faces of the vessel parts facing each other are selected in such a way that the initial gases are coupled into the second module largely unhindered.

In order substantially to reduce the intensity of the initial gases the second vessel part must be relatively long. It has therefore proved advantageous to construct this part of individual modules also so that the relevant damper inserts with the absorption coils can also be correspondingly short.

Securing means may be provided in order to ensure that the modules can be assembled quickly and in a durable manner. For this purpose, on their front faces the modules preferably have flanges which are conical on one side and which are held together positively by means of a tightening strap forming a securing means that is

bi-conical on the inside. A tightening strap can comprise two or more segments which are connected in an articulated manner and which are pre-tensioned by means of a tension lever or tension jacks. A play-free fit of the tightening strap and a minimal gap between the flanges is achieved by means of this arrangement.

Irrespective of the calibre the damper inserts can be flexibly suspended on the housings of the modules with springs, rubber bearings, shock absorbers or by a practical combination of these elements. This flexible, damped suspension brings about a great reduction of the forces that are transferred to the silencer housing and thus, if applicable, to the carriage or the base.

Further and preferred features and advantages of this invention are described by way of example with reference to embodiments shown in the drawings and wherein:

Figure 1 shows the side view of a silencer according to this invention comprising a vessel formed of three parts with the muzzle end of a weapon barrel indicated diagrammatically,

Figure 2 shows a longitudinal section through a silencer with a damper insert which has absorber material wound coaxially round

the projectile channel,

Figure 3 shows a cross-section on III-III through the silencer shown in Figure 2,

Figure 4 shows in a perspective view an absorber made of expanded mesh,

Figure 5 shows in diagrammatic form a longitudinal section along a section line shown as V-V in Figure 6, through a silencer with several absorbers arranged in columnar form which extend in the longitudinal direction of the vessel,

Figure 6 shows a cross-section through the silencer shown in Figure 5, and

Figure 7 shows a diagrammatic longitudinal section through a silencer for a weapon barrel which is provided with a muzzle brake.

Referring to the drawings and as shown in Figure 1, 1 is a silencer which is mounted on a platform 2 and into which the muzzle end 3 of a weapon barrel 4 projects. The silencer 1 comprises a vessel best described as a boiler-shaped container 5 which is composed of three parts or modules 6, 7 and 8 in which corresponding absorbers 9 to 14, which are described in greater detail below, are located.

Modules 6, 7 and 8 comprise a metal or plastic

housing such as glass-fibre reinforced plastic 15 to 17 in each case and have flanges on their front faces. The modules 6 to 8 are positively interconnected with the aid of tightening straps 18, 19 which are placed over the adjacent flanges in each case.

The tightening strap 19 can, however, also be replaced by a screwed flange in connection as the modules 7, 8 are rarely separated in practice.

On the side facing the weapon the silencer 1 has a front face wall 20 as well as a rear face wall 21, opposite the front face wall, with an opening 22 through which the projectile, after passing through a projectile channel 23 in the interior of the silencer 1, leaves.

The first module 6 is designed in such a way that it essentially surrounds the muzzle region 3 of the weapon barrel 4. The propellant charge gases flowing laterally out of the muzzle when a projectile is fired need to expand in the silencer and the energy of the lateral gases arising through the superposition of the gases and the detonation wave front should be largely destroyed by the corresponding absorbers 9, 10.

In contrast, the particularly high-energy front wave of gases 24 forming after a projectile is fired through the impact of the gases on the detonation wave principally expands in the second and third modules 7 and

8 and the energy of these gases is absorbed thereby the absorbers 11 to 14. In this case it is, however, a prerequisite that the depth of penetration of the barrel 4 in the first module 6 and/or the openings 25, 26 in the front faces 27, 28 facing each other of the modules 6, 7, are selected in such a way that the front wave of gases 24 is also coupled into the subsequent module 7 largely unhindered (as the transition from the front to the lateral bank of gases is approximately between 40 and 50° with respect to the projectile trajectory, the angle of aperture α (Figure 1) determining the diameters of the openings 25, 26 should therefore be approximately 100°).

Figure 2 shows a longitudinal section through the module 6 shown in Figures 1 to 6. In the interior a damper insert 30 is provided according to this invention, which contains several support rings 33, a series of support ribs 31 and 32 and a number of radial supports 33a, so that several compartment-shaped recesses 34, 35 are thus produced. The sound-absorbing material 36, 37 is located in these recesses 34, 35. For reasons of greater clarity Figure 2 shows only two recesses with sound-absorbing material therein. In the embodiment shown the sound-absorbing material is barbed wire which is wound round the support ribs 31, 32 (see also Figure 3). The permeability - and hence the heat transfer and

the potential throughflow of the gases - can be varied by means of both the number of plies per layer and the design of the absorber material.

An expanded mesh has also proved particularly suitable as an alternative absorber material to barbed wire (see Figure 4). Among other things expanded meshes have the advantage that they have high stability in the axial direction, are simple to wind from a technical manufacturing point of view and are commercially available in virtually all applicable mesh widths.

As can be seen from Figure 3, the support ribs 31, 32 have a series of segment-shaped openings 38, 39 of correspondingly high acoustic permeability, through which the propellant charge gases reach the sound-absorbing material 36, 37. These support ribs can be formed from suitable profiles of different materials, so that an energy breakdown of the sound waves takes place as soon as the sound waves are coupled into the absorber chamber.

Alternatively the support ribs 31, 32 and the support rings 33 can be replaced by perforated tubes. The permeability of the tubes is matched to the energy-absorbing material 36, 37.

It has proved advantageous if the sound-absorbing material 36, 37 does not completely fill the compartment-shaped recesses. Rather, the gas conveyed through the

absorbers 37 should first abate in the free chambers and then flow through the absorber 36.

To achieve a reduction of the forces which act on the mounting platform 2 (Figure 1) through the silencer 1, it is of advantage if the damper inserts of the modules 6 to 8 are at least partially flexibly connected to the appropriate housing 15 to 17 of the modules 6 to 8 by means of springs, rubber bearings or the like. In Figure 2 the corresponding flexible bearings are provided with the reference numerals 40 to 43.

Instead of winding a corresponding absorber material round the damper inserts 30, the absorber material can also comprise a series of individual coils which have a columnar construction, several coil columns being arranged coaxially round the projectile channel. In this case the ribs of the damper inserts can be configured as shims with corresponding recesses for the coils, for example.

A coil arrangement of this kind has the advantage that either the damper inserts with the coils or the entire silencer and/or the corresponding module can be divided in the longitudinal direction 100 and the coils and/or damper inserts are interchangeable in a simple manner in this way. Furthermore this provides the possibility of dividing the silencer in the longitudinal

direction for use in the context of training.

Figures 5 and 6 show a corresponding embodiment of an arrangement with a total of 16 coils in diagrammatic form. In this case the silencer designated as 45 comprises two modules 46, 47 for example. In the modules several coil columns 48 to 55 are arranged round the projectile channel 56 and for reasons of greater clarity the damper inserts are not shown in this case.

Figure 7 shows the embodiment of a silencer 57 for a weapon in which the barrel 58 has a muzzle brake 59. Because of the high proportion of gases which escape laterally, in this case not only is at least one additional module 61 arranged in the direction of the projectile channel on the module 60 surrounding the barrel muzzle but a further two modules 62, 63 are arranged laterally with respect to the module 60. These modules have corresponding absorbers 64, 65 whose construction and function correspond to the absorbers described above.

In all the illustrations the dimensions of the boiler-shaped container and/or the modules are only shown diagrammatically and not to scale in relation to the dimensions of the weapon barrels. In a preferred embodiment in which three modules according to Figure 1 were used, the relevant module length was 2.45 m and the

relevant maximum module diameter 3 m. Such silencers were successfully used on firing ranges to silence large-calibre weapons. A reduction of the detonation pressures of between 18 and 20 dB in the high-frequency range was achieved.

This type of silencer, with the same construction as that described above but with smaller dimensions for module length and module diameter, was also successfully used with automatic weapons.

Further silencing can be achieved by applying structural sound insulating materials directly to the walls of the module on the inside or outside. A wire mesh, rubber, PUR foams or sandbags are suitable for external application for example. Bitumen can be advantageously applied from inside.

CLAIMS

1. Silencer for weapons which is in use arranged on a mounting device which is separate from the weapon barrel and which comprises a tubular hollow body for positioning in front of the muzzle of the weapon barrel and into which the weapon barrel partially projects through a front face wall, said body having an axial projectile channel and an opening in a rear face wall opposite the front face wall for passage therethrough of the projectile, a material absorbing sound being arranged around the projectile channel in the hollow body for sound silencing purposes, wherein the silencer comprises a vessel of boiler-shape which is formed of at least two module parts with a separate damper insert on which the sound-absorbing material is arranged, located in each said module.

2. Silencer for weapons which is in use arranged on a mounting device which is separate from the weapon barrel and which comprises a tubular hollow body for positioning in front of the muzzle of the weapon barrel and into which the weapon barrel partially projects through a front face wall, said body having an axial projectile channel and an opening in a rear face wall opposite the

front face wall for passage therethrough of the projectile, a material absorbing sound being arranged around the projectile channel in the hollow body for sound silencing purposes, wherein the silencer comprises a vessel of boiler-shape which is formed of at least two module parts with a separate damper insert on which the sound-absorbing material is arranged, located in each said module, the first module facing the weapon barrel surrounding the muzzle end of the weapon barrel and the end faces facing each other of the first and of the second module in the direction of fire having openings forming the projectile channel which are selected in such a way that the high-energy front wave of gases formed on firing reaches the second module largely unhindered.

3. Silencer according to Claim 1 or 2, wherein the modules have a flange in each case on their front faces facing each other which flanges can be positively interconnected through securing means preferably tightening straps or screw connections.

4. Silencer according to any one of Claims 1 to 3, wherein the damper inserts are interchangeably arranged in the modules.

5. Silencer according to any one of Claims 1 to 4, wherein the damper inserts are flexibly fixed to the metal housings.

6. Silencer according to any one of Claims 1 to 5, wherein the damper inserts have compartmented recesses arranged around the projectile channel and in which recesses a fibre mesh of metal or plastic is wound in a coil shape as sound-absorbing material.

7. Silencer according to Claim 6, wherein each compartmented recess can be filled with one material or different materials to produce the required damping and strength.

8. Silencer according to Claim 6 or 7, wherein the fibre mesh only partially fills the compartmented recesses so that the expanding gases can abate within these recesses.

9. Silencer according to any one of Claims 6 to 8, wherein the fibre mesh comprises barbed wire, wire mesh, expanded mesh or fibres which are embedded in a polymer matrix.

10. Silencer according to any one of Claims 6 to 9, wherein the fibre mesh is wound coaxially round the projectile channel.

11. Silencer according to any one of Claims 6 to 9, wherein several coils of the fibre mesh constructed in columnar form are arranged coaxially round the projectile channel.

12. Silencer according to any preceding claim wherein the silencer or individual modules of the silencer are arranged in the longitudinal direction in a divisible manner.

13. Silencer according to any one of Claims 1 to 12, wherein to silence weapons whose barrels have a muzzle brake, further modules are arranged connected with the first module on the weapon barrel side and laterally at the level of the muzzle brake, further modules being arranged in the direction of the projectile channel so that the corresponding gases leaving the muzzle brake laterally can expand in the said further modules.

14. Silencer according to any one of Claims 1 to 13, wherein structural noise insulating materials are applied

directly from the inside or outside and are arranged on the walls of the modules.

15. Silencer for a weapon constructed and arranged to function as described herein and exemplified with reference to the drawings.

16. In combination a barrel weapon, a silencer according to any preceding claim positioned adjacent the muzzle, and a mounting therefor.

Patents Act 1977 Examiner's report to the Comptroller under Section 17 (The Search report)		Application number GB 9505831.9
Relevant Technical Fields (i) UK Cl (Ed.N) F3C (CBB, CLA/X, CPM/X, CTA/B/F/N); F1B (BFB) (ii) Int Cl (Ed.6) F01N, F41A		Search Examiner TREVOR BERRY
Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii) ONLINE: WPI		Date of completion of Search 7 JUNE 1995 Documents considered relevant following a search in respect of Claims :- 1 TO 16

Categories of documents

X:	Document indicating lack of novelty or of inventive step.	P:	Document published on or after the declared priority date but before the filing date of the present application.
Y:	Document indicating lack of inventive step if combined with one or more other documents of the same category.	E:	Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A:	Document indicating technological background and/or state of the art.	&:	Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2192977 A	(GORMILL ENG)	1
X	GB 0574215	(MORRIS)	1
X	US 5078043	(STEPHENS) note Figure 7	1
X	US 5020631	(DEVIL SA)	1
X	US 4576083	(SEBERGER) referred to in present application	1
X	US 4530417	(DANIEL)	1
	US 4454798	(US NAVY SEC)	1

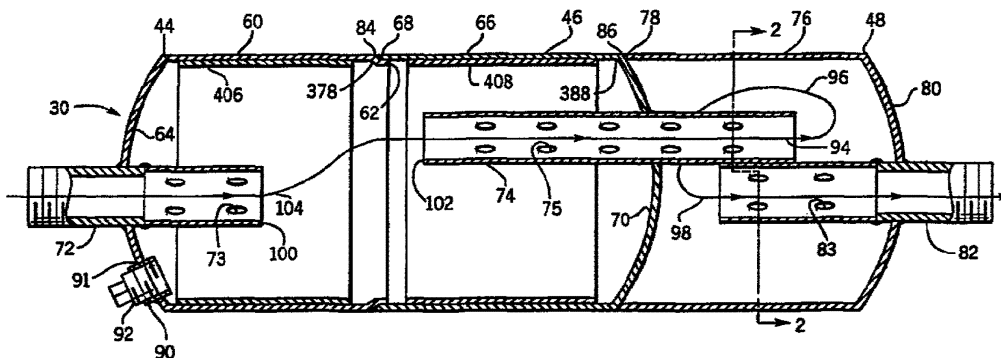
Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : F01N 7/18	A1	(11) International Publication Number: WO 99/02826 (43) International Publication Date: 21 January 1999 (21.01.99)
(21) International Application Number: PCT/US98/13451 (22) International Filing Date: 29 June 1998 (29.06.98) (30) Priority Data: 08/888,479 7 July 1997 (07.07.97) US (71) Applicant: NELSON INDUSTRIES, INC. [US/US]; 1802 Highway 51, West, Stoughton, WI 53589 (US). (72) Inventors: BATEMAN, Ralph; 54 Timber Trail, Montello, WI 53949 (US). BRUMM, Craig, S.; 7727 North Morning Meadow Lane, Evansville, WI 53536 (US). CUMMINS, Jim, R., Jr.; 2514 Bigler Circle, Verona, WI 53593 (US). ERIKSSON, Larry, J.; 6105 Fairfax Lane, Madison, WI 53718 (US). GREENER, Charles, M.; 14701 Irish Ridge Road, Mount Hope, WI 53816 (US). KENDZIERA, Ronald, W.; 17892 Circle Drive, Boscobel, WI 53805 (US). (74) Agents: TAKEN, Michael, E. et al.; Andrus, Sceales, Starke & Sawall, LLP, Suite 1100, 100 East Wisconsin Avenue, Milwaukee, WI 53202 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: MODULAR SILENCER



(57) Abstract

A modular silencer (30) is formed by drawn pots (44, 46) as building blocks in various constructions, components, and methods. Various internal axial, lateral and reversing paths are provided together with multiple compartments and enclosures. Simplified assembly and insulation installation techniques are provided.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

- 1 -

MODULAR SILENCER

BACKGROUND AND SUMMARY

The invention relates to silencers, and more particularly to economical silencer constructions, components, and methods.

5 Silencers are used in various applications for quieting noise, including mufflers for internal combustion engines, and including other devices such as rotary blowers, compressors, pumps, and the like. Silencers may be used on intake and/or exhaust systems, and may pass various intake and/or exhaust fluids therethrough, including gas and liquid.

10 Silencers are typically characterized by complex constructions and labor intensive manufacturing methods, particularly welding, all contributing to high cost. The present invention provides simplified constructions and methods in combination with a modular building block approach, to lower cost. The invention also provides simplified, cost effective insulation techniques.

BRIEF DESCRIPTION OF THE DRAWINGS

15 Fig. 1 is a sectional view of a silencer constructed in accordance with the invention.

Fig. 2 is a sectional view taken along line 2-2 of Fig. 1.

Fig. 3 is a view of a portion of the structure of Fig. 1 and shows a further embodiment.

20 Fig. 4 is a sectional view of a silencer constructed in accordance with the invention.

Fig. 5 is a sectional view of a silencer constructed in accordance with the invention.

25 Fig. 6 is a sectional view of a silencer constructed in accordance with the invention.

Fig. 7 is a sectional view taken along line 7-7 of Fig. 6.

Fig. 8 is a sectional view of a silencer constructed in accordance with the invention.

30 Fig. 9 is a sectional view of a silencer constructed in accordance with the invention.

Fig. 10 is a sectional view of a silencer constructed in accordance with the invention.

Figs. 11-20 sequentially illustrate manufacturing steps for constructing a silencer

- 2 -

component.

Figs. 21-23 sequentially illustrate an insulation technique.

Fig. 24 is an exploded perspective view of the structure of Fig. 1.

Fig. 25 is an assembled perspective view of the structure of Fig. 1.

5 Fig. 26 is a sectional view of a silencer component.

Fig. 27 is a sectional view of a plug silencer constructed in accordance with the invention.

Fig. 28 is like Fig. 27 and shows a further embodiment.

10 Fig. 29 is a sectional view of a spark arrestor silencer constructed in accordance with the invention.

Fig. 30 is a sectional view taken along line 30-30 of Fig. 29.

Fig. 31 is a sectional view taken along line 31-31 of Fig. 30.

Fig. 32 is a sectional view of a spark arrestor silencer constructed in accordance with the invention.

15 Fig. 33 is a sectional view taken along line 33-33 of Fig. 32.

Fig. 34 is a sectional view of an aspirating silencer constructed in accordance with the invention.

Fig. 35 is a sectional view of a catalytic silencer constructed in accordance with the invention.

20 Fig. 36 is like Fig. 35 and shows a further embodiment.

Fig. 37 is like Fig. 35 and shows a further embodiment.

Fig. 38 is a sectional view of a heat recovery silencer constructed in accordance with the invention.

25 Fig. 39 is a sectional view of a silencer constructed in accordance with the invention.

DETAILED DESCRIPTION

Fig. 1 shows a modular silencer or muffler 30 constructed in accordance with the invention, including a plurality of axially aligned drawn pots. Draw forming of pots is known in the prior art, for example as shown in U.S. Patent 5,020,631, incorporated herein by reference, and is briefly illustrated in Figs. 11 and 12. A flat sheet of metal 32, Fig. 11, is gradually and repetitively deformed and cold flowed by a mandrel to a pot or can 34 as shown in Fig. 12. The pot is trimmed to a desired length by knife blade 36, Fig. 13. Pot 34 has an axially extending continuous sidewall 38 open at one end 40 and having an integral dome head

- 3 -

42 at the other axial end. Fig. 1 shows first, second and third axially aligned drawn pots 44, 46, 48. Pot 48 is formed as above described and then further by punching a hole through its dome head with punch 50, Fig. 15, and then inserting a pipe 52, Fig. 16, through such hole and welding the pipe to the dome head of the pot by welding gun 54. Pot 46, Fig. 1, is similarly made, except that the hole in the dome head is punched at a location laterally offset from the axial centerline, for example as shown at the middle pot in Fig. 24. Pot 44 is similarly constructed as pot 48, except that an additional step, Fig. 14, is provided wherein a tool 56 swages, necks or joggles the open end of the pot to a reduced diameter at 58. The swaging enables telescoped nesting engagement of pots 44 and 46, to be described. In an alternate embodiment, pot 46 is swaged at its open end rather than pot 44, to provide the telescoped nesting engagement.

The construction in Fig. 1 includes first and second axially aligned drawn pots 44 and 46. Pot 44 has an axially extending continuous sidewall 60 initially open at axial end 62 and having an integral dome head 64 at the other axial end. Pot 46 has an axially extending continuous sidewall 66 initially open at axial end 68 and having an integral dome head 70 at the other axial end. Inlet pipe 72 extends axially through dome head 64 along the axial centerline of the pots. In an alternate embodiment, inlet pipe 72 extends axially through dome head 64 and is laterally offset from the axial centerline of the pots. In another alternate embodiment, inlet pipe 72 extends through dome head 64 at an angle relative to the axial centerline of the pots, for example 30° or some other angle. In the latter embodiment, the inlet pipe intersects the dome head at a point laterally offset from the axial centerline of the pots. Intermediate connecting pipe 74 extends axially through dome head 70 and is laterally offset from the axial centerline of the pots, Figs. 1 and 2. The construction of Fig. 1 further includes a third axially aligned drawn pot 48 having an axially extending continuous sidewall 76 initially open at axial end 78 and having an integral dome head 80 at the other axial end. Outlet pipe 82 extends axially through dome head 80 along the axial centerline of the pots. In alternate embodiments, pipe 82 may be laterally offset from the axial centerline of the pots, or may extend at an angle relative to such centerline, as above described in conjunction with pipe 72. The pots are welded together by circumferential weldments 84 and 86 at the respective interfaces of the pots by welder 88, Fig. 25. Further in Fig. 1, dome head 64 has another hole punched therethrough, with a sleeve 90 inserted therein and welded thereto at weldment 91 and receiving a drain plug 92 in threaded relation. Pipe 74 has a plurality of perforations such as 75 through the sidewall thereof. Pipes 72 and 82 have perforations such as 73 and 83 along the portions thereof within

- 4 -

the pots. The exterior portions of pipes 72 and 82 are solid, and are threaded for connection to other components or piping as desired.

In Fig. 1, pipe 74 is laterally offset from pipe 72 and is laterally offset from pipe 82. Pipes 74 and 82 are axially overlapped such that fluid, gas or liquid, inlet or exhaust, flows axially in one direction, e.g. rightwardly in Fig. 1, along path 94, then reverses itself and flows axially in the opposite direction along path 96 laterally adjacent path 94, and then reverses itself again and flows axially rightwardly along path 98 laterally adjacent paths 94 and 96. Path 94 is through pipe 74 through dome head 70. Path 98 is through pipe 82 through dome head 80. Pipes 72 and 74 have axial ends 100 and 102, respectively, axially spaced from each other in nonoverlapping relation such that fluid may flow at 104 from axial end 100 of pipe 72 to axial end 102 of pipe 74 without reversing itself. Pipes 72 and 82 are axially spaced from each other on axially distally opposite sides of pipe 74.

Fig. 3 shows a further embodiment of the construction of Fig. 1. Flanges 104 and 106 are welded to the ends of respective pipes 72 and 82, to facilitate mounting in flanged installations.

Fig. 4 shows a silencer 110 with first, second, third and fourth axially aligned drawn pots 112, 114, 116, 118. Inlet pipe 120 extends axially through dome head 122 of pot 112 along the axial centerline thereof. Intermediate connecting pipe 124 extends axially through dome head 126 of pot 114 along the axial centerline thereof. Intermediate connecting pipe 128 extends axially through dome head 130 of pot 116 and is laterally offset from the axial centerline of the pots. Outlet pipe 132 extends axially through dome head 134 of pot 118 along the axial centerline thereof. Axial ends 136 and 138 of respective pipes 124 and 128 are axially overlapped. All of the remaining axial ends of the pipes are axially spaced from each other in nonoverlapping relation.

Fig. 5 shows a silencer 140 having first, second and third axially aligned drawn pots 142, 144, 146. Inlet pipe 148 extends axially through dome head 150 of pot 142 along the axial centerline thereof, and through insulation 152, to be described. Intermediate connecting pipe 154 extends axially through dome head 156 of pot 144 and is laterally offset from the axial centerline of the pots. Outlet pipe 158 extends axially through dome head 160 of pot 146 along the axial centerline thereof. In Fig. 5, there is no axial overlapping of the pipes, and the axial ends of all the pipes are axially spaced from each other in nonoverlapping relation.

Fig. 6 shows a silencer 162 having first, second and third axially aligned drawn pots 164, 166, 168. Inlet pipe 170 extends axially through dome head 172 of pot 164 along the

- 5 -

axial centerline thereof. A pair of intermediate connecting pipes 174 and 176, Fig. 7, extend through dome head 178 of pot 166 and are each laterally offset from the axial centerline of the pots. Pipes 174 and 176 are further supported by a cross brace 180 welded therebetween. Outlet pipe 182 extends axially through dome head 184 of pot 168 along the axial centerline thereof. Pipes 170 and 182 are axially spaced from each other on axially distally opposite sides of pipes 174 and 176. Pipes 174 and 176 are laterally offset from pipes 170 and 182. Pipes 174 and 176 extend in parallel laterally spaced relation, each having an axial end 186 axially spaced from axial end 188 of pipe 170 in nonoverlapping relation. Pipes 174 and 176 have an axial end 190 axially spaced from axial end 192 of pipe 182 in nonoverlapping relation.

Fig. 8 shows a silencer 200 having first, second, third and fourth drawn pots 202, 204, 206, 208, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. Pot 202 concentrically surrounds pot 204. Pot 206 concentrically surrounds pot 208. Pots 202 and 206 are coaxially aligned and joined at their open ends 210 and 212 to form a first enclosure 214. Pots 204 and 208 are coaxially aligned and joined at their open ends 216 and 218 to form a second enclosure 220 within enclosure 214. Inlet pipe 222 extends axially through dome head 224 of pot 202 and through dome head 226 of pot 204 along the axial centerline thereof. Outlet pipe 228 extends axially through dome head 230 of pot 206 and through dome head 232 of pot 208 along the axial centerline thereof. Pipes 222 and 228 have inner axial ends 234 and 236, respectively, within enclosure 220 and axially spaced from each other in nonoverlapping relation. Dome head 224 of pot 202 is axially spaced from dome head 226 of pot 204 by an axial gap 225 which is spanned by pipe 222. Dome head 230 of pot 206 is axially spaced from dome head 232 of pot 208 by an axial gap 231 which is spanned by pipe 228. Pots 204 and 208 are perforated along their sidewalls 238 and 240. Pots 202 and 206 forming enclosure 214 are coaxial with pots 204 and 208 forming enclosure 220. Enclosure 220 is spaced radially inwardly of enclosure 214 by an annular gap 215.

Fig. 9 shows a silencer 250 including first, second, third and fourth axially aligned drawn pots 252, 254, 256, 258, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. Pots 252 and 254 are connected at their open ends 260 and 262 to form a first compartment 264. Pots 256 and 258 are connected at their open ends 266 and 268 to form a second compartment 270. An intermediate cylindrical sidewall 272 extends axially between pots 254 and 256. Intermediate cylindrical sidewall 272 has a leftward axial end 274 connected to the junction of cylindrical

- 6 -

sidewall 276 and dome head 278 of pot 254. Intermediate cylindrical sidewall 272 has a rightward axial end 280 connected to the junction of cylindrical sidewall 282 and dome head 284 of pot 256. The noted connection of intermediate cylindrical sidewall 272 to pots 254 and 256 forms a third compartment 286. Inlet pipe 288 extends axially through dome head 290 of pot 252 along the axial centerline thereof and into compartment 264. Outlet pipe 292 extends axially through dome head 294 of pot 258 along the axial centerline thereof and into compartment 270. Outlet or inlet pipe 296 extends radially through intermediate cylindrical sidewall 272 and into compartment 286. Intermediate connecting pipe 298 extends axially through dome head 278 of pot 254 and is laterally offset from the axial centerline thereof. Pipe 298 extends between compartments 286 and 264 and communicates with pipe 288 in compartment 264. Intermediate connecting pipe 300 extends axially through dome head 284 of pot 256 and is laterally offset from the axial centerline thereof. Pipe 300 extends between compartments 286 and 270 and communicates with pipe 292 in compartment 270. Pipes 296, 298 and 300 communicate with each other in compartment 286.

Fig. 10 shows a silencer 310 including first, second and third axially aligned drawn pots 312, 314, 316, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. A fourth drawn pot 318 has a continuous sidewall 320 initially open at one end 322 and having an integral dome head 324 at the other end. End 322 of pot 318 is connected to sidewall 326 of pot 316 and extends laterally away therefrom. Open end 328 of pot 312 is connected to open end 330 of pot 314. Open end 332 of pot 316 is connected to the junction of sidewall 334 and dome head 336 of pot 314. Sidewall 320 of pot 318 is connected to sidewall 326 of pot 316 along an arcuate interface as shown in dashed line at 338. Outlet pipe 340 extends axially through dome head 342 of pot 312 along the axial centerline thereof. Intermediate connecting pipe 344 extends axially through dome head 336 of pot 314 and is laterally offset from the axial centerline thereof. Dome head 346 of pot 316 does not have an inlet pipe therethrough. Intermediate connecting pipe 348 extends laterally through sidewall 326 of pot 316. Inlet pipe 350 extends through dome head 324 of pot 318.

In various of the embodiments shown above, a first pot, such as 360, Fig. 14, has a main body portion 362 of a first diameter 364, and an open end portion 366 of a second smaller diameter 368. A second pot 370, Fig. 15, is not necked by tool 56 and has both its main body portion 372 and its open end portion 374 of the noted first diameter 364. As shown above, such pots are axially overlapped in nesting telescoped relation, for example as shown at

- 7 -

ends 62 and 68 in Fig. 1, ends 210 and 212, and 216 and 218, in Fig. 8, ends 260 and 262, and 266 and 268, in Fig. 9, ends 330 and 328 in Fig. 10, and in other figures. Sidewall 362, Fig. 14, of pot 360 has a transition portion 376 between main body portion 362 and open end portion 366. When pots 360 and 370 are nested, open end 374 of pot 370 axially faces transition portion 376 of pot 360, for example as shown in Fig. 1 at end 68 of sidewall 66 of pot 46 axially facing transition portion 378 of sidewall 60 of pot 44 and connected thereto by weldment 84 at such interface. Sidewall 362, Fig. 14, of pot 360 meets dome head 380 of pot 360 at a junction 382, which junction is circumferential and is of the noted diameter 364. Sidewall 372 of pot 370 meets dome head 384 of pot 370 at junction 386, which junction is circumferential and has the noted diameter 364. This is desirable for various of the above shown mounting arrangements wherein the open end of a pot meets and is joined to the closed dome head end of another pot, for example as shown in Fig. 1 where open end 78 of sidewall 76 of pot 48 abuts the junction 388 of sidewall 66 and dome head 70 of pot 46 and is connected thereto at weldment 86 at such interface. The difference between diameters 364 and 368 is preferably twice the thickness of the sidewall 372 of pot 370, to enable a flush fit outer axially extending surface after assembly.

Figs. 17-20 show various insulation installation methods. In one embodiment, a cylindrical metal liner 400 is inserted into pot 402 and welded thereto by a welding gun 404, Fig. 18. This liner is shown in various of the above figures, for example at 406, 408 in Fig. 1, 410, 412, 414 in Fig. 4, 416 in Fig. 5, 418 in Fig. 6. In another embodiment, with or without liner 400, a preformed annular insulation cartridge 420, Fig. 17, is inserted into pot 402 through open end 422. Cartridge 420 is axially slid along pipe 424 into engagement with dome head 426, Fig. 19. Annular disc or plate 428 is then inserted and welded to pipe 424 by weld gun 430. This insulation package is also shown in Figs. 5 and 6.

In an alternate embodiment, a plurality of annular disc like cartridges or donuts 432, 434, 436, etc., Fig. 17, are serially inserted one after the other into pot 402, with or without liner 400, through open end 422, and axially slid along pipe 424 to form a stack of donuts, Fig. 20, circumferentially surrounding the pipe, followed by insertion and welding of plate 428 as above. The donuts have different shape. Annular donut 432 has a central aperture 438 for receiving pipe 424, a first domed arcuate side 440 conforming to dome head 426, and a second flat side 442. Second annular donut 434 has a central aperture 444 for receiving pipe 424, a first flat side 446 for mating against flat side 442 of donut 432, and a second flat side 448. Further donuts as desired, such as 436, each have a central aperture 450 for receiving pipe 424,

- 8 -

a first flat side 452 for mating against the preceding donut such as 434, and a second flat side 454 for mating against the succeeding donut. Pipe 424 is inserted through dome head 426 prior to insertion of the donuts into pot 402. First donut 432 is inserted into pot 402, and the aperture 438 of donut 432 is slid along pipe 424 until domed arcuate side 440 of donut 432 engages dome head 426. Second donut 434 is inserted into pot 402, and aperture 444 of donut 434 is slid along pipe 424 until flat side 446 of donut 434 engages flat side 442 of donut 432. The next donut such as 436 is inserted into pot 402, and aperture 450 of such donut is slid along pipe 424 until flat side 452 engages flat side 448 of donut 434. Donuts are continued to be inserted into the pot along pipe 424 to a desired length to provide a plurality of serially stacked donuts along pipe 424 within pot 402. The donuts are stacked such that each interface between successive donuts defines a plane substantially perpendicular to the axial extension of pipe 424.

In a further embodiment, the donuts 432, 434, 436, etc., Figs. 17 and 20, are provided of differing sound absorption characteristics to provide differing sound absorption across the respective interfaces between donuts such that there is an impedance change at the interface which causes a reactive effect in addition to a resistive effect. In preferred form, this is accomplished by providing different density donuts. In a further embodiment, the series of donuts providing a series of different sound absorption characteristics provide a plurality of interfaces alternating between increasing and decreasing impedance change thereacross, e.g. providing alternate high and low density donuts in series.

Figs. 21-23 show a further insulation installation technique. A spool 460 of continuous filament insulation thread 462 is fed into pot 402 around pipe 424. Thread 462 is drawn from spool 460 and air blown by air nozzle 461 of air gun 464 into pot 402 with or without liner 400. The thread is preferably multi-stranded yarn. Pressurized air is supplied at 466 to the air gun and puffs out the strands of the thread as shown at 468 during blowing into pot 402. Continuous filament thread for insulation is known in the prior art. In the present implementation, the continuous filament is desirable because it eliminates fiber ends which are believed to contribute to deterioration of silencer insulation because the ends tend to disintegrate over time and in response to heat. In one embodiment, vacuum is applied to the pot at 463 from vacuum source 465 to apply vacuum to pot 402 through the perforations 467 in the interior portion of pipe 424 during blowing of thread 462 into pot 402 by air gun 464. The vacuum draws and locates the thread into the pot. After the insulation thread is blown into the pot as shown at 470, Fig. 23, plate 428 is inserted and welded as before. The described blown-in insulation installation technique is particularly desirable from a commercial and manufacturing

- 9 -

standpoint because of the modularity-enhancing characteristics thereof complementing the modularity of the pots and further simplifying construction, reducing part content, and reducing labor cost by providing a less labor intensive manufacturing process and assembly sequence. The technique provides not only the noted commercial and manufacturing advantages, but also

5 improved performance in extended life due to reduction of deterioration and disintegration of insulation.

Fig. 26 shows a modular silencer component 480 including first and second axially aligned drawn pots 482, 484, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. Pot 482 is within pot

10 484, to provide a lined double-walled member having a double-walled dome head 486 and a double-walled sidewall 488. Dome head 490 of pot 484 engages dome head 492 of pot 482 in conforming coextensive parallel arcuate relation. Sidewall 494 of pot 484 engages sidewall 496 of pot 482 in conforming parallel concentric relation. Pot 482 is axially inserted fully into pot 484 until dome head 492 of pot 482 engages dome head 490 of pot 484.

15 Fig. 27 shows a modular plug silencer 502 including an outer pot assembly 503 including axially aligned drawn outer pots 504, 506, 508, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. Inlet pipe 510 extends axially through dome head 512 of pot 504. Outlet pipe 514 extends axially through dome head 516 of pot 508. A smaller inner drawn pot 518 is within the outer

20 pot assembly and diverts fluid flow from inlet pipe 510 laterally around inner pot 518 as shown at arrows 520, 522. Inner drawn pot 518 has an integral dome head 524, and an axially extending continuous sidewall 526 along which fluid flows axially. Dome head 528 of outer pot 506 provides a dividing wall extending laterally inwardly from the outer pot assembly and supporting inner pot 518 which extends axially through a central aperture 529 in dome head

25 528. Dome head 528 is perforated, as at 530, 532, to pass fluid flow axially therethrough after being laterally diverted by inner pot 518. Cylindrical sidewall 526 of inner pot 518 is open at the leftward axial end 534 in Fig. 27, and has integral dome head 524 at the rightward axial end. Open axial end 534 of inner pot 518 faces inlet pipe 510. Cylindrical sidewall 526 of inner pot 518 extends from dome head 524 toward open end 534 along an axial direction opposite to the

30 axial direction of fluid flow. Inner pot 518 is mounted between inlet pipe 510 at open end 534 of the inner pot, preferably by welding, and dome head 528 of outer pot 506 at dome head 524 of inner pot 518, preferably by welding. Inlet pipe 510 extends rightwardly through dome head 512 all the way to open end 534 of inner pot 518, and the portion of inlet exhaust pipe 510

- 10 -

between dome head 512 and inner pot 518 is perforated as shown at 511. In another embodiment, inlet pipe 510 may extend only partially toward pot 518, and there may be an axial gap between such inlet pipe and the open end 534 of inner pot 518. In another embodiment, cylindrical sidewall 526 of inner pot 518 may extend leftwardly through dome head 512 of pot 504, to provide the inlet pipe, to be described, Fig. 39.

In Fig. 27, inner pot 518 is within outer pot assembly 503 and is spaced laterally inwardly of sidewall 505 of outer pot 504 by a lateral gap 507 permitting fluid flow axially through such gap as shown at arrows 520a and 522a. Inner pot 518 is axially spaced from dome head 512 of outer pot 504 by an axial gap 509 permitting fluid flow laterally through such axial gap as shown at arrows 520b and 522b. This is also illustrated in Fig. 8 where sidewalls 220 and 240 of inner pots 204 and 208 are spaced laterally inwardly of sidewalls 203 and 207 of outer pots 202 and 206 by a lateral gap 215. Dome head 226 of inner pot 204 is spaced axially from dome head 224 of outer pot 202 by axial gap 225. Dome head 232 of inner pot 208 is axially spaced from dome head 230 of outer pot 206 by axial gap 231. Inner pots 204 and 208 are coaxially aligned, and lateral gap 215 defines an annulus through which fluid flows. Annulus 215 has an outer circumference at sidewalls 203 and 207 of outer pots 202 and 206. Annulus 215 has an inner circumference at sidewalls 220 and 240 of inner pots 204 and 208. In Fig. 27, pot 518 is within outer pot 504, and sidewall 526 of inner pot 518 is spaced laterally inwardly of sidewall 505 of outer pot 504 by lateral gap 507 permitting fluid flow axially, at arrows 520a, 522a, through such lateral gap 507. Dome head 524 of inner pot 518 is spaced axially from dome head 512 of outer pot 504 by axial gap 509 permitting fluid flow laterally, at arrows 520b, 522b, through such axial gap 509. Pots 504 and 518 are coaxially aligned, and lateral gap 507 defines an annulus through which fluid flows axially. Annulus 507 has an outer circumference at sidewall 505 of outer pot 504. Annulus 507 has an inner circumference at sidewall 526 of inner pot 518.

Fig. 28 shows a modular plug silencer 540 including an outer pot assembly 541 including axially aligned drawn outer pots 542, 544, 546, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. Inlet pipe 548 extends axially through dome head 550 of pot 542. Outlet pipe 552 extends axially through dome head 554 of pot 546. Inner drawn pot 556 is within the outer pot assembly and has an axially extending continuous sidewall 558 open at its rightward axial end and has an integral dome head 560 at its leftward axial end. Inner pot 556 diverts fluid flow from inlet pipe 548 laterally around the inner pot as shown at arrows 562, 564. Dome head 566

- 11 -

of outer pot 544 provides a divider wall extending laterally inwardly from the outer pot assembly and supporting inner pot 556. Dome head 566 is perforated, as at 568, 570, and passes fluid flow axially therethrough after being laterally diverted by inner pot 556. Cylindrical sidewall 558 of inner pot 556 extends from dome head 560 toward the rightward open end of the pot along an axial direction the same as the axial direction of fluid flow. In the embodiment in Fig. 28, inner pot 556 is within inlet pipe 548. Dome head 566 of outer pot 544 has a central aperture at 567 receiving pipe 548. The interior portion of pipe 548 is perforated, as at 549. Dome head 566 at aperture 567 is welded around pipe 548, and inner pot 556 is welded within pipe 548. In the embodiment of Fig. 28, a singular through pipe 572 extends through all of the outer pots, including through dome heads 550, 566, 554 of pots 542, 544, 546, respectively, such that the singular through pipe 572 provides both the inlet pipe 548 and the outlet pipe 552.

Fig. 29 shows a modular spark arrestor silencer 580 including an outer pot assembly 581 including axially aligned drawn pots 582, 584, 586, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. Inlet pipe 588 extends axially through dome head 590 of pot 582. Outlet pipe 592 extends axially through dome head 594 of pot 586. Spin flow structure 596 is provided within the outer pot assembly and imparts a spinning corkscrew motion as shown at 598 to fluid flow from inlet pipe 588 before passage to outlet pipe 592. The spin flow structure includes a plurality of louvers 600 receiving axial fluid flow from inlet pipe 588 and imparting a radial and circumferential component thereto. Dome head 602 of outer pot 584 provides an annular divider wall extending laterally inwardly from the outer pot assembly and supporting the louvers. Dome head 602 directs fluid flow from inlet pipe 588 to the louvers, and blocks reverse fluid flow after passage through the louvers. The spin flow structure is provided by an inner drawn pot 604 within the outer pot assembly. Inner pot 604 has a continuous cylindrical sidewall 606 open at its rightward axial end, and an integral dome head 608 at its leftward axial end. Inner pot 604 extends through central aperture 603 in dome head 602 of outer pot 584, and is mounted thereto by welding. Dome head 608 of inner pot 604 has a plurality of louvers 600 punched therethrough, Figs. 29-31. The louvers receive axial fluid flow from inlet pipe 588 and impart the noted radial and circumferential component thereto. Dome head 608 axially faces inlet pipe 588, and cylindrical sidewall 606 of inner pot 604 extends axially from dome head 608 to the rightward open axial end of the inner pot along the same axial direction as fluid flow. The spinning corkscrew motion imparted to fluid flow by louvers 600 as shown at arrow 598

- 12 -

carries spark debris into inner pot 604 along cylindrical sidewall 606 and through the rightward open end of inner pot 604 into outer pot 586 for collection along cylindrical sidewall 610 thereof, and subsequent clean-out for example at clean-out plug 612.

Figs. 32 and 33 show an alternate embodiment of the structure of Figs. 29-31, and use like reference numerals where appropriate to facilitate understanding. Instead of punching the louvers through dome head 608 of inner pot 604, louvers 605 instead are punched through sidewall 606 of inner pot 604, to impart a radial and circumferential component to the fluid flow, and provide the noted spinning corkscrew motion to carry spark debris into inner pot 604 along cylindrical sidewall 606 and through the rightward open end of the inner pot into outer pot 586 for collection and clean-out, as above.

Fig. 34 shows a modular aspirating silencer 620 including a pot assembly 621 including axially aligned drawn pots 622, 624, 626, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. Inlet pipe 628 extends axially through dome head 630 of pot 622. Outlet pipe 632 extends axially through dome head 634 of pot 626. A converging cone 636 within the pots provides a venturi 638. An aspiration inlet 640 into the pot assembly aspirates venturi 638. Dome head 642 of pot 624 has an opening punched therethrough along a frustoconically tapered sidewall 644 providing the converging cone. The aspiration inlet includes an aspiration pipe 646 extending through dome head 642 of pot 624. Frustoconically tapered sidewall 644 tapers from an upstream diameter to a smaller downstream diameter. Outlet exhaust pipe 632 is axially aligned with convergence cone 636 and has a larger diameter than the noted downstream diameter of frustoconically tapered sidewall 644.

Fig. 35 shows a modular catalytic silencer 650 including a pot assembly 651 including axially aligned drawn pots 652, 654, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. Inlet pipe 656 extends axially through dome head 658 of pot 652. Outlet pipe 660 extends axially through dome head 662 of pot 654. Catalytic media 664 is provided in at least one of the pots, either in the form of a known catalytic monolith or known catalytic beads.

Fig. 36 shows a modular catalytic silencer 670 including a pot assembly 671 including axially aligned drawn pots 672, 674, 676, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. Inlet pipe 678 extends axially through dome head 680 of pot 672. Outlet pipe 682 extends axially through dome head 684 of pot 676. Dome head 686 of pot 674 is at the open end of pot

- 13 -

676. Catalytic media 688 is in pot 676. Dome head 686 of pot 674 has a plurality of laterally spaced openings or perforations 690 therethrough for fluid flow distribution to catalytic media 688 in pot 676.

Fig. 37 shows a modular catalytic silencer 702 including a pot assembly 703 including axially aligned drawn pots 704, 706, 708, 710, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. Inlet pipe 712 extends axially through dome head 714 of pot 704. Outlet pipe 716 extends axially through dome head 718 of pot 710. Dome head 720 of pot 706 is at the open end of pot 708. Dome head 722 of pot 708 is at the open end of pot 710. Catalytic media 724 is in pot 708. Dome head 720 of pot 706 has a plurality of laterally spaced openings or perforations 726 therethrough for fluid flow distribution to catalytic media 724 in pot 708. Dome head 722 has a plurality of laterally spaced openings or perforations 728 therethrough for fluid flow distribution from catalytic media 724 in pot 708.

Fig. 38 shows a modular heat transfer silencer 740 including a pot assembly 741 including axially aligned drawn pots 742, 744, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end. Inlet pipe 746 extends axially through dome head 748 of pot 742. Outlet pipe 750 extends axially through dome head 752 of pot 744. Fluid heat exchanger module 754 in the pot assembly has a heat exchanger inlet 756 extending through the pot assembly into heat exchanger 754, and a heat exchanger outlet 758 extending out of the heat exchanger 754 through the pot assembly, to transfer heat between fluid in the pots and fluid in heat exchanger 754. In one embodiment, heat exchanger 754 is a heat recovery module recovering heat from the pot assembly and delivering fluid at heat exchanger outlet 758 at an elevated temperature relative to fluid at heat exchanger inlet 756.

Fig. 39 shows a silencer 770 similar to silencer 502 in Fig. 27, and uses like reference numerals where appropriate to facilitate understanding. Outer pot assembly 772 includes outer pots 506 and 508, as in Fig. 27, and includes a pot 774 with cylindrical sidewall 776 and integral dome head 778. Inner pot 780 includes cylindrical sidewall 782 open at its leftward axial end and having integral dome head 784 at its other axial end. In Fig. 39, cylindrical sidewall 782 of inner pot 780 provides inlet pipe 786. Cylindrical sidewall 782 of inner pot 780 extends from dome head 784 of the inner pot axially leftwardly in Fig. 39 toward the open end of the inner pot axially through dome head 778 of outer pot 774. This eliminates separate inlet pipe 510 in Fig. 27.

- 14 -

It is recognized that various equivalents, alternatives and modifications are possible within the scope of the appended claims. In a desirable aspect of the invention, numerous other combinations of structures and chambers may be mixed and matched. In a further desirable aspect, numerous of the joints or interfaces between the pots may be provided
5 by direct welding of the pots to each other and/or the addition of flange joints at such interfaces which may be welded and/or bolted, the latter facilitating disassembly or removal for clean-out, or the like. Such flange joints can be provided by an annular disc or ring around the pot, or could be provided, for example, by flaring the open end of the pot outwardly to a larger radius. The present invention may be used in combination with conventional silencers, for example by
10 adding pots or chambers on either end of a conventional silencer. The present silencer may be used as a complete stand alone unit, or, for example, may be enclosed within a conventional silencer, or may be provided around and encompassing a conventional silencer.

- 15 -

CLAIMS

1. A modular silencer comprising first and second axially aligned drawn pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, a first pipe extending axially through said dome head of said first pot along the axial centerline thereof, a second pipe extending axially through said
5 dome head of said second pot and laterally offset from the axial centerline thereof.

2. A modular silencer comprising first, second and third axially aligned drawn pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, first, second and third pipes extending axially through a respective said dome head, at least two of said pipes being laterally offset from each other.

3. The silencer according to claim 2 wherein said two pipes are axially overlapped such that fluid flows axially in one direction along a first path, then reverses itself and flows axially in the opposite direction along a second path laterally adjacent said first path, and then reverses itself again and flows axially in said one direction along a third path laterally
5 adjacent said second path.

4. The silencer according to claim 3 wherein:
said first path is through said second pipe through said second dome head;
said third path is through said third pipe through said third dome head;
said first and second pipes have axial ends axially spaced from each other in
5 nonoverlapping relation such that fluid may flow from said axial end of said first pipe to said axial end of said second pipe without reversing itself.

5. The silencer according to claim 2 wherein:
said first and third pipes are axially spaced from each other on axially distally opposite sides of said second pipe;
said second pipe is laterally offset from at least one of said first and second
5 pipes.

6. The silencer according to claim 5 wherein said first and third pipes are axially aligned.

7. The silencer according to claim 2 wherein:
said first and second pipes have axial ends axially spaced from each other in nonoverlapping relation;

said second and third pipes are axially overlapped.

8. The silencer according to claim 2 wherein:

- 16 -

said first and second pipes have axial ends axially spaced from each other in nonoverlapping relation;

said second and third pipes have axial ends axially spaced from each other in
5 nonoverlapping relation.

9. The silencer according to claim 2 comprising:

a fourth pipe extending axially through said dome head of said second pot;

said first and third pipes being axially spaced from each other and on axially distally opposite sides of said second and fourth pipes.

10. The silencer according to claim 9 wherein said second and fourth pipes are laterally offset from said first and third pipes.

11. The silencer according to claim 9 wherein said second and fourth pipes extend in parallel laterally spaced relation, each having an axial end axially spaced from an axial end of said first pipe in nonoverlapping relation.

12. The silencer according to claim 9 wherein:

said first and second pipes have axial ends axially spaced from each other in nonoverlapping relation;

said second and third pipes have axial ends axially spaced from each other in
5 nonoverlapping relation;

said first and fourth pipes have axial ends axially spaced from each other in nonoverlapping relation;

said third and fourth pipes have axial ends axially spaced from each other in nonoverlapping relation.

13. The silencer according to claim 2 comprising:

a fourth drawn pot axially aligned with said first, second and third pots, said fourth pot having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end;

5 a fourth pipe extending axially through said dome head of said fourth pot.

14. The silencer according to claim 13 wherein:

said open end of said first pot is joined to said open end of said second pot;

said dome head of said second pot is joined to said open end of said third pot;

said dome head of said third pot is joined to said open end of said fourth pot.

15. The silencer according to claim 13 wherein at least two of said pipes are axially aligned, and at least one of the remaining pipes is laterally offset therefrom.

- 17 -

16. The silencer according to claim 15 wherein said first, second and fourth pipes are axially aligned, and said third pipe is laterally offset therefrom.

17. The silencer according to claim 16 wherein:

said first and second pipes have axial ends axially spaced from each other in nonoverlapping relation;

said second and third pipes are axially overlapped;

5 said second and fourth pipes have axial ends axially spaced from each other in nonoverlapping relation;

said third and fourth pipes have axial ends axially spaced from each other in nonoverlapping relation.

18. A modular silencer comprising first, second, third and fourth drawn pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, said first pot concentrically surrounding said second pot, said third pot concentrically surrounding said fourth pot, said first and third pots being
5 coaxially aligned and joined at their open ends to form a first enclosure, said second and fourth pots being coaxially aligned and joined at their open ends to form a second enclosure within said first enclosure.

19. The silencer according to claim 18 comprising:

a first pipe extending axially through said dome head of said first pot and through said dome head of said second pot;

a second pipe extending axially through said dome head of said third pot and
5 through said dome head of said fourth pot.

20. The silencer according to claim 19 wherein:

said first and second pipes have inner axial ends within said second enclosure and axially spaced from each other in nonoverlapping relation;

said dome head of said first pot is axially spaced from said dome head of said
5 second pot by a first axial gap;

said first pipe spans said first axial gap;

said dome head of said third pot is axially spaced from said dome head of said fourth pot by a second axial gap;

said second pipe spans said second axial gap.

21. The silencer according to claim 18 wherein:

said second and fourth pots are perforated along their sidewall;

- 18 -

said first and third pots forming said first enclosure are coaxial with said second and fourth pots forming said second enclosure;

5 said second enclosure is spaced radially inwardly of said first enclosure by an annular gap.

22. A modular silencer comprising first, second, third and fourth axially aligned drawn pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, said first and second pots being connected at their open ends to form a first compartment, said third and fourth pots being connected at
5 their open ends to form a second compartment, an intermediate cylindrical sidewall extending axially between said second and third pots, said intermediate cylindrical sidewall having a first axial end connected to said cylindrical sidewall of said second pot at said dome head of said second pot, said intermediate cylindrical sidewall having a second axial end connected to said cylindrical sidewall of said third pot at said dome head of said third pot, to form a third
10 compartment.

23. The silencer according to claim 22 comprising:

a first pipe extending axially through said dome head of said first pot;

a second pipe extending axially through said dome head of said fourth pot;

a third pipe extending radially through said intermediate cylindrical sidewall.

24. The silencer according to claim 23 comprising:

a fourth pipe extending axially through said dome head of said second pot and communicating with said first pipe in said first compartment;

5 a fifth pipe extending axially through said dome head of said third pot and communicating with said second pipe in said second compartment;

said third, fourth and fifth pipes communicating with each other in said third compartment.

25. A modular silencer comprising a plurality of axially aligned drawn pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, a side pot comprising a drawn pot having a continuous sidewall open at one end and having an integral dome head at the other end, said
5 open end of said side pot being connected to said sidewall of one of said axially aligned pots.

26. The silencer accordingly to claim 25 wherein said sidewall of said side pot extends laterally away from said sidewall of said one of said axially aligned pots.

27. The silencer according to claim 25 wherein said plurality of axially aligned

- 19 -

pots comprises first, second and third axially aligned drawn pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, said side pot comprises a fourth drawn pot having a continuous sidewall open at one end and having an integral dome head at the other end, said open end of said fourth pot being connected to said sidewall of one of said first, second and third pots.

28. The silencer according to claim 27 wherein said sidewall of said third pot is longer than the width of said dome head of said fourth pot, and wherein said open end of said fourth pot is connected to said sidewall of said third pot.

29. The silencer according to claim 27 wherein:

said open end of said first pot is connected to said open end of said second pot;

said open end of said third pot is connected to said dome head of said second pot;

said sidewall of said fourth pot is connected to said sidewall of said third pot along an arcuate interface.

30. The silencer according to claim 29 comprising:

a first pipe extending axially through said dome head of said first pot;

a second pipe extending axially through said dome head of said second pot;

a third pipe extending laterally through said sidewall of said third pot;

a fourth pipe extending through said dome head of said fourth pot.

31. A modular silencer comprising first and second axially aligned drawn pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, the axially extending sidewall of said first pot having a main body portion of a first diameter and an open end portion of a second different diameter at said open axial end of said first pot, the axially extending sidewall of said second pot having an open end portion of said first diameter at said open axial end of said second pot.

32. The silencer according to claim 31 wherein said open ends of said first and second pots are axially overlapped in nesting telescoped relation.

33. The silencer according to claim 32 wherein:

said sidewall of said first pot has a transition portion between said main body portion of said first diameter and said open end portion of said second diameter;

said open end of said second pot axially faces said transition portion of said first pot;

and comprising a weldment at the interface of said open end of said second pot

- 20 -

and said transition portion of said first pot.

34. The silencer according to claim 32 wherein:

said first and second pots are nonidentical;

said sidewall of said second pot has a main body portion of said first diameter,
and said open end portion of said first diameter.

35. The silencer according to claim 34 wherein:

said sidewall of said first pot meets said dome head of said first pot at a first
junction;

said sidewall of said second pot meets said dome head of said second pot at a
5 second junction;

each of said first and second junctions is of said first diameter.

36. The silencer according to claim 34 wherein said second diameter is less than
said first diameter.

37. The silencer according to claim 34 comprising:

a third drawn pot axially aligned with said first and second pots, said third pot
having an axially extending continuous sidewall open at one axial end and having an integral
dome head at the other axial end;

5 said sidewall of said third pot having a main body portion of said first diameter,
and an open end portion of said first diameter at said open axial end of said third pot;

said open end of said third pot axially abutting said dome head of one of said
first and second pots.

38. The silencer according to claim 37 wherein:

said sidewall of said first pot meets said dome head of said first pot at a junction
having said first diameter;

said sidewall of said second pot meets said dome head of said second pot at a
5 junction having said first diameter;

said sidewall of said third pot meets said dome head of said third pot at a
junction having said first diameter.

39. A modular silencer component comprising first and second axially aligned
drawn pots, each having an axially extending continuous sidewall open at one axial end and
having an integral dome head at the other axial end, said first pot being within said second pot
to provide a lined double-walled member having a double-walled dome head and a double-
5 walled sidewall.

- 21 -

40. The silencer component according to claim 39 wherein said dome head of said second pot engages said dome head of said first pot in conforming coextensive parallel arcuate relation, and said sidewall of said second pot engages said sidewall of said first pot in conforming parallel concentric relation.

41. A modular silencer component comprising first and second drawn pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, said first pot being within said second pot, with said sidewall of said second pot spaced laterally inwardly of said sidewall of said first pot by a lateral gap
5 permitting fluid flow axially through said lateral gap.

42. The silencer component according to claim 41 wherein said dome head of said second pot is spaced axially from said dome head of said first pot by an axial gap permitting fluid flow laterally through said axial gap.

43. The silencer component according to claim 42 wherein said first and second pots are coaxially aligned, and said lateral gap defines an annulus through which said fluid flows axially, said annulus having an outer circumference at said sidewall of said first pot, said annulus having an inner circumference at said sidewall of said second pot.

44. A modular silencer component comprising an axially drawn pot having an axially continuous sidewall open at one axial end and having an integral dome head at the other axial end, said sidewall having a main body portion of a first diameter, an open end portion of a second diameter at said open axial end of said pot, and a junction portion of a third diameter at
5 the junction of said sidewall and said dome head, said first and third diameters being equal.

45. The silencer component according to claim 44 wherein said first and second diameters are equal.

46. The silencer component according to claim 44 wherein said first and second diameters are different.

47. The silencer component according to claim 46 wherein said second diameter is less than said first diameter.

48. The silencer component according to claim 44 comprising a second axially drawn pot having an axially continuous sidewall open at one axial end and having an integral dome head at the other axial end, said sidewall of said second pot having a main body portion of a fourth diameter, an open end portion of a fifth diameter at said open axial end of said
5 second pot, and a junction portion of a sixth diameter at the junction of said sidewall of said second pot and said dome head of said second pot, wherein:

- 22 -

said first, second, third, fourth and sixth diameters are all equal to each other;
said fifth diameter is different than said first, second, third, fourth and sixth diameters.

49. The silencer component according to claim 48 wherein the difference between said fifth diameter and said first, second, third, fourth and sixth diameters is equal to twice the thickness of said sidewall of the first of said pots.

50. A method for making a modular silencer comprising:

draw forming a plurality of pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end;

swaging said sidewall of a first of said pots at said open end to a different
5 diameter;

assembling said first pot and a second of said pots by axially aligning said pots at said open ends and axially sliding said sidewall of said first pot along said sidewall of said second pot to axially overlap said sidewalls along said swaged portion of said sidewall of said first pot.

51. The method according to claim 50 comprising:

swaging said sidewall of said first pot at said open end to a reduced diameter;

axially inserting said first pot partially into said second pot by inserting said swaged open end of said first pot into said second pot.

52. The method according to claim 50 comprising assembling a third of said pots and one of said first and second pots by axially aligning said dome head of said one of said first and second pots and said open end of said third pot and axially moving them toward each other until said sidewall of said third pot at said open end engages the junction of said dome
5 head and said sidewall of said one of said first and second pots, without axial overlap of said sidewalls of said third pot and said one of said first and second pots.

53. A method for making a modular silencer comprising draw forming a plurality of pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, axially inserting one of said pots fully into another of said pots until said dome head of said one pot engages said dome head of said
5 other pot to provide a lined double-walled member having a double-walled dome head and a double-walled sidewall.

54. A method for making a modular silencer component comprising draw forming a pot having an axially extending continuous sidewall open at one axial end and having

- 23 -

an integral dome head at the other axial end, axially inserting a preformed annular insulation cartridge into said pot through said open end.

55. The method according to claim 54 comprising:

punching a hole axially through said dome head;

inserting a pipe axially through said hole in said dome head;

axially sliding said cartridge along said pipe.

56. The method according to claim 55 comprising:

providing a plurality of said cartridges in the form of donuts;

inserting said donuts one after the other serially into said pot through said open end;

5 axially sliding said donuts along said pipe to form a stack of donuts circumferentially surrounding said pipe.

57. The method according to claim 56 comprising providing different shape said donuts, including:

a first annular donut having a central aperture for receiving said pipe, a first domed arcuate side conforming to said dome head, and a second flat side;

5 a second annular donut having a central aperture for receiving said pipe, a first flat side for mating against said second flat side of said first donut, and a second flat side;

further donuts as desired, each having a central aperture for receiving said pipe, a first flat side for mating against the preceding donut, and a second flat side for mating against the succeeding donut;

10 and comprising:

inserting said pipe through said dome head prior to insertion of said cartridges into said pot;

inserting said first donut into said pot and sliding said aperture of said first donut along said pipe until said first domed arcuate side of said first donut engages said dome head;

15 inserting said second donut into said pot and sliding said aperture of said second donut along said pipe until said first flat side of said second donut engages said second flat side of said first donut;

inserting the next donut into said pot and sliding the aperture of said next donut along said pipe until said first flat side of said next donut engages said second side of said
20 second donut;

continuing to insert donuts into said pot and sliding said donuts along said pipe

- 24 -

to a desired length to provide a plurality of serially stacked donuts along said pipe within said pot;

stacking said donuts along said pipe such that each interface between successive
25 donuts defines a plane substantially perpendicular to the axial extension of said pipe.

58. The method according to claim 56 comprising providing differing sound absorption characteristic said donuts to provide differing sound absorption across an interface between donuts such that there is an impedance change at said interface causing a reactive effect in addition to a resistive effect.

59. The method according to claim 58 comprising providing a series of different sound absorption characteristic said donuts providing a plurality of said interfaces alternating between increasing and decreasing impedance change thereacross.

60. A method for making a modular silencer comprising draw forming a plurality of pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, punching a hole axially through said dome head, inserting a pipe axially through said hole in said dome head, providing a spool of
5 continuous filament insulation thread and feeding said thread into said pot around said pipe.

61. The method according to claim 60 comprising drawing said thread from said spool and air blowing said thread into said pot.

62. The method according to claim 61 comprising providing multi-stranded yarn-like said thread and blowing said thread into said pot through an air nozzle and puffing out the strands of said thread during said blowing into said pot.

63. The method according to claim 62 comprising drawing and locating said thread into said pot by applying vacuum to said pot during said blowing of said thread into said pot.

64. A modular silencer component comprising an axially drawn pot having an axially continuous sidewall open at one axial end and having an integral dome head at the other axial end, a pipe extending axially through said dome head, a preformed annular insulation cartridge in said pot around said pipe.

65. The silencer component according to claim 64 wherein said preformed annular insulation cartridge comprises a plurality of donuts concentrically surrounding said pipe and axially stacked in series along said pipe.

66. The silencer component according to claim 65 wherein said donuts have different shape, and comprise:

- 25 -

a first annular donut having a central aperture for receiving said pipe, a first domed arcuate side conforming to said dome head, and a second flat side;

5 a second annular donut having a central aperture for receiving said pipe, a first flat side for mating against said second flat side of said first donut, and a second flat side;

further donuts as desired, each having a central aperture for receiving said pipe, a first flat side for mating against the preceding donut, and a second flat side for mating against the succeeding donut;

10 said donuts being stacked along said pipe within said pot such that each interface between successive donuts defines a plane substantially perpendicular to the axial extension of said pipe.

67. A modular silencer comprising a pot having an axial sidewall open at one axial end and having a dome head at the other axial end, a plurality of insulation cartridges axially stacked in series in said pot, said cartridges having differing sound absorption characteristics to provide differing sound absorption across an interface between cartridges such
5 that there is an impedance change at said interface causing a reactive effect in addition to a resistive effect.

68. The silencer component according to claim 67 comprising a pipe extending axially through said dome head, and wherein said cartridges comprise donuts concentrically surrounding said pipe and axially stacked in series along said pipe.

69. The silencer component according to claim 68 wherein said donuts comprise a series of different sound absorption characteristic said donuts providing a plurality of said interfaces alternating between increasing and decreasing impedance change thereacross.

70. The silencer component according to claim 68 wherein said donuts have differing density.

71. A modular plug silencer comprising an outer pot assembly comprising a plurality of axially aligned drawn outer pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, an inlet pipe extending into said outer pot assembly, an outlet pipe extending out of said outer pot
5 assembly, an inner pot within said outer pot assembly.

72. The plug silencer according to claim 71 wherein said inner pot is spaced laterally inwardly of said sidewall of a first of said outer pots by a lateral gap permitting fluid flow axially through said lateral gap, and wherein said inner pot is spaced axially from said dome head of said first outer pot by an axial gap permitting fluid flow laterally through said

- 26 -

5 axial gap.

73. The plug silencer according to claim 72 wherein said inlet pipe extends axially through said dome head of said first outer pot, and wherein said inner pot diverts fluid flow from said inlet pipe laterally around said inner pot.

74. The plug silencer according to claim 73 wherein said inner pot comprises a dome head, and a cylindrical sidewall along which exhaust flows axially.

75. The plug silencer according to claim 74 comprising an annular perforated divider wall extending laterally inwardly from said outer pot assembly and supporting said inner pot, the perforations through said divider wall passing fluid flow axially therethrough after being laterally diverted by said inner pot.

76. The plug silencer according to claim 75 wherein said divider wall is comprised of said dome head of a second of said outer pots.

77. The plug silencer according to claim 74 wherein said cylindrical sidewall of said inner pot is open at one axial end and has said dome head at the other axial end, said open axial end of said inner pot faces said inlet pipe, said cylindrical sidewall of said inner pot extending from said dome head toward said open end along an axial direction opposite to the
5 axial direction of fluid flow.

78. The plug silencer according to claim 77 wherein said inner pot is mounted between said inlet pipe at said open end of said inner pot, and said dome head of a second of said outer pots at said dome head of said inner pot.

79. The plug silencer according to claim 74 wherein said cylindrical sidewall of said inner pot is open at one axial end and has said dome head at the other axial end, said cylindrical sidewall of said inner pot extending from said dome head toward said open end along an axial direction the same as the axial direction of fluid flow.

80. The plug silencer according to claim 74 wherein said inner pot is within said inlet pipe.

81. The plug silencer according to claim 80 comprising an annular divider wall extending laterally between said outer pot assembly and said inlet pipe, said divider wall and said inlet pipe each being perforated.

82. The plug silencer according to claim 81 wherein said divider wall is comprised of said dome head of a second of said outer pots.

83. The plug silencer according to claim 82 comprising a through pipe extending through all of said outer pots, including through respective dome heads of distally

- 27 -

opposite outer pots, and through said perforated dome head of said second outer pot, such that said through pipe provides both said inlet pipe and said outlet pipe.

84. The plug silencer according to claim 71 wherein said inner pot comprises a cylindrical sidewall open at one end and having a dome head at the other end, said cylindrical sidewall providing said inlet pipe.

85. The plug silencer according to claim 84 wherein said cylindrical sidewall of said inner pot extends from said dome head of said inner pot toward said open end of said inner pot axially through said dome head of a first of said outer pots.

86. The plug silencer according to claim 85 wherein said cylindrical sidewall of said inner pot extends from said dome head of said inner pot toward said open end of said inner pot along an axial direction opposite to the axial direction of fluid flow.

87. A modular spark arrestor silencer comprising an outer pot assembly comprising a plurality of axially aligned drawn outer pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, an inlet pipe extending into said outer pot assembly, an outlet pipe extending out of outer
5 pot assembly, spin flow structure within said outer pot assembly imparting a spinning motion to fluid flow from said inlet pipe before passage to said outlet pipe.

88. The spark arrestor silencer according to claim 87 wherein said spin flow structure comprises a plurality of louvers receiving fluid flow from said inlet pipe and imparting a radial and circumferential component thereto.

89. The spark arrestor silencer according to claim 88 comprising an annular divider wall extending laterally inwardly from said outer pot assembly and supporting said louvers, said divider wall directing fluid flow to said louvers, and blocking reverse fluid flow after passage through said louvers.

90. The spark arrestor silencer according to claim 89 wherein said divider wall is comprised of said dome head of a second of said outer pots.

91. The spark arrestor silencer according to claim 87 wherein said spin flow structure is provided by an inner pot within said outer pot assembly, said inner pot having a cylindrical sidewall and a dome head, said inner pot having a plurality of louvers formed therein, said louvers receiving fluid flow from said inlet pipe and imparting a spinning
5 corkscrew component thereto.

92. The spark arrestor silencer according to claim 91 wherein said cylindrical sidewall of said inner pot is open at one axial end and has said dome head at the other axial end,

- 28 -

said cylindrical sidewall of said inner pot extends axially from said dome head to said open end along the same axial direction as fluid flow, wherein the spinning corkscrew motion imparted to said fluid flow by said louvers carries spark debris into said inner pot along said cylindrical sidewall of said inner pot and through said open end of said inner pot into an outer pot for collection and clean-out.

93. The spark arrestor silencer according to claim 92 wherein said inner pot extends axially through said dome head of a second of said outer pots.

94. The spark arrestor silencer according to claim 91 wherein said louvers are punched through said dome head of said inner pot and impart a radial and circumferential component to said fluid flow.

95. The spark arrestor silencer according to claim 91 wherein said louvers are punched in said sidewall of said inner pot and impart a radial and circumferential component to said fluid flow.

96. A modular aspirating silencer comprising a pot assembly comprising a plurality of axially aligned drawn pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, an inlet pipe extending into said pot assembly, an outlet pipe extending out of said pot assembly, a venturi in said pot assembly, an aspiration inlet into said pot assembly and aspirating said venturi.

97. The aspirating silencer according to claim 96 comprising a converging cone within said pot assembly providing said venturi.

98. The aspirating silencer according to claim 97 wherein said plurality of pots comprises first, second and third axially aligned drawn pots, said second pot being axially between said first and third pots, said dome head of said second pot having an opening punched therethrough along a frustoconically tapered sidewall providing said converging cone.

99. The aspirating silencer according to claim 98 wherein said aspiration inlet comprises an aspiration pipe extending through said dome head of at least one of said pots.

100. The aspirating silencer according to claim 98 wherein said frustoconically tapered sidewall tapers from an upstream diameter to a smaller downstream diameter, and wherein said outlet pipe is axially aligned with said convergence cone and has a larger diameter than said downstream diameter of said frustoconically tapered sidewall.

101. A modular catalytic silencer comprising a pot assembly comprising a plurality of axially aligned drawn pots, each having an axially extending continuous sidewall open at one axial end and having an integral dome head at the other axial end, an inlet pipe

- 29 -

extending into said pot assembly, an outlet pipe extending out of said pot assembly, catalytic
5 media in at least one of said pots.

102. The catalytic silencer according to claim 101 comprising a first said pot upstream of a second said pot, and wherein:

said dome head of said first pot is at said open end of said second pot;

said catalytic media is in said second pot;

5 said dome head of said first pot has a plurality of laterally spaced openings therethrough for fluid flow distribution to said catalytic media in said second pot.

103. The catalytic silencer according to claim 102 comprising a third said pot downstream of said second pot, and wherein:

said dome head of said second pot is at said open end of said third pot;

5 said dome head of said second pot has a plurality of laterally spaced openings therethrough for fluid flow distribution from said catalytic media in said second pot.

104. A modular heat transfer silencer comprising a pot assembly comprising a plurality of axially aligned pots, each having an axially extending sidewall open at one axial end and having a dome head at the other axial end, an inlet pipe extending into said pot assembly, an outlet pipe extending out of said pot assembly, a heat exchanger in said pot assembly and
5 having a heat exchanger inlet extending through said pot assembly into said heat exchanger, and a heat exchanger outlet extending out of said heat exchanger through said pot assembly, to transfer heat between fluid in said pots and fluid in said heat exchanger.

105. The heat transfer silencer according to claim 104 wherein said heat exchanger comprises a heat recovery module in said pot assembly and recovering heat from said pot assembly and delivering fluid at said heat exchanger outlet at an elevated temperature relative to fluid at said heat exchanger inlet.

1 / 13

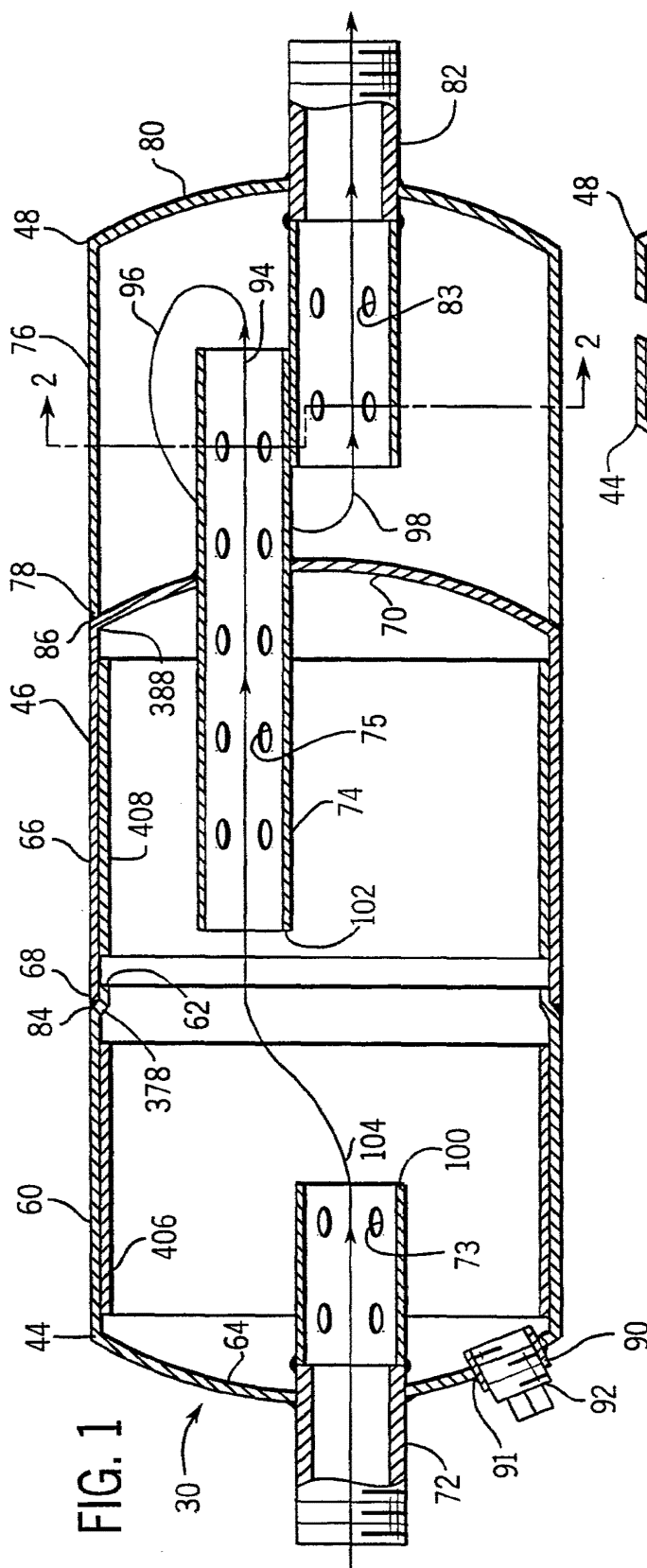


FIG. 1

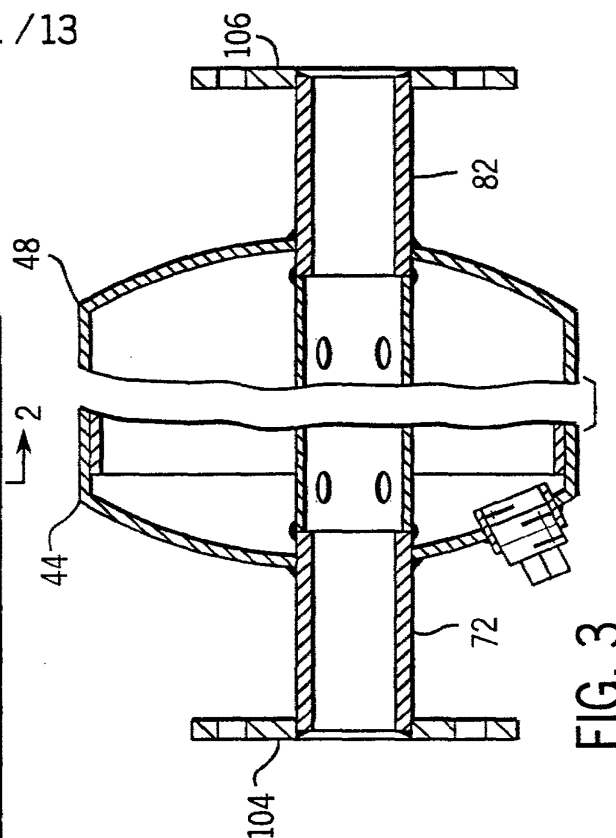


FIG. 3

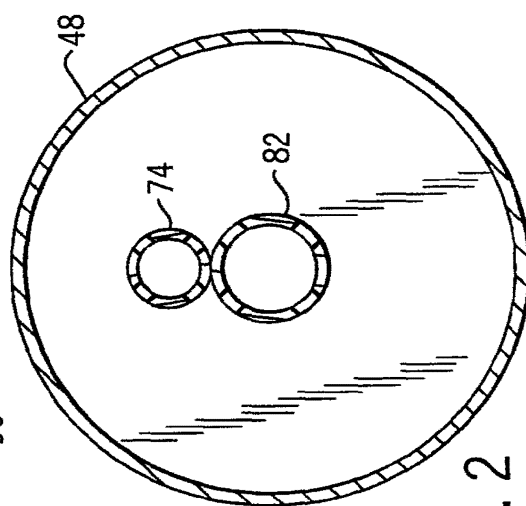


FIG. 2

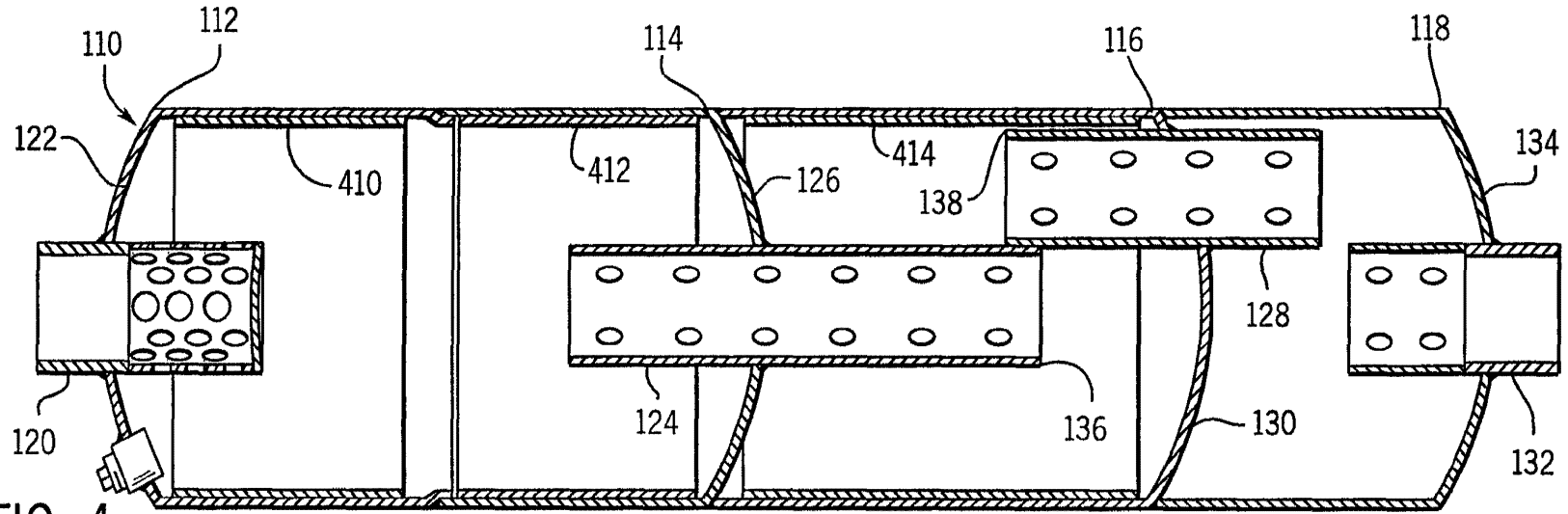


FIG. 4

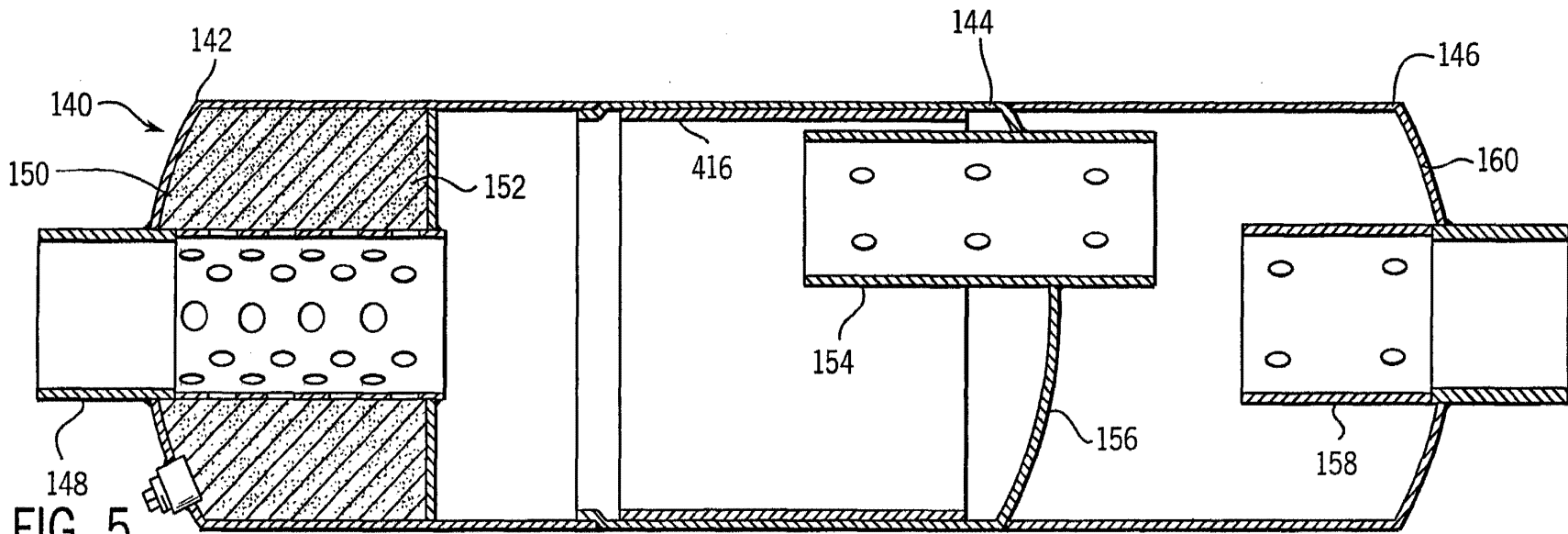


FIG. 5

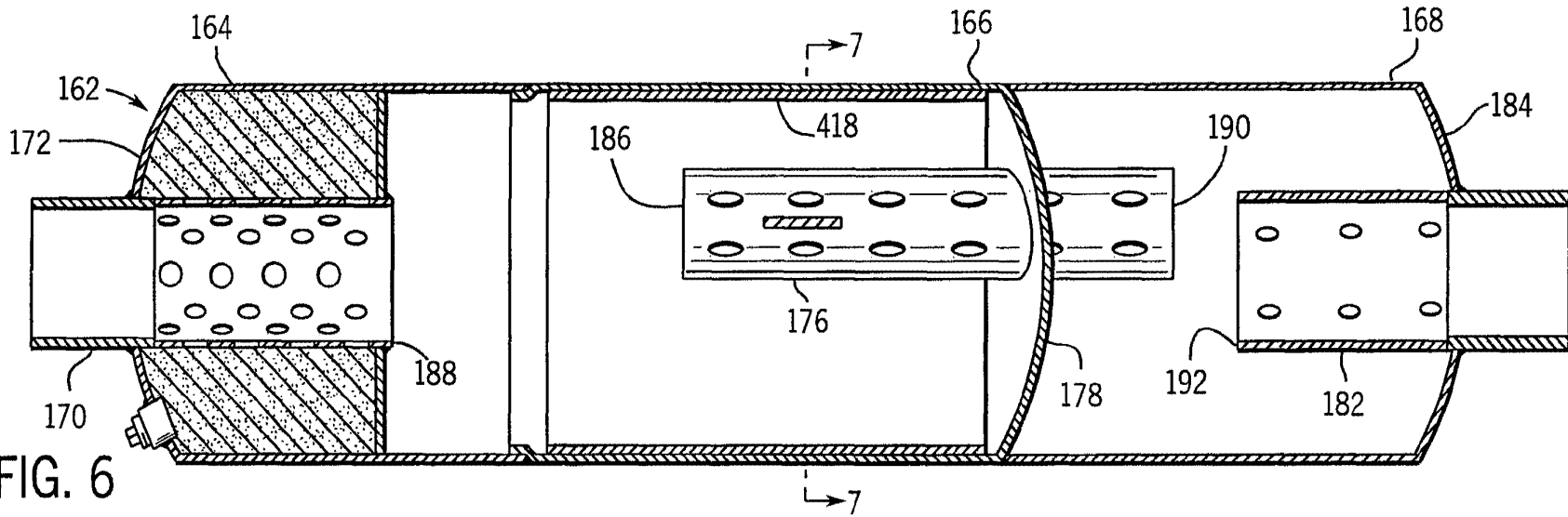


FIG. 6

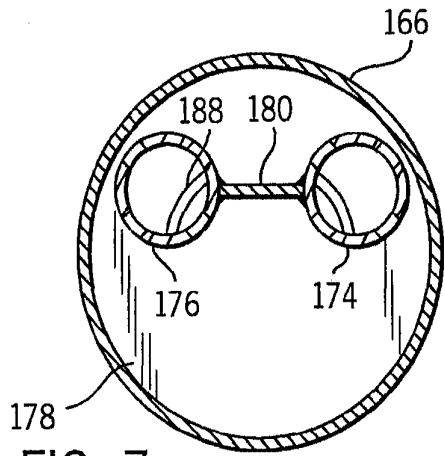


FIG. 7

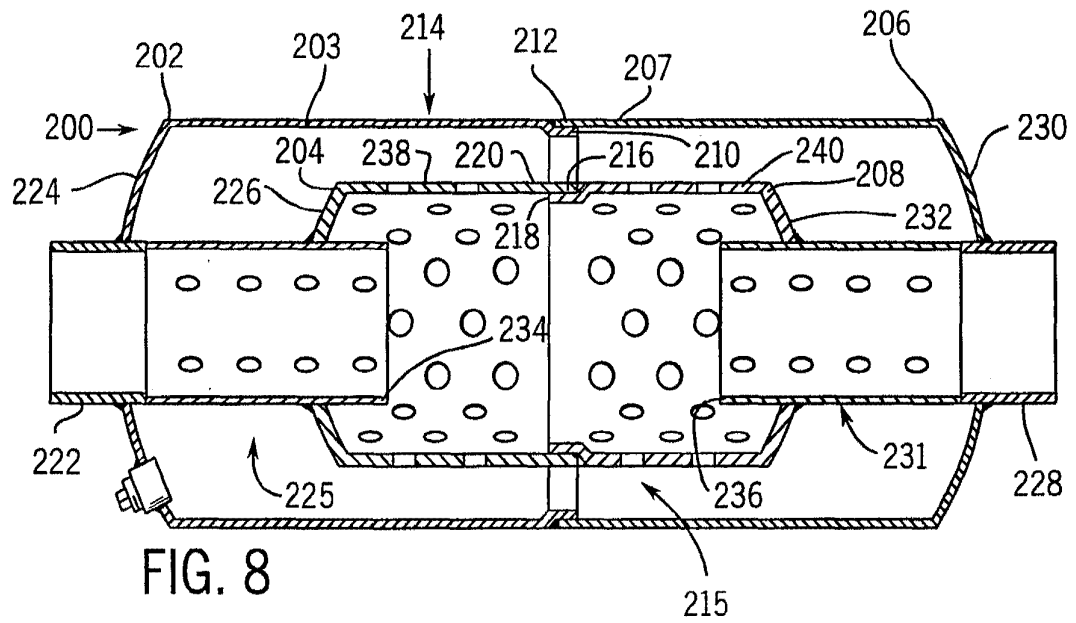


FIG. 8

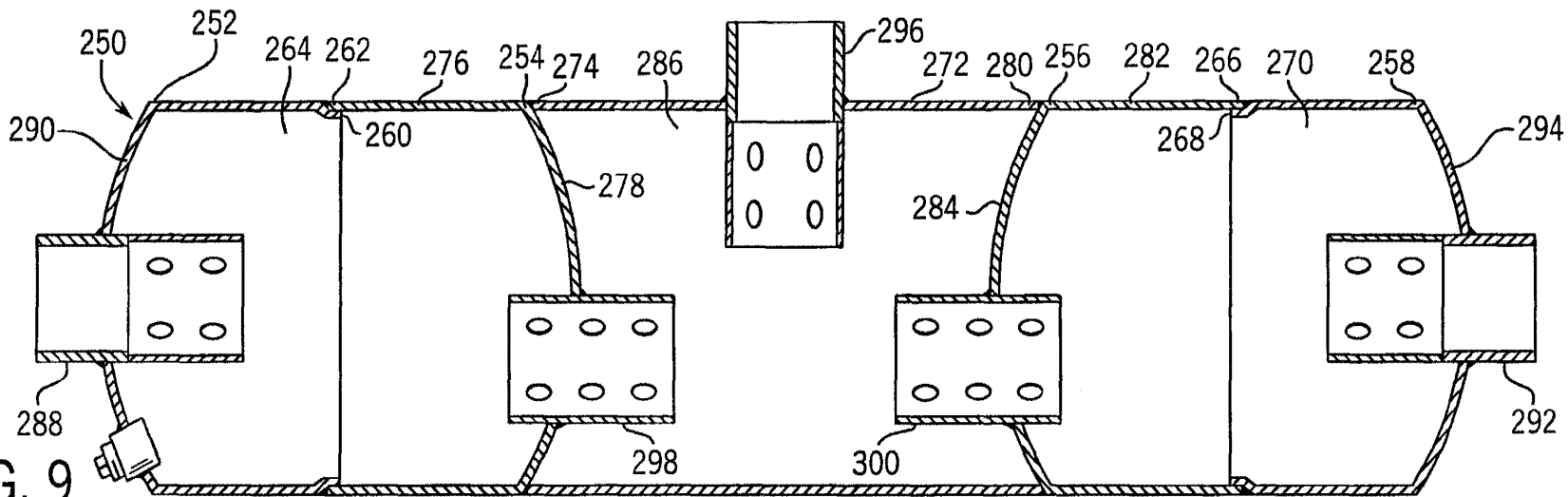


FIG. 9

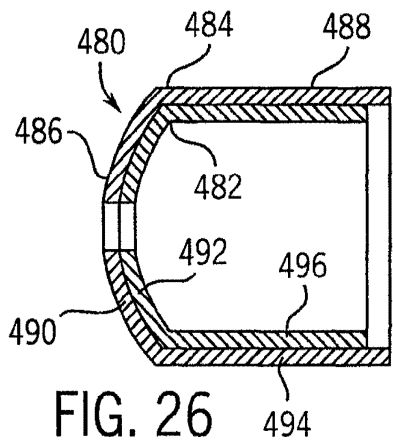


FIG. 26

5 / 13

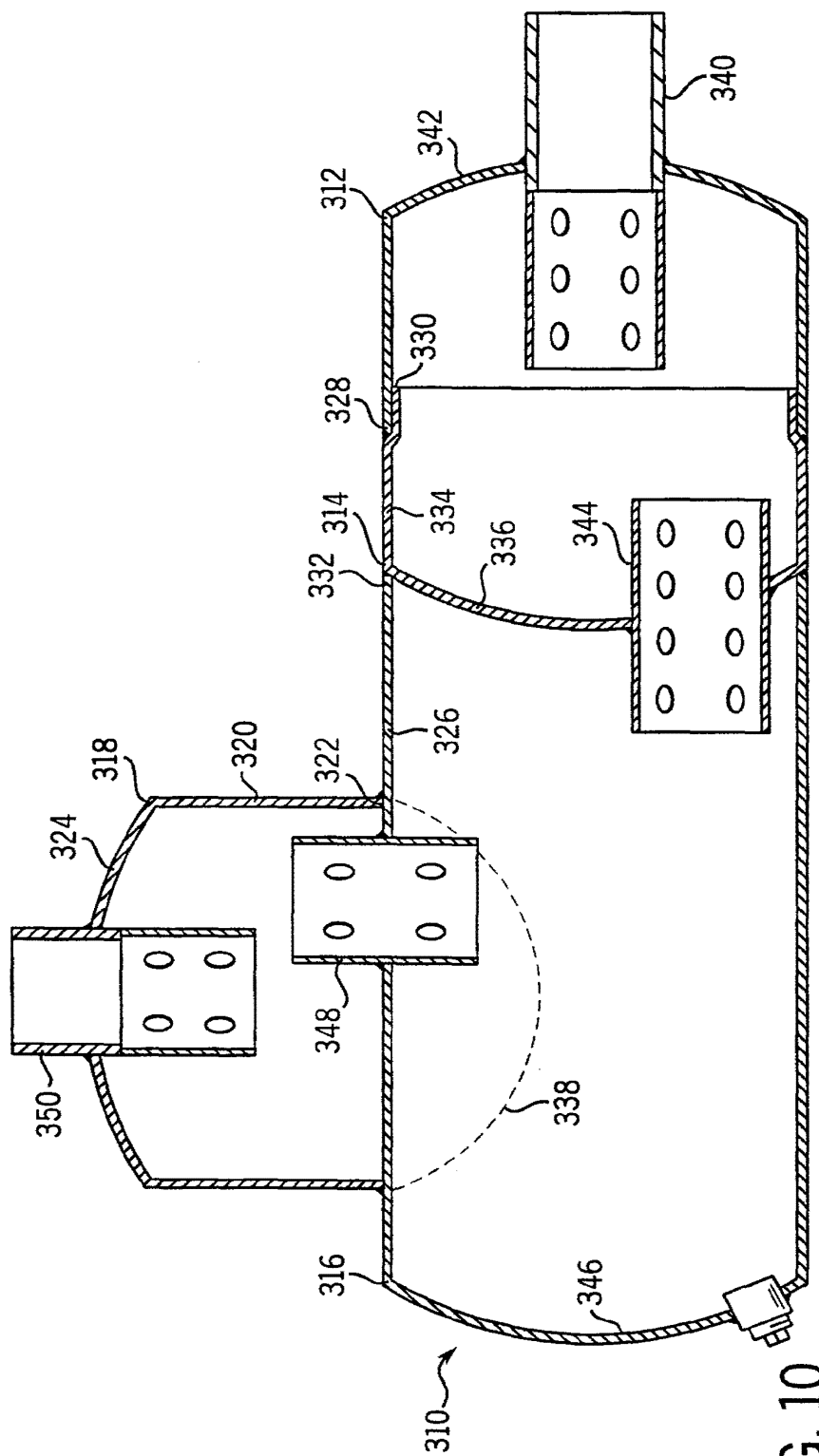


FIG. 10

6 / 13

FIG. 11

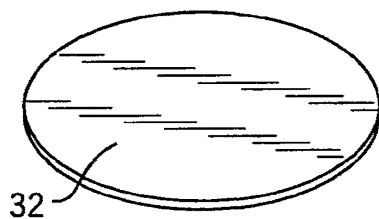


FIG. 12

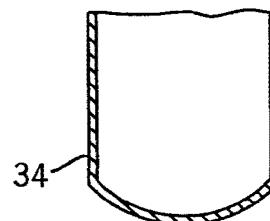


FIG. 13

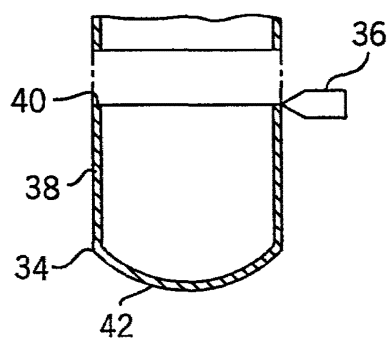


FIG. 14

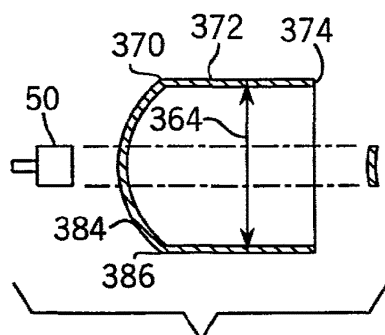
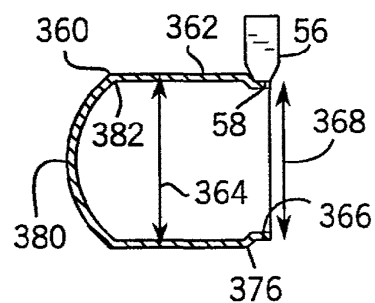
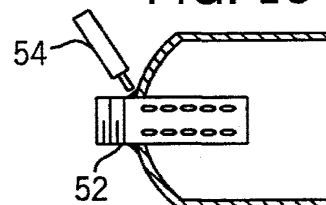


FIG. 15

FIG. 16



7 / 13

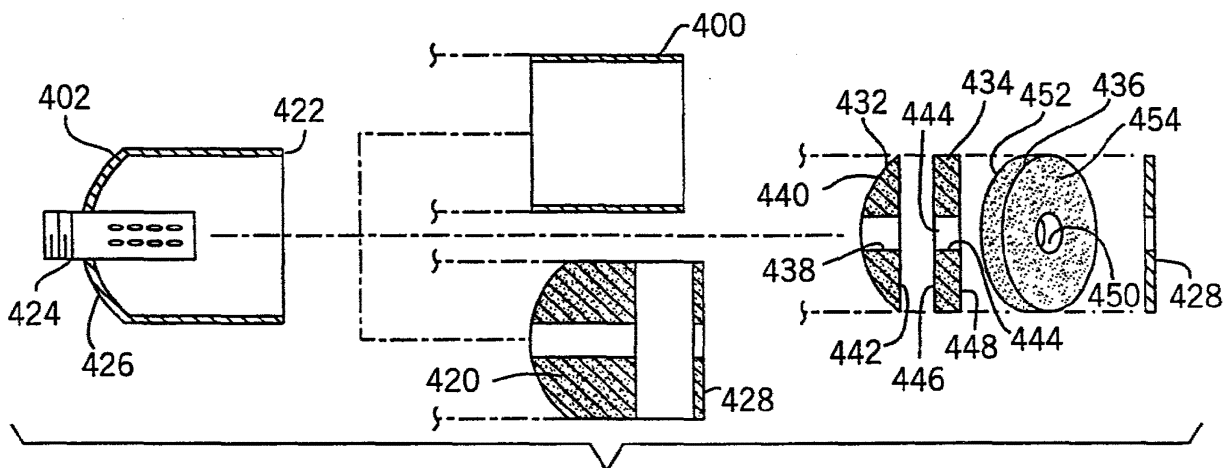


FIG. 17

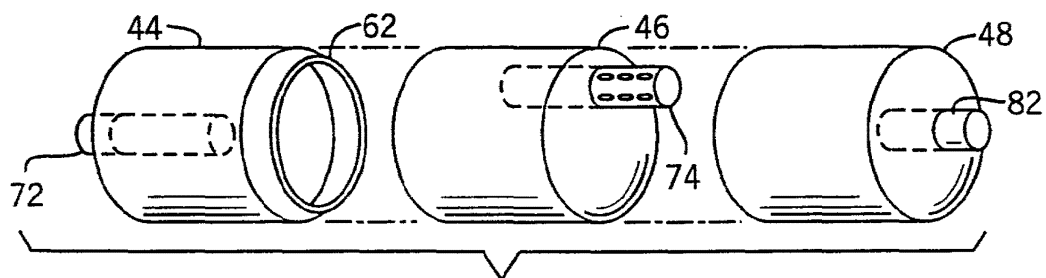


FIG. 24

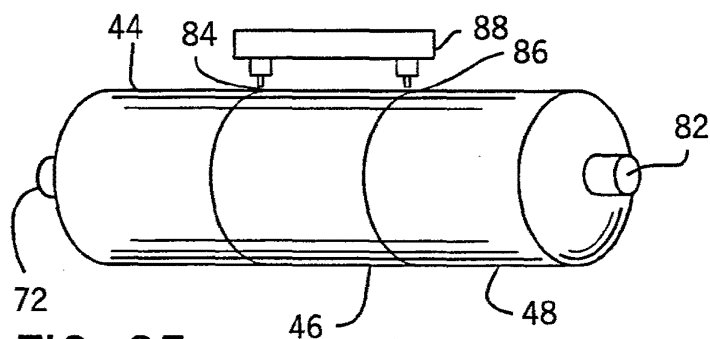


FIG. 25

8 / 13
FIG. 19

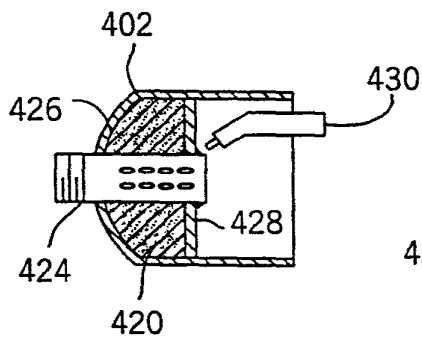
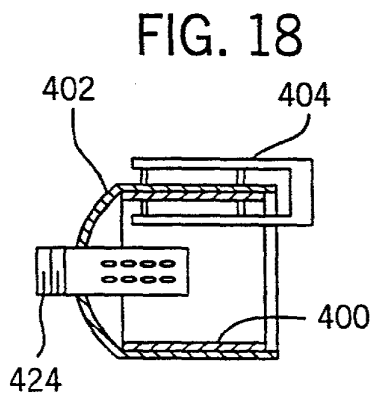


FIG. 20

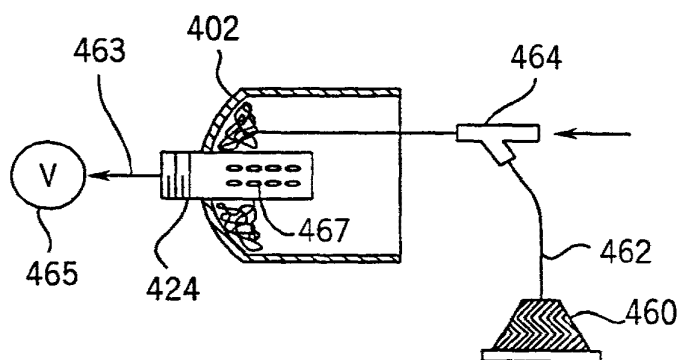
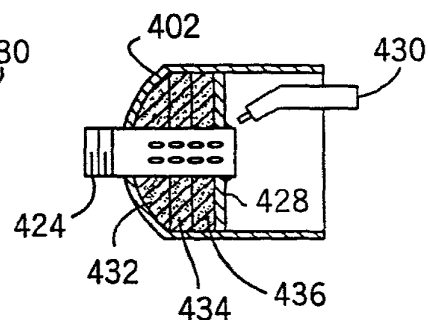


FIG. 21

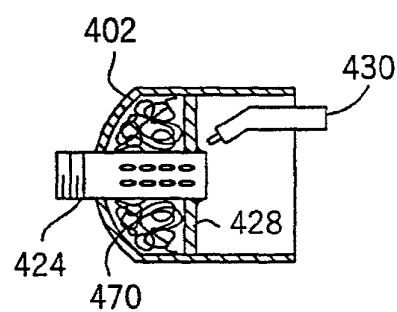


FIG. 23

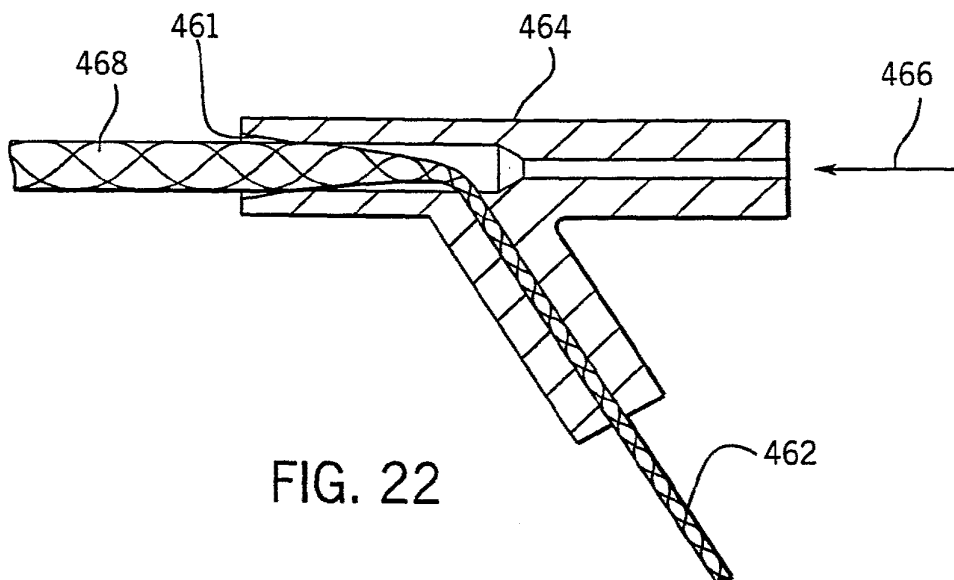
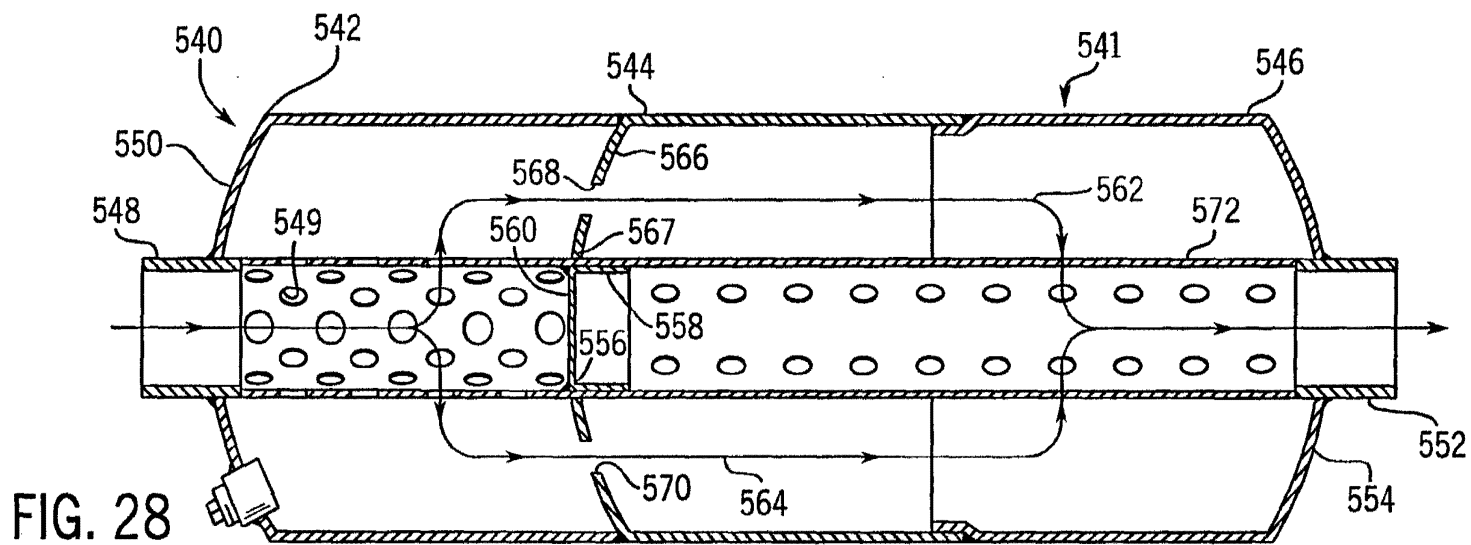
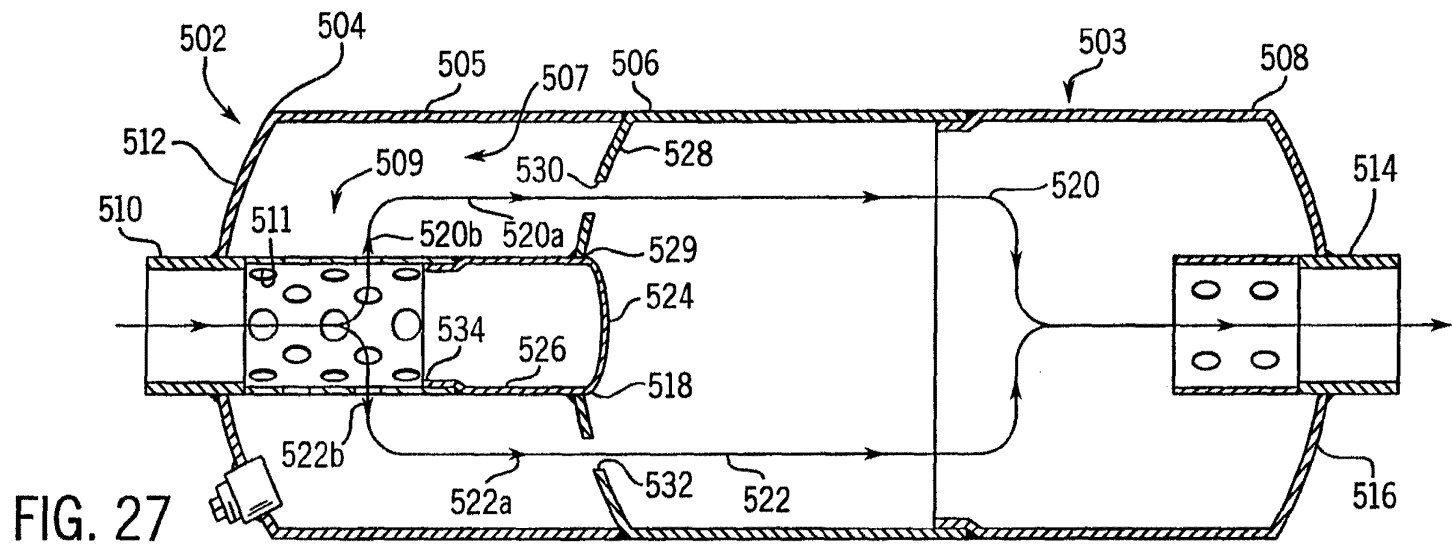


FIG. 22



10 / 13

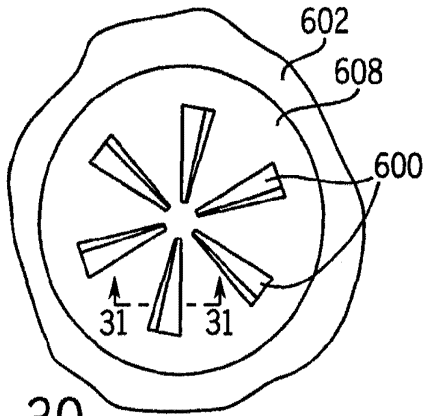


FIG. 30

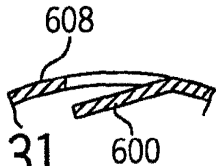


FIG. 31

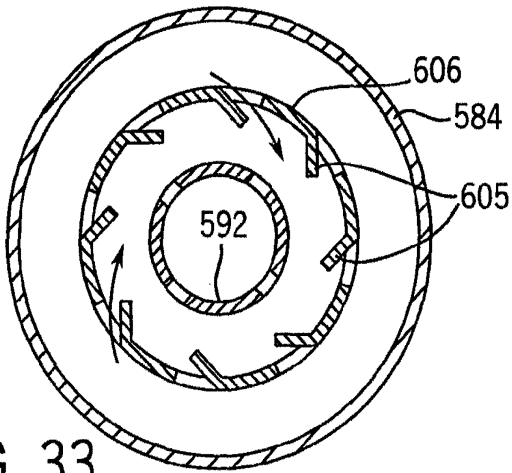


FIG. 33

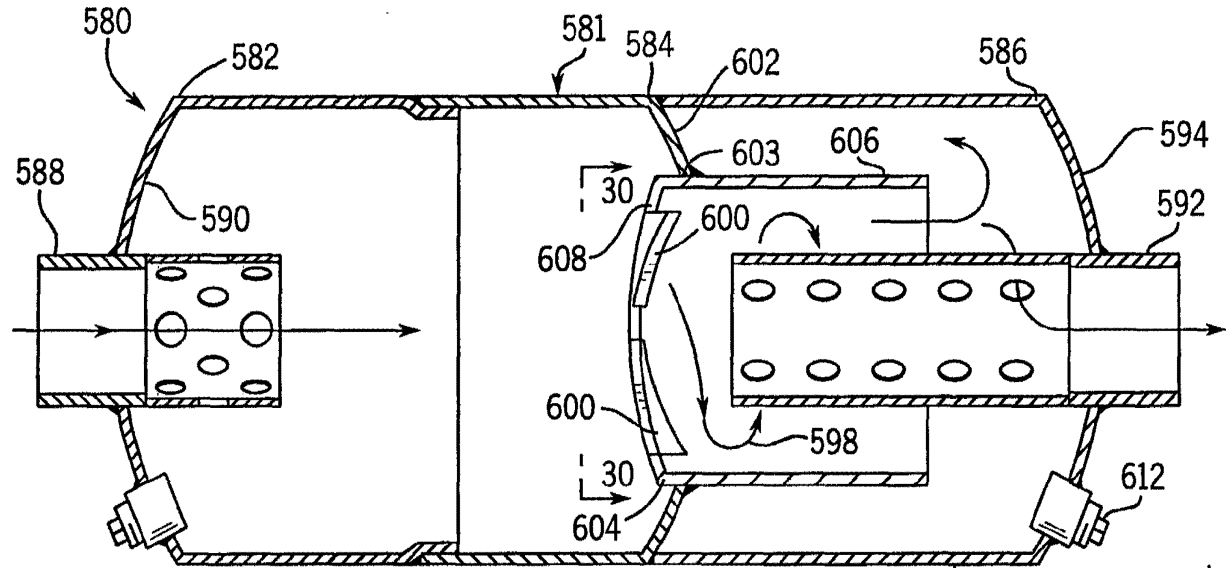


FIG. 29

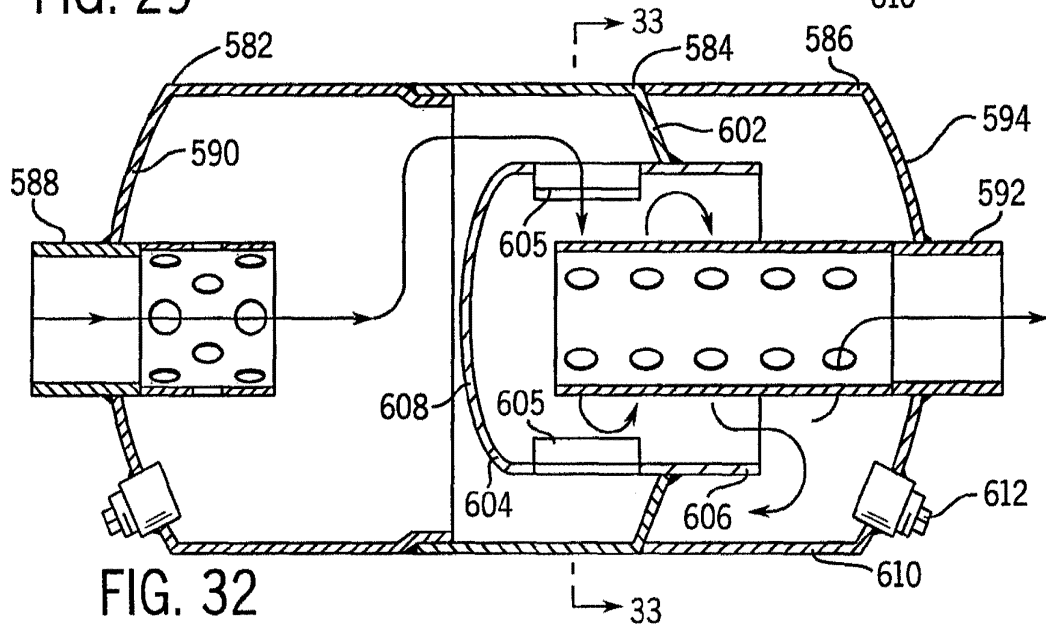
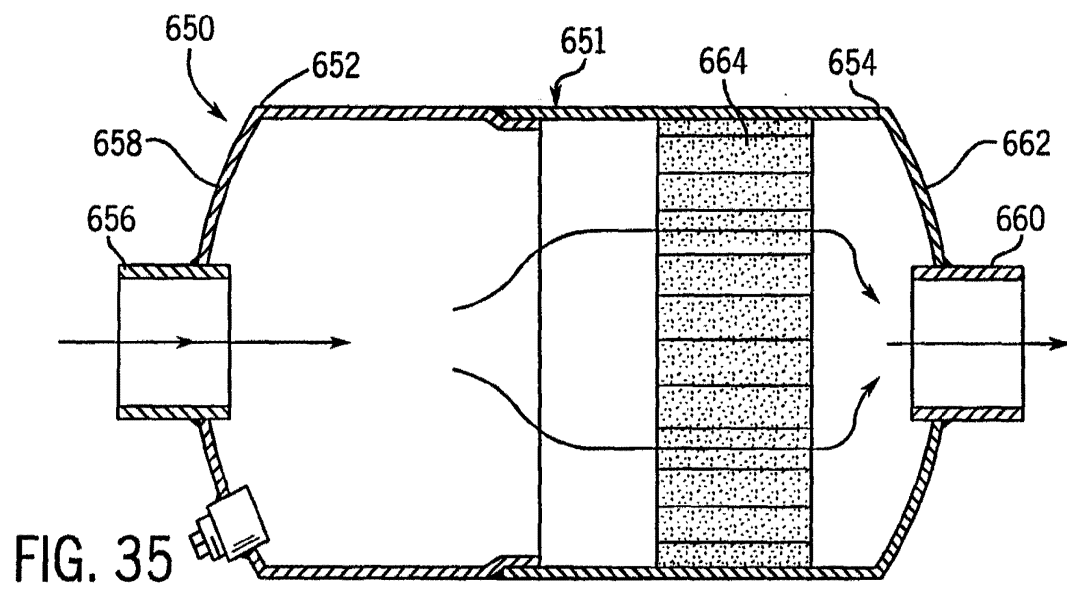
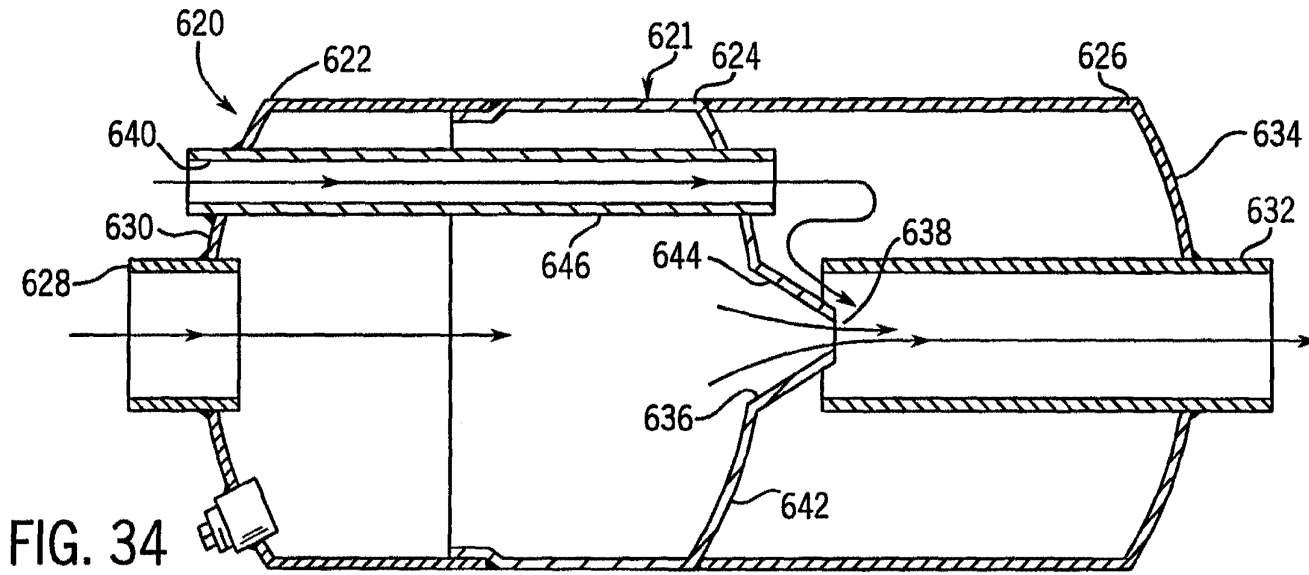


FIG. 32



12 / 13

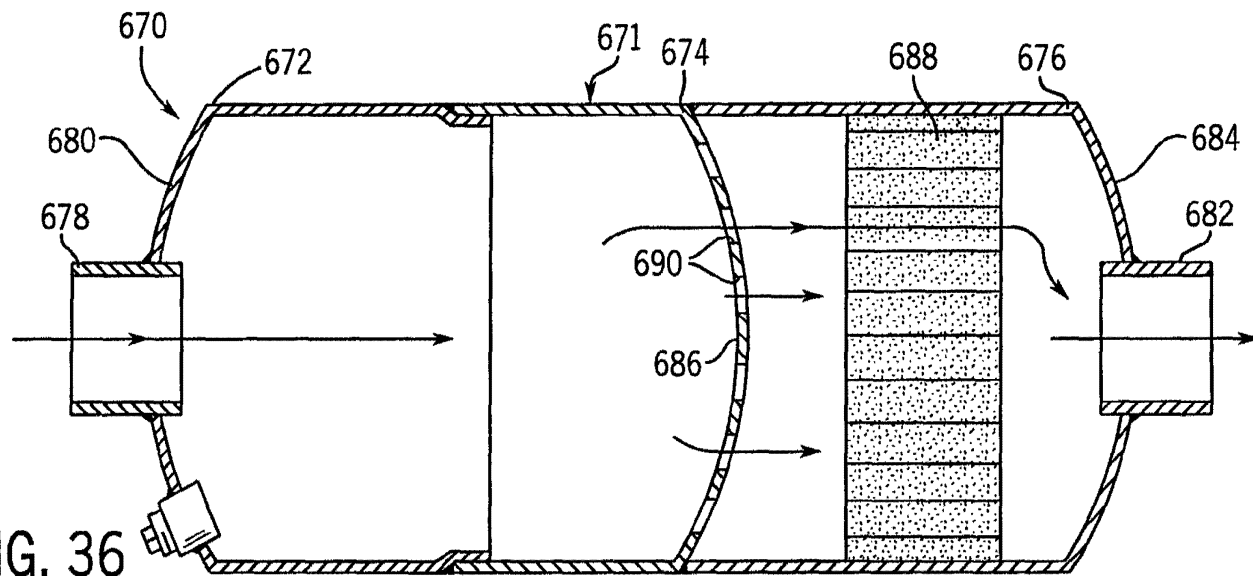


FIG. 36

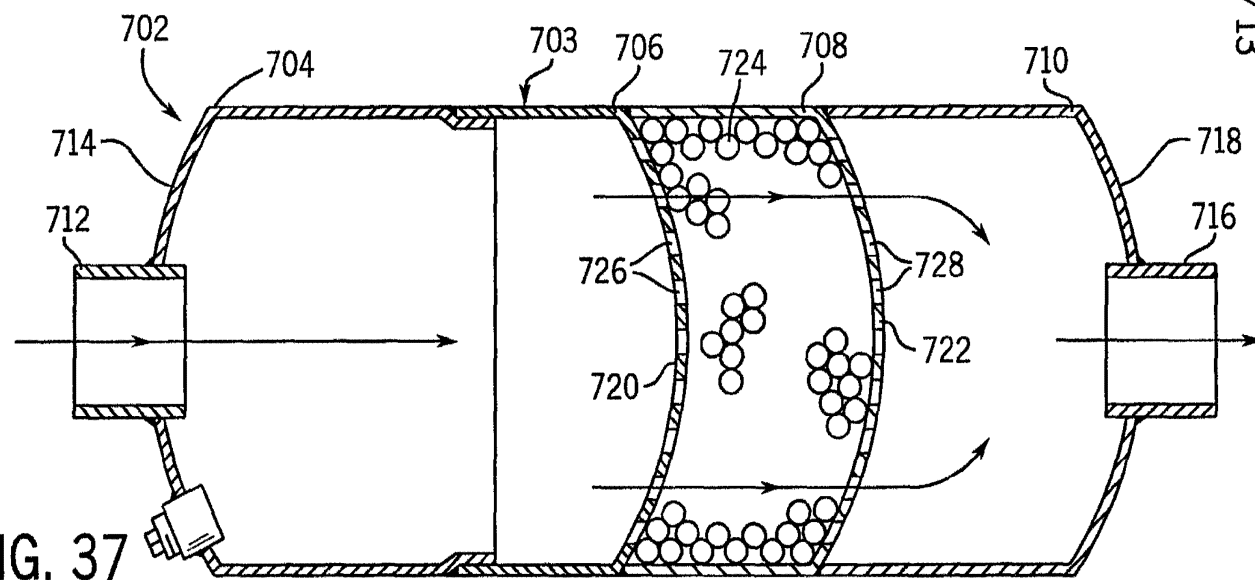
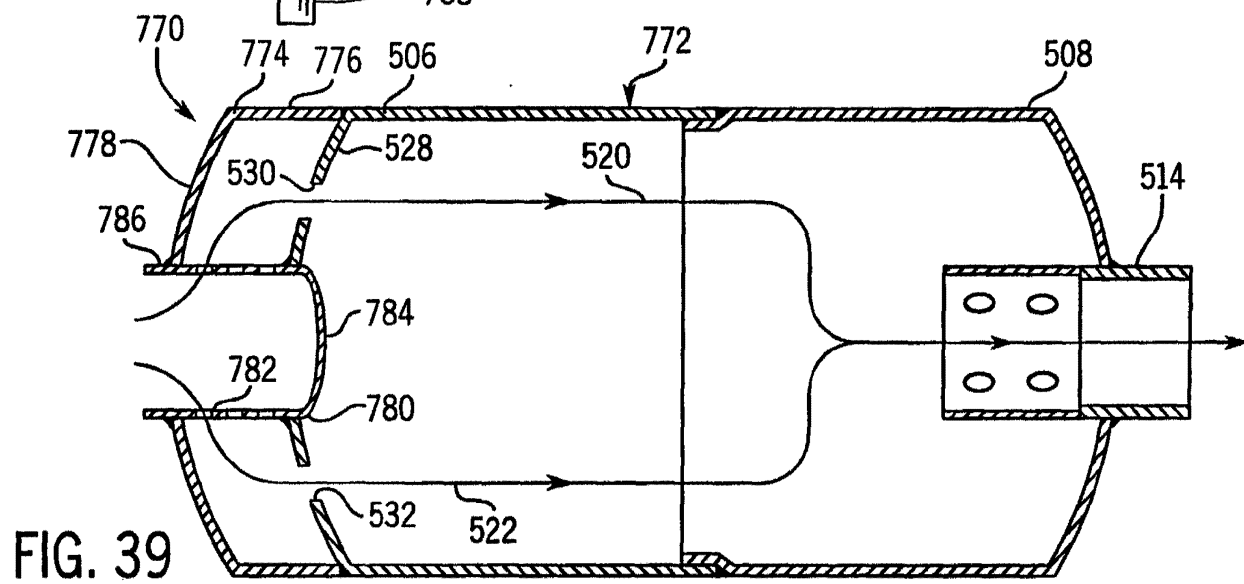
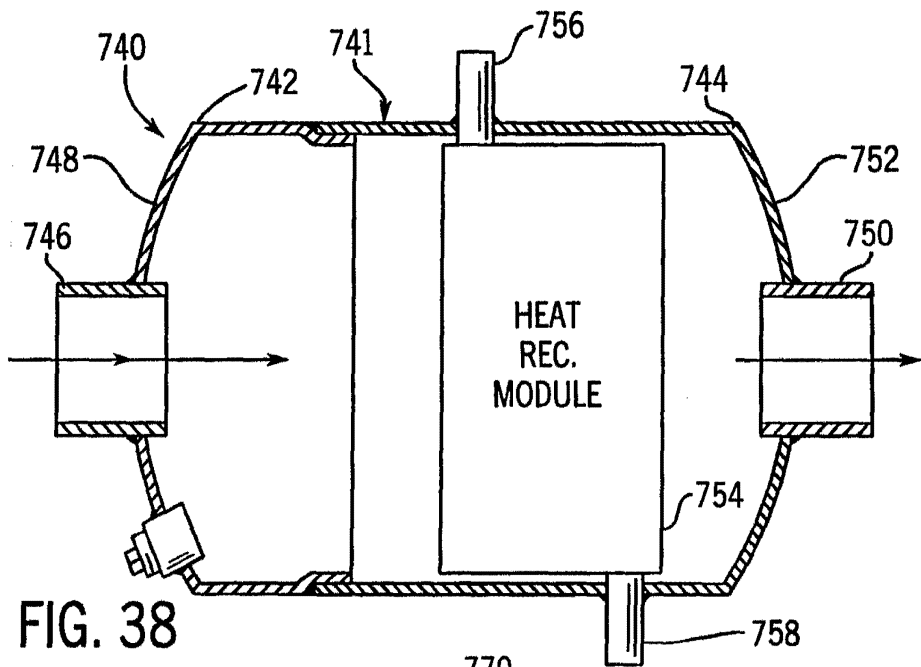


FIG. 37



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/13451

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :F01N 7/18

US CL :181/282

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 181/243, 255, 269, 272, 282

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2,107,588 A (SMITH) 08 February 1938 (08.02.38), see entire document	1-105
A	US 4,172,508 A (MOSS et al.) 30 October 1979 (30.10.79), see entire document	1-105
A	US 3,827,531 A (HANSEN) 06 August 1974 (06.08.74), see entire document	1-105
A	US 4,102,430 A (WILSON) 25 July 1978 (25.07.78) see entire document	1-105



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:		"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier document published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"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		

Date of the actual completion of the international search

27 OCTOBER 1998

Date of mailing of the international search report

29 DEC 1998

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

Khanh Dang

Telephone No. (703) 308-0211

Electronic Acknowledgement Receipt

EFS ID:	10165522
Application Number:	13025989
International Application Number:	
Confirmation Number:	3886
Title of Invention:	Energy Capture and Control Device
First Named Inventor/Applicant Name:	Russell Oliver
Customer Number:	20551
Filer:	Erik Sun Ericksen/Eileen Fuessel
Filer Authorized By:	Erik Sun Ericksen
Attorney Docket Number:	3212-002.NP4
Receipt Date:	25-MAY-2011
Filing Date:	11-FEB-2011
Time Stamp:	13:03:16
Application Type:	Utility under 35 USC 111(a)

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		ids.pdf	350518 9212508b1ef46cf661d59be0774852271f555ed9	yes	7

	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal Letter		1	4	
	Information Disclosure Statement (IDS) Filed (SB/08)		5	7	
Warnings:					
Information:					
2	Foreign Reference	743111.pdf	197371	no	3
			9d429003f02d4b5c84e25295bfcfb6bd61a68c0c		
Warnings:					
Information:					
3	Foreign Reference	gb2287780.pdf	527265	no	16
			7cbcdc96fa195ab991611401bb5e4a095f935e71		
Warnings:					
Information:					
4	Foreign Reference	gb2288007.pdf	800412	no	25
			639e8208654ffb3f451846785d87d1ce03a34767		
Warnings:					
Information:					
5	Foreign Reference	WO9902826A1.pdf	2196463	no	45
			6f628d2b419374c4bed49396ea8e3d716e678497		
Warnings:					
Information:					
6	NPL Documents	jbu.pdf	126703	no	3
			f6972c6d03aceec113ec9f60b6a93e85afc8d4df		
Warnings:					
Information:					
7	NPL Documents	suppressor.pdf	1141719	no	14
			560b31b5a957011631f8e08eb10254ffe8323e0f		
Warnings:					
Information:					
Total Files Size (in bytes):			5340451		

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.

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

ART UNIT: 2855	<u>CERTIFICATE OF MAILING</u> <u>UNDER 37 C.F.R. § 1.8</u> DATE OF DEPOSIT: <u>May 25, 2011</u> I hereby certify that this paper or fee (along with any paper or fee referred to as being attached or enclosed) is being submitted on the date indicated above via: ☒ EFS Web ☐ facsimile to _____ ☐ the United States Postal Service with sufficient postage as first class mail addressed to: Mail Stop _____, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450. _____ /eriksericksen/ Erik S. Ericksen
EXAMINER: To Be Determined	
FIRST NAMED INVENTOR: Russell Oliver	
SERIAL NO.: 13/025,989	
FILED: 2/11/2011	
CONF. NO.: 3886	
FOR: ENERGY CAPTURE AND CONTROL DEVICE	
DOCKET NO.: 3212-002.NP4	

**INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. §§ 1.56, 1.97 and 1.98**

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

Dear Sir/Madam:

Pursuant to the duty of disclosure under 37 C.F.R. §§ 1.56, 1.97 and 1.98, the Applicant requests consideration of this Information Disclosure Statement, which is being submitted in accordance with:

- ☒ 37 C.F.R. § 1.97(b)(1) or (3), within three months of the filing date of the application, or before a first office action on the merits, whichever occurs last;
- ☐ 37 C.F.R. § 1.97(c), after a first office action on the merits, but before a Final Office Action or a Notice of Allowance, whichever occurs first, and is accompanied by **EITHER** a statement in accordance with 37 C.F.R. § 1.97(e), **OR** the fee set forth in 37 C.F.R. § 1.17(p); or
- ☐ 37 C.F.R. § 1.97(d), after a Final Office Action or Notice of Allowance, whichever occurs first, but on or before payment of the issue fee, and is accompanied by **BOTH** a statement

in accordance with 37 C.F.R. § 1.97(e), **AND** the fee set forth in 37 C.F.R. § 1.17(p).

SUBMISSIONS

Please find enclosed, pursuant to 37 C.F.R. §§ 1.97 and 1.98:

- ☒ Form **PTO/SB/08A** and/or **PTO/SB/08B** listing the references submitted for consideration, which contains a list of all patents, publications and all other items that have come to the attention of one or more of the individuals designated in 37 C.F.R. § 1.56(c).
- ☒ Legible copies of the listed non-patent documents, unpublished U.S. applications and foreign documents or their relevant portions are included.
- ☐ All English translations of each non-English reference, if any, within the possession, custody, control or availability of anyone designated in 37 C.F.R. § 1.56(c) (see 37 C.F.R. § 1.98 are included).
- ☐ For all listed references that are not either in the English language, or accompanied by a translation into English, a concise explanation of relevance as required under 37 C.F.R. § 1.98(a)(3) is enclosed attached to each.

Copies of references listed on the enclosed PTO/SB/08A and/or PTO/SB/08B are **not** enclosed:

- ☐ because, under 37 C.F.R. § 1.98.(d), they were previously cited by or submitted to the Office in application number _____, which is relied upon for an earlier filing date under 37 C.F.R. § 1.20.
- ☐ because they are substantially cumulative of an enclosed reference.

STATEMENT IN ACCORDANCE WITH 37 C.F.R. § 1.97(e)

☐ I hereby certify that each item contained in the information disclosure statement was first cited in a 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.

☐ I hereby certify that no item 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 §1.56(c) more than three months prior to the filing of the information disclosure statement.

REMARKS

While no representation is made that any of these references may be “prior art” within the meaning of that term in accordance with 37 C.F.R. §§ 102 or 103, the enclosed list of references is disclosed so as to comply with the duty of disclosure set forth in 37 C.F.R. § 1.56.

Moreover, while no representation is made that a specific search of office files or patent office records has been conducted or that no better art exists, the undersigned attorney of record believes that the references listed, together with any other references which may have been previously submitted or listed, are the closest to the claimed invention (taken in its entirety) of which the undersigned is presently aware, and no art which is closer to the claimed invention (taken in its entirety) has been knowingly withheld.

☐ Check No. ____ in the amount of \$ ____ (amount in § 1.17(p)) constituting the submission fee set forth in 37 C.F.R. § 1.17(p) is enclosed.

In the event that 37 C.F.R. § 1.97(c) applies and the Examiner is not satisfied that the Statement meets the requirements of 37 C.F.R. § 1.97(e), or in any other event remediable by a fee, please credit any

over payment or charge any additional fees to Deposit Account No. 20-0100 of the undersigned.

Dated this 25th day of May, 2011.

Respectfully submitted,

/eriksericksen/

Erik S. Ericksen, M.S.
Attorney for Applicant
Registration No. 48954

THORPE NORTH & WESTERN, LLP
Customer No. 20,551
P.O. Box 1219
Sandy, Utah 84091-1219
Telephone: (801) 566-6633

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 13/025,989	
APPLICATION AS FILED - PART I							
(Column 1)		(Column 2)		SMALL ENTITY		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	82		N/A	
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	270		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))	20	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			
			TOTAL	462		TOTAL	
* If the difference in column 1 is less than zero, enter "0" in column 2.							
APPLICATION AS AMENDED - PART II							
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	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		OR	TOTAL ADD'L FEE
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	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		OR	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.							



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
13/025,989	02/11/2011	Russell Oliver	3212-002.NP4

20551
THORPE NORTH & WESTERN, LLP.
P.O. Box 1219
SANDY, UT 84091-1219

CONFIRMATION NO. 3886
POA ACCEPTANCE LETTER



Date Mailed: 02/25/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/11/2011.

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.

/yli/

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



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
13/025,989	02/11/2011	2855	462	3212-002.NP4	20	3

CONFIRMATION NO. 3886

20551
THORPE NORTH & WESTERN, LLP.
P.O. Box 1219
SANDY, UT 84091-1219

FILING RECEIPT



Date Mailed: 02/25/2011

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)

Russell Oliver, Sandy, UT;

Assignment For Published Patent Application

OS Inc.

Power of Attorney: The patent practitioners associated with Customer Number 20551

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/303,553 02/11/2010
and claims benefit of 61/418,285 11/30/2010

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.)

If Required, Foreign Filing License Granted: 02/23/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/025,989**

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

**** SMALL ENTITY ****

Title

Energy Capture and Control Device

Preliminary Class

073

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).

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.

**UTILITY
PATENT APPLICATION
TRANSMITTAL**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	3212-002.NP4
First Inventor	Russell Oliver
Title	Energy Capture and Control Device
Express Mail Label No.	Electronically Filed

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ **Fee Transmittal Form** (e.g., PTO/SB/17)
2. ☒ **Applicant claims small entity status.**
See 37 CFR 1.27.
3. ☒ **Specification** [Total Pages 21]
Both the claims and abstract must start on a new page
(For information on the preferred arrangement, see MPEP 608.01(a))
4. ☒ **Drawing(s)** (35 U.S.C. 113) [Total Sheets 10]
5. **Oath or Declaration** [Total Sheets 2]
 - a. ☒ Newly executed (original or copy)
 - b. ☐ A copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 18 completed)
 - i. ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s)
name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☒ **Application Data Sheet.** See 37 CFR 1.76
7. ☐ **CD-ROM or CD-R** in duplicate, large table or
Computer Program (Appendix)
☐ Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission**
(if applicable, items a. – c. are required)
 - a. ☐ Computer Readable Form (CRF)
 - b. ☐ Specification Sequence Listing on:
 - i. ☐ CD-ROM or CD-R (2 copies); or
 - ii. ☐ Paper
 - c. ☐ Statements verifying identity of above copies

ADDRESS TO:
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450
ACCOMPANYING APPLICATION PARTS

9. ☒ **Assignment Papers** (cover sheet & document(s))
Name of Assignee OS Inc.
10. ☐ **37 CFR 3.73(b) Statement** (when there is an assignee) ☒ **Power of Attorney**
11. ☐ **English Translation Document** (if applicable)
12. ☐ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
☐ Copies of citations attached
13. ☐ **Preliminary Amendment**
14. ☐ **Return Receipt Postcard** (MPEP 503)
(Should be specifically itemized)
15. ☐ **Certified Copy of Priority Document(s)**
(if foreign priority is claimed)
16. ☒ **Nonpublication Request** under 35 U.S.C. 122(b)(2)(B)(i).
Applicant must attach form PTO/SB/35 or equivalent.
17. ☒ Other: Petition to Make Special

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.:

Prior application information: Examiner: Art Unit:

19. CORRESPONDENCE ADDRESS
☒ The address associated with Customer Number: 20,551 OR ☐ Correspondence address below

Name

Address

City

State

Zip Code

Country

Telephone

Email

Signature

/eriksericksen/

Date

February 11, 2011

Name

(Print/Type)

Erik S. Ericksen, M.S.

Registration No.

(Attorney/Agent)

48954

This collection of information is required by 37 CFR 1.53(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.

APPLICATION DATA SHEET

Under 37 CFR §1.76

Sheet of

Section 1 APPLICANT INFORMATION

☐see continuation sheet(s)
for more applicants

Given Name(s)	Family Name or Surname	Residence (City & State or Country)	Mailing Address	Citizenship	Inventor ✓
Russell	Oliver	Sandy, UT	545 West 9460 South Sandy, UT 84070	US	☒
					☐
					☐
					☐

Any applicant which is not an inventor claims authority to apply on behalf of the inventor(s) for the reason(s) listed below:

Section 2 CORRESPONDENCE INFORMATION

Please address all correspondence to

at the address associated with Customer Number:

20,551

Section 3 APPLICATION INFORMATION

Application No.:

Filing Date:

February 11, 2011

Title

Attorney Docket No.:

3212-002.NP4

Energy Capture and Control Device

Type of Application:

Utility

Drawings, total # sheets:

10

Designated Fig. for Publication:

Suggested Class & Subclass:

For plant applications:

Technology Center:

Latin Genus:

Latin Species:

Variety Denomination:

Does this application disclose any significant part of the subject matter of an application under a secrecy order pursuant to 37 CFR §5.2? ☐ Yes ☒ No

Section 4 REPRESENTATIVE INFORMATION

Applicant is represented by the attorneys and patent agents associated with Customer Number:

20,551

Section 5 DOMESTIC PRIORITY INFORMATION

☐see continuation sheet(s)
for more priority information

This application	claims benefit	of App. No. 61/303,553	filed 02/11/2010	with current status of: pending
App. No. and	claims benefit	of App. No. 61/418,285	filed 11/30/2010	with current status of: pending
App. No. *	*	of App. No. *	filed *	with current status of: *

Section 6 FOREIGN PRIORITY INFORMATION

☐see continuation sheet(s)
for more priority information

Country: *	Application No.: *	Filing Date: *
Country: *	Application No.: *	Filing Date: *
Country: *	Application No.: *	Filing Date: *

Section 7 ASSIGNEE INFORMATION

Name:	Mailing Address:
Date Submitted: February 11, 2011	By: Erik S. Ericksen, M.S.

**NONPUBLICATION REQUEST
UNDER
35 U.S.C. 122(b)(2)(B)(i)**

First Named Inventor

Russell Oliver

Title

Energy Capture and Control Device

Attorney Docket Number

3212-002.NP4

I hereby 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.

I hereby request that the attached application not be published under 35 U.S.C. 122(b).

/eriksericksen/

February 11, 2011

Signature

Date

Erik S. Ericksen, M.S.

48954

Typed or printed name

Registration Number, if applicable

(801) 566-6633

Telephone Number

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application **upon filing**.

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant **must** notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. **Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).**

This collection of information is required by 37 CFR 1.213(a). 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 6 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 (1-800-786-9199) and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

ART UNIT:	
EXAMINER:	
FIRST NAMED INVENTOR:	Russell Oliver
SERIAL NO.:	
FILED:	February 11, 2011
CONF. NO.:	
FOR:	ENERGY CAPTURE AND CONTROL DEVICE
DOCKET NO.:	3212-002.NP4

CERTIFICATE OF MAILING
UNDER 37 C.F.R. § 1.8

DATE OF DEPOSIT: February 11 2011

I hereby certify that this paper or fee (along with any paper or fee referred to as being attached or enclosed) is being deposited with the United States Postal Service with sufficient postage as first class mail on the date indicated above and is addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

/Marla E. Howlett/

Marla E. Howlett

PETITION TO MAKE SPECIAL UNDER 37 C.F.R. § 1.102(C)

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

Dear Sir:

Pursuant to 37 C.F.R. § 1.102(c), Applicant hereby submits this petition to make special the non-provisional patent application filed herewith. Special status is sought because the invention materially contributes to countering terrorism. As such, no fee is being submitted.

Applicant respectfully requests that this petition be granted.

Dated this 11th day of February, 2011.

Respectfully submitted,

THORPE NORTH & WESTERN, LLP

/eriksericksen/

Erik S. Ericksen, M.S.
Attorney for Applicant
Registration No. 48954
8180 S. 700 E., Suite 350
Sandy, Utah 84070
(801) 566-6633 Telephone
(801) 566-6673 Facsimile

EE/mh

UNITED STATES PATENT APPLICATION

of

Russell Oliver

for

ENERGY CAPTURE AND CONTROL DEVICE

THORPE, NORTH & WESTERN, LLP

ATTORNEYS AT LAW

8180 SOUTH 700 EAST, SUITE 350, SANDY, UTAH 84070

801.566.6633 TELEPHONE

801.566.0750 FACSIMILE

ENERGY CAPTURE AND CONTROL DEVICE

RELATED APPLICATIONS

Priority is claimed to United States Provisional Patent Application Serial No. 61/303,553, filed on February 11, 2010, and United States Provisional Patent Application Serial No. 61/418,285, filed November 30, 2010, which are each hereby incorporated herein by reference.

BACKGROUND

High energy sources can produce undesirable levels of acoustic noise and/or particulate pollution. Frequent exposure to high levels of acoustic noise can cause permanent or temporary hearing loss. Furthermore, in the case of firearms discharge, such acoustic noise can also provide information as to location of a shooter.

In many counter-terrorism efforts, snipers will attempt to conceal their location from terrorists and others using various sound suppression devices. However, muzzle blast, projectile shock waves, and particulate discharge associated with firing a weapon can enable terrorists to determine a range and direction of the sniper. For example, where both blast and shock waves can be detected and properly processed, existing technologies can enable terrorists to determine the direction and range of incident fire without even having to survey and look for sources of fire. Projectile speeds, trajectories, miss distances, and so forth can also be used as input to determine a position of a sniper.

In the field of firearm sound suppression, basic sound suppression technology has varied only modestly over the past hundred years. However, as described above, terrorists' ability to pinpoint a sniper's location has increased dramatically. The possession of such technology by terrorist cells can substantially undermine counter-terrorism efforts.

Generally, sound suppression designs are based on internal baffles which direct gases into vortices or other flow patterns with optional expansion chambers. Although these designs provide suppression of sound from firearm discharge, there is still a substantial decibel level produced when using these devices. Those designs which reduce

sounds to a higher degree also tend to have a lower useful lifespan. Many of the current high-end designs utilize a sound absorbing fluid such as oil or water in the device. Such fluids must be periodically replaced (e.g. every few shots) and can be vaporized and distributed into the air upon discharge of the firearm. Therefore, despite some
5 advantageous performance of these devices, many challenges still remain in achieving a long service life suppressor with low maintenance requirements and high acoustic suppression performance.

BRIEF DESCRIPTION OF THE DRAWINGS

10 FIG. 1a is a cross-sectional side view of a device having multiple concentric tubes, a helical wall, and series of deflectors in accordance with an example of the present technology;

FIG. 1b is a cross-sectional end view of the device of FIG. 1a;

15 FIG. 2 is a perspective view of an innermost tube having apertures to allow fluids to flow from the central chamber into the off axis chamber in accordance with an example of the present technology;

FIG. 3a is a perspective view of a locking block having a tapered throat portion in accordance with an example of the present technology;

20 FIG. 3b is a cross-sectional side view of the locking block of FIG. 3a;

FIG. 4a is a perspective view of a locking block having a tapered throat portion with an intermediate throat portion in accordance with an example of the present technology;

FIG. 4b is a cross-sectional side view of the locking block of FIG. 4a;

25 FIG. 5a is a perspective view of a primary chamber in accordance with an example of the present technology;

FIG. 5b is a cross-sectional side view of the primary chamber of FIG. 5a;

FIG. 6a is a perspective view of a primary chamber in accordance with an example of the present technology;

30 FIG. 6b is a cross-sectional side view of the primary chamber of FIG. 6a;

FIG. 7a is a perspective view of a primary chamber in accordance with an example of the present technology;

FIG. 7b is a cross-sectional side view of the primary chamber of FIG. 7a;

FIG. 8a is an end view of a tube cap in accordance with an example of the present technology;

FIG. 8b is a perspective view of the tube cap of FIG. 8a;

FIG. 9a is an end view of an end cap in accordance with an example of the present technology;

FIG. 9b is a perspective view of the end cap of FIG. 9a;

FIG. 10a is an end view of a helical wall in accordance with an example of the present technology;

FIG. 10b is a side view of a single revolution helical wall in accordance with an example of the present technology;

FIG. 11 is a side view of a two revolution helical wall in accordance with an example of the present technology;

FIG. 12 is a side view of a three revolution helical wall in accordance with an example of the present technology;

FIG. 13 is a side view of a four revolution helical wall in accordance with an example of the present technology;

FIG. 14 is an exploded perspective view of a device having concentric incomplete cylinders which are offset in accordance with an example of the present technology;

FIG. 15 is a cross-sectional side view of a particulate capture module in accordance with an example of the present technology;

FIG. 16 is a perspective view of a device within an outer shell having longitudinal chambers which are each off set from the central axis in accordance with an example of the present technology; and

FIG. 17 is a flow diagram of a method for energy capture and control from a high energy device in accordance with an example of the present technology.

These figures are provided for convenience in describing the following aspects. In particular, variation may be had in dimensions, materials, configurations and proportions from those illustrated and not depart from the scope of the invention.

DETAILED DESCRIPTION

While these exemplary embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, it should be understood that other embodiments may be realized and that various changes to the invention may be made without departing from the spirit and scope of the present invention. Thus, the following more detailed description of the embodiments of the present invention is not intended to limit the scope of the invention, as claimed, but is presented for purposes of illustration only and not limitation to describe the features and characteristics of the present invention, to set forth the best mode of operation of the invention, and to sufficiently enable one skilled in the art to practice the invention. Accordingly, the scope of the present invention is to be defined solely by the appended claims.

Definitions

In describing and claiming the present invention, the following terminology will be used.

The singular forms “a,” “an,” and “the” include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to “a tube” includes reference to one or more of such members, and reference to “directing” refers to one or more such steps.

As used herein with respect to an identified property or circumstance, “substantially” refers to a degree of deviation that is sufficiently small so as to not measurably detract from the identified property or circumstance. The exact degree of deviation allowable may in some cases depend on the specific context.

As used herein, “adjacent” refers to the proximity of two structures or elements. Particularly, elements that are identified as being “adjacent” may be either abutting or connected. Such elements may also be near or close to each other without necessarily contacting each other. The exact degree of proximity may in some cases depend on the specific context.

As used herein, a plurality of items, structural elements, compositional elements, and/or materials may be presented in a common list for convenience. However, these lists

should be construed as though each member of the list is individually identified as a separate and unique member. Thus, no individual member of such list should be construed as a *de facto* equivalent of any other member of the same list solely based on their presentation in a common group without indications to the contrary.

Concentrations, amounts, and other numerical data may be presented herein in a range format. It is to be understood that such range format is used merely for convenience and brevity and should be interpreted flexibly to include not only the numerical values explicitly recited as the limits of the range, but also to include all the individual numerical values or sub-ranges encompassed within that range as if each numerical value and sub-range is explicitly recited. For example, a numerical range of about 1 to about 4.5 should be interpreted to include not only the explicitly recited limits of about 1 to about 4.5, but also to include individual numerals such as 2, 3, 4, and sub-ranges such as 1 to 3, 2 to 4, etc. The same principle applies to ranges reciting only one numerical value, such as “less than about 4.5,” which should be interpreted to include all of the above-recited values and ranges. Further, such an interpretation should apply regardless of the breadth of the range or the characteristic being described.

Any steps recited in any method or process claims may be executed in any order and are not limited to the order presented in the claims. Means-plus-function or step-plus-function limitations will only be employed where for a specific claim limitation all of the following conditions are present in that limitation: a) “means for” or “step for” is expressly recited; and b) a corresponding function is expressly recited. The structure, material or acts that support the means-plus function are expressly recited in the description herein. Accordingly, the scope of the invention should be determined solely by the appended claims and their legal equivalents, rather than by the descriptions and examples given herein.

Energy Capture and Control

In counter-terrorism operations, concealment of the location of firearm operators is critical to hostage rescue, terrorist apprehension, operations protection, dignitary and witness protection, intelligence gathering, and other operations. These missions are important to the successful defense of nations from terrorism. Effective energy capture and control devices for firearms can dramatically increase effectiveness and survivability of

counter terrorism special forces during such operations. Increased survivability in such scenarios can also improve operator confidence and performance, and decrease collateral costs associated with injuries to highly trained operators.

An energy capture and control device can comprise a central chamber oriented along a central axis within an outer shell. The central chamber can have an inlet configured to receive a high energy material from a high energy outlet. An off axis chamber can be oriented within the outer shell in fluid communication with the central chamber. The off axis chamber can have a fluid outlet and multiple internal walls configured to produce a serpentine fluid pathway which dissipates energy transferred from the high energy material.

As illustrated in FIG. 1a, the energy capture and control device 100 can include a plurality of deflectors 165, 170, 175 arranged within the central chamber. The central chamber can be oriented along a central axis within an outer shell 110. The deflectors can be arranged to enable passage of a high energy material therethrough while redirecting at least a portion of gases, sound/shock waves, and/or particulates into the off axis chamber.

The off axis chamber can include multiple internal walls 115, 120, 125, 130, 140, 145, 150, and/or 155 defining a serpentine or winding fluid pathway. The multiple internal walls can provide an increased volume for fluid expansion and increased acoustic absorbent path length. The fluid pathway can be an axially serpentine fluid pathway which causes fluids received in the off axis chamber to travel back and forth along a length of the off axis chamber. In another aspect, the fluid pathway can be a radially serpentine fluid pathway which causes the fluids received in the off axis chamber to flow back and forth around a radius of the off axis chamber. In another aspect, the fluid pathway can be a radially serpentine pathway which causes the fluids to flow back and forth around a radius of the off axis chamber while also traversing a length of the off axis chamber. In yet another aspect, the fluid pathway can be a helical fluid pathway which causes the fluids to spiral around the central chamber within the off axis chamber along a length of the off axis chamber. The various configurations can be integrated into various combinations as well to produce more complex flow paths.

Although the parts of the device can be formed of any suitable material, the central chamber and off axis chamber can be formed substantially of titanium. Non-limiting examples of other suitable materials can include high impact polymers, stainless steels,

aluminum, molybdenum, refractory metals, super alloys, aircraft alloys, carbon steels, composites thereof, and the like. One or more of the individual components can further include optional coatings such as, but not limited to, diamond coatings, diamond-like carbon coatings, molybdenum, tungsten, tantalum, and the like can also be used. These components can be molded, machined, deposited or formed in any suitable manner. Currently, machining can be particularly desirable but is not required.

FIG. 1a illustrates an example configuration where the internal walls define an axially serpentine fluid pathway which helically spirals around the central chamber along a length of the off axis chamber. More specifically, the off axis chamber is comprised of a plurality of tubes 115, 120, 125, 130, 135 of differing diameters nested within one another. In other words, the multiple internal walls can be formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces between each adjacent tube. FIG. 1b is a cross-sectional side view of the device of FIG. 1a, illustrating tubes nested within an octagonally-shaped outer shell.

Adjacent tubes define a void therebetween through which gases can flow. Each tube can have at least one inlet from a successively smaller tube (or from a deflector or other structure) to allow fluids to flow from one tube to the next. For example, the inlet in one tube may comprise a hole near a first end of the tube and the same tube may have an outlet at an opposite end of the tube. Placing a hole near the ends of the tubes will force gases along a pathway through the tube due to pressure of the gases from the high energy device discharge.

In another aspect, the concentric tubes can have ends offset from an adjacent tube so as to produce a serpentine fluid annular pathway. The multiple concentric tubes can include an innermost tube which includes orifices oriented to allow fluid to pass from the central chamber into a first annular space adjacent the innermost tube and through the annular spaces of progressively larger diameter.

One or more of the tubes can also include a rod 140, 145, 150, 155 or other device helically winding within the tube to define a helical pathway within the tube. The rod can be sized and shaped to fit snugly between adjacent tubes to force gases along a desired path. In one aspect, the rod can be permanently attached to at least one of the tubes. In another aspect, the off axis chamber may comprise five separate tubes, an innermost tube

defining the central chamber. Four helical rods can be arranged within the voids between the tubes to define helical pathways in each of the tubes along an entire length of the energy capture device.

The central chamber can further comprise a locking block 160 oriented at the inlet.

- 5 The locking block can have an engagement surface configured to attach to the high energy outlet and a hollow interior along the central axis, said hollow interior having a reducing throat portion and a flared outlet.

In one aspect, the engagement surface can include a male component and a female component. For example, the engagement surface may comprise a coupling device which
10 is threaded to enable threaded coupling of the shell 110 to the high energy discharge device. The threaded coupler can include a male component or a female component. In another more specific example, the threaded coupler can have helical threads rotating in an opposite direction as rifling in the high energy discharge device. Having the coupler threads rotate in an opposite direction as the rifling will result in torque on the energy
15 control device 100 from the spin of the bullet which tightens the threaded coupling of the energy control device to the high energy discharge device.

Various other types of coupling mechanisms may be used to couple the particulate capture module to a high energy discharge device or other modular attachment to a high energy discharge device. For example, the energy control device can be a modular
20 attachment to enable selective sound suppression in the field. The ends of the energy control device can include an engagement or coupling mechanism to secure modules to one another and/or to a firearm when desired. The coupling device can maintain a relative position between the shell and the high energy discharge device. Non-limiting examples of suitable engagement mechanisms can include threaded engagement, recessed locking,
25 interference fit, detent locking, and the like. The modular design can be sub-divided into additional sub-modules as desired and reassembled to provide function individually or assembled. In a more specific aspect, the coupling device includes a first coupling member having a first catch and a first alignment surface. A second coupling member can have a second catch and a second alignment surface. A resilient component can be associated
30 with the second coupling member and can resiliently deflect upon engagement with the first catch when joining the first coupling member and the second coupling member.

Engagement with the first catch can resist release of the first coupling member and the second coupling member. The first catch and the second catch can interface to maintain a relative position along a first axis and the first alignment surface and the second alignment surface interface to maintain a relative position along a second axis orthogonal to the first axis.

As described above, the locking block can be arranged adjacent to a deflector within the central chamber of the device. In another aspect, the central chamber may further comprise a plurality of deflectors 165, 170, 175 oriented in series along the central axis. A variety of specific contours and deflector shapes can be used. In one aspect, the plurality of deflectors can be frustoconical having a hollow interior along the central axis and each having a flared exit portion as illustrated in FIG. 1a. The embodiment shown in FIG. 1a illustrates a plurality of deflectors which include a primary deflector 165, a secondary deflector 170, and at least one tertiary deflector 175. However, any desired number of deflectors may be used. As shown in FIG. 1a, the at least one tertiary deflector can include four deflectors. The tertiary deflectors can be at least partially engaged within the flared exit portion of an adjacent deflector. In another optional aspect, the plurality of deflectors can span substantially the entire central axis along the central chamber.

In another aspect, the off axis chamber can further include an annular dampening chamber 180 oriented about the central chamber and being filled with an energy absorbent material. The dampening chamber can be oriented adjacent the outer shell 110 as illustrated in FIG. 1a. The energy absorbent material can be any suitable acoustic impedance filter. Generally, the material can absorb and/or deflect acoustic waves back toward the bullet path. In one aspect, the energy absorbent material is a dry material. Non-limiting examples of suitable material can include powder tungsten filament, metal powder, graphite, polymer, and the like. In one aspect the material can be a powder tungsten filament or other heavy metal or metal powders (e.g. aluminum, stainless steel, carbon steels, iron, copper, tantalum, titanium, vanadium, chromium, zirconium, carbides of these, alloys of these, and the like). Although fluids could be used (e.g. oil, water etc.) these are generally not needed and can be conveniently omitted without loss of performance. This dampening chamber can be used in connection with or without the axially serpentine fluid pathway or the plurality of deflectors. The energy absorbent material can also be

optionally introduced into other chambers within the device. For example, the energy absorbent material can be particularly beneficial when placed in one or more annular spaces intermediate between the central axis and the outer shell. In one aspect, a tapered annular space exists between the locking block throat and the adjacent tube (i.e. tube 125).

5 In some applications a modular system can be desirable to allow for adjustable acoustic suppression in the field. For example, the device can be modularized along the central axis to form at least two detachable portions. In one aspect, the chamber can be divided between the secondary and tertiary deflectors of FIG. 1a and capped at the junction on each corresponding end. The ends can include an engagement mechanism to secure the
10 modules together when desired. Non-limiting examples of suitable engagement mechanisms can include threaded engagement, recessed locking, interference fit, detent locking, and the like. The modular design can be sub-divided into additional sub-modules as desired and reassembled to provide function individually or assembled.

An innermost tube 135 in the off axis chamber can include orifices which
15 correspond to the plurality of deflectors. One configuration of an innermost tube is shown in FIG. 2. Orifices 137 can be varied in location, size and number for individual designs. In one aspect, the holes can oriented adjacent a contact point between a deflector and an inner wall of the innermost tube.

FIGs. 3a-4b illustrate configurations for locking blocks 160, 162 for attaching the
20 energy capture device to the high energy outlet of a high energy discharge device. The locking blocks include hollow interiors along the central axis. The hollow interiors in one aspect can have an inlet chamber, a reducing throat portion, and a flared outlet. FIG. 3 and FIG. 4 illustrate two optional configurations for a locking block. One difference between FIGs. 3 and 4 is that FIG. 4 includes a middle chamber between the inlet chamber and the
25 flared outlet. The middle chamber can have a different diameter than the inlet chamber. The staging of chambers of differing diameters can assist in sound reduction by providing additional space for acoustic waves, pressures, and gases to flow and reduce energy before exiting an outlet of the energy capture device.

At least one of the plurality of deflectors can be positioned adjacent to or at least
30 partially within the flared outlet of the locking block. For example, a primary deflector may be arranged such that an inlet of the primary deflector is at least partially within the

flared outlet of the locking block. Likewise additional deflectors can be adjacent to one another or at least partially nested within one another. In another aspect, one or more of the deflectors may be spaced from another deflector or the locking block such that the deflector is not adjacent or nested within a nearby deflector or locking block.

FIGs. 5a-7b illustrate different configurations for deflectors. For example, the figures illustrate frustoconically shaped deflectors 165, 170, 175 having hollow interiors along a central axis and a flared exit portion. The degree of flaring, as well as specific size and shape considerations, can be varied according to application and/or positioning of a specific deflector within an energy capture device relative to other deflectors.

The deflectors and any walls, tubes, etc. in the off axis chamber can be arranged within the outer shell. The outer shell can be generally tubular and have any suitable cross-section shape. In one aspect, the outer shell has an octagonal cross-section. The outer shell can optionally have a circular cross-section or any other desired shape (e.g. 5, 6, 7, 9 or 10 sides). Optionally, the outer shell can include an end cap assembly at an outlet end of the central chamber and which allows fluid to escape from the off axis chamber. For example, the end cap assembly can include a tube cap and an end cap.

FIGs. 8a-8b illustrate a tube cap 185 having outlet slits 187 which correspond to an outermost tube in the off axis chamber. The outlet slits can be semi-circular to correspond to a shape of the tube and to enable gases from the tube to pass therethrough. For example, where helical walls are included in the outermost tube, there is a potential for gases to be at least partially blocked from exiting the tube without a tube cap having sufficient slits to enable gases to escape regardless of orientation of the helical walls. Thus, the slits of FIGs. 8a-8b can provide a pathway for gases from the outermost tube through to an end cap.

FIG. 9 illustrates an end cap 190 having exit apertures 192 offset to prevent an unobstructed exit of fluids from the off-axis chamber. Providing apertures in the end cap which are smaller than the slits, at least in one dimension, can restrict expulsion of gases, acoustic waves, and so forth from the end of the energy capture device. Completely blocking the discharge of such gases, waves, and the like, is another option, but can have increased detrimental effects on the high energy discharge device to which the energy capture device is attached. In one aspect, the end cap can include apertures of varying diameters and be rotatable with respect to the tube cap. As a result, the end cap can be

rotated to adjust an amount of energy capture (i.e., sound suppression) according to a selected aperture. In this aspect, the tube cap can optionally include smaller slits or apertures such that only one size of aperture is open to the tube cap slits/apertures at any time.

As described above, one optional aspect of the device is to include a helical wall oriented within at least one of the annular spaces to direct fluids along a helical path within the at least one annular space (e.g., the off axis chamber, or alternately a space within the off axis chamber defined by one or more tubes). In one aspect all of the annular spaces which define the fluid pathway include a helical wall, and in another aspect fewer than all of the annular spaces include a helical wall. FIGs. 10a-13 illustrate side views of helical rods having spring-like shapes. More specifically, FIG. 10a illustrates an end view of a helical rod 140 which may be representative of an end view of any of the helical rods of FIGs. 10b-13. FIG. 10b illustrates a helical rod 141 which provides for a single revolution within an annular space. FIG. 11 illustrates a helical rod 142 which provides for two revolutions. FIG. 12 illustrates a helical rod 143 which provides for three revolutions. FIG. 13 illustrates a helical rod 144 which provides for four revolutions. Rods with even greater revolutions may also be used. Increasing the number of revolutions can increase a path length through the energy capture device. A single device can include multiple helical rods of same or differing revolutions.

As illustrated in FIGs. 10b-13, the helical walls can have varying winding ratios (i.e. windings:diameter). This winding ratio can be varied to optimize performance of the device for particular applications based on a number of variables (e.g. caliber, back pressure, etc.). The helical walls can be optionally replaceable so as to provide an adjustable tuning or to be repaired. The winding ratio can also be changed in order to control and/or adjust the energy transfer velocity and subsequent back pressure returned to the high energy outlet. This configuration can resolve or mitigate adverse effects that traditional sound suppressors may have on their host weapon. For example, 75% loss of expected life span of the weapon due to excessive PSI, rate of fire increases, excessive fouling and carbon buildup, debris returning to the operators face via the chamber of the barrel, unreliability due to combinations of these issues. These drawbacks can be largely eliminated or substantially reduced using the configurations described herein.

Generally, a higher rate of twist provides a greater path length for fluids along the fluid pathway to the chamber outlet. Although other ratios can be suitable, in one aspect, the helical wall has a winding ratio of about 3:1 to about 8:1. In one aspect, the device can include five multiple concentric tubes forming the annular spaces although other numbers of concentric tubes can be suitable. For example, pistol suppressors can sometimes utilize fewer chambers while high caliber rifles can utilize more chambers to achieve desirable sound suppression. Thus, each different diameter tube may have a different winding ratio if the number of windings is consistent within each tube. Alternately, each tube can be configured to have a substantially similar winding ratio by changing the number of windings in a specific tube according to a diameter of the tube.

Another alternative configuration for the internal walls to form the serpentine pathway can be concentric incomplete cylinders (i.e. the cross-section is an incomplete circle). The openings or gaps can form slits along the length of the cylinder. These gaps can be offset such that gases traveling therethrough are forced to pass through the annular space between each concentric cylinder. One example of such a configuration is shown in FIG. 14. In this configuration, the device includes multiple segments 500 which each have concentric offset cylinders 505. Gases flow into a serpentine path 510 created by the offset and spaced cylinders. The serpentine path in this case is a series of annular spaces which are connected and progressively larger. An outer shell 515 can enclose the assembly of segments and can include endpieces 520 and 525 to redirect gases which can optionally flow through the outer shell and external shell 530. Coupling mechanisms 535 and 540 can also optionally be used to secure the device to a muzzle adapter or other modular device. Such coupling can also be obtained using threaded or other suitable connectors as described herein.

In another optional aspect, a particulate modular attachment can be used to capture particulates from the high energy material as it exits the chamber. This can be particularly useful in firearm applications where the high energy material is a bullet. The particulate modular attachment 200 can have a particulate inlet 210 and a module outlet 215 defining a particulate control chamber, as shown in FIG. 15. The attachment can be configured to attach to the fluid outlet and remove particulates. In one aspect, the particulate modular attachment includes a self-healing polymeric material 220 oriented in the particulate

control chamber. The self-healing polymeric material can be any suitable material such as, but not limited to, expanded polyurethane, expanded polyethylene, expanded polystyrene, ionomeric metal salt of an ethylene-vinyl copolymer, copolymers thereof, and composites thereof. In one aspect, the self-healing polymeric material is expanded polyurethane or an ionomeric metal salt. The chamber can optionally include a removable cap to allow the polymeric material to be periodically replaced. Over time, this material can lose its resiliency and/or accumulate excessive particulates sufficient to make replacement desirable.

In another aspect, the device has substantially no moving parts during operation. This can greatly improve the useful life of the device by avoiding or reducing mechanical friction and potential for part wear and/or fatigue. In one aspect, the central chamber includes a central chamber outlet along the central axis and the high energy material is a bullet. The high energy outlet in this case can be a firearm muzzle (e.g. rifle, pistol, etc).

FIG. 16 illustrates another optional configuration for the multiple internal walls which form a plurality of longitudinal chambers. For purposes of illustration, the outer shell shown in previous figures is not shown. The longitudinal chambers can be each offset from the central axis and fluidly connected to from the axially serpentine fluid pathway. In this case, the longitudinal chambers include a first primary chamber 315 which splits the fluid flow into two paths at the end 317. The two paths serpentine along opposing sides and then recombine at a lower common chamber (not shown, but below the primary chamber 315, and more specifically directly below the high energy material path indicated generally by inlet 310) which can then direct fluids to a chamber exit (not shown).

Referring now to FIG. 17, a method 400 is provided for energy capture and control from a high energy device. The method can include discharging 410 a high energy material from the high energy device through an energy capture and control device which includes a central chamber oriented along a central axis within an outer shell. The central chamber can have an inlet for receiving a high energy material from a high energy outlet and an off axis chamber oriented within the outer shell in fluid communication with the central chamber. The off axis chamber can have therein a winding fluid pathway. The method can further include capturing 420 energy within the off axis chamber using the

winding fluid pathway, the energy being associated with discharge of the high energy material from the high energy discharge device.

The devices can generally perform well for a large number of cycles, periodic optional cleaning can remove film, debris or other material which collects within the device. Non-limiting examples of suitable cleaning protocols can include sonication, solvent immersion, disassembly, and high pressure air. Although specific acoustic suppression performance can vary depending on the specific configuration and options included, these designs have shown up to 15% sound reduction. The resulting devices can dramatically suppress acoustic impact of high energy materials with minimal maintenance and high cycle life.

Although the devices described are exemplified in terms of firearms, and more specifically in terms of silencer devices for sniper rifles used in counter-terrorism efforts, other applications can also benefit from these configurations. For example, high velocity/high temperature gases, projectiles, heat or sound energy can be suppressed using these devices. By adjusting the chamber configurations (e.g. number or shapes of tubes, deflectors, windings, etc) the back pressure can be tuned for a particular application. Most often, the device also does not adversely affect performance of the host mechanism to which it is attached.

The foregoing detailed description describes the invention with reference to specific exemplary embodiments. However, it will be appreciated that various modifications and changes can be made without departing from the scope of the present invention as set forth in the appended claims. The detailed description and accompanying drawings are to be regarded as merely illustrative, rather than as restrictive, and all such modifications or changes, if any, are intended to fall within the scope of the present invention as described and set forth herein.

CLAIMS

What is claimed is:

- 5 1. An energy capture and control device, comprising:
 - a) a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet;
 - 10 b) an off axis chamber oriented within the outer shell in fluid communication with the central chamber and having a fluid outlet and multiple internal walls configured to produce a serpentine fluid pathway which dissipates energy transferred from the high energy material.
- 15 2. The device of claim 1, wherein the central chamber further comprises a locking block oriented at the inlet, said locking block having an engagement surface configured to attach to the high energy outlet and a hollow interior along the central axis, said hollow interior having a reducing throat portion and a flared outlet.
- 20 3. The device of claim 1, wherein the central chamber further comprises a plurality of deflectors oriented in series along the central axis, the plurality of deflectors comprising a frustoconical shape and having a hollow interior along the central axis and each having a flared exit portion.
- 25 4. The device of claim 3, wherein the plurality of deflectors include a primary deflector, a secondary deflector, and at least one tertiary deflector.
5. The device of claim 4, wherein at least one tertiary deflector is at least partially engaged within the flared exit portion of an adjacent deflector.
- 30 6. The device of claim 3, wherein the plurality of deflectors span substantially the entire central axis along the central chamber.

7. The device of claim 1, wherein the multiple internal walls are formed to produce a radially serpentine fluid pathway.
- 5 8. The device of claim 1, wherein the multiple internal walls are formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces between each adjacent tube, and having alternating ends offset so as to produce an axially serpentine fluid annular pathway.
- 10 9. The device of claim 9, wherein the multiple concentric tubes include an innermost tube which includes orifices oriented to allow fluid to pass from the central chamber into a first annular space adjacent the innermost tube and through the annular spaces of progressively larger diameter.
- 15 10. The device of claim 9, wherein the annular spaces further include a helical wall oriented within at least one of the annular spaces to direct fluids along a helical path within the at least one annular space.
- 20 11. The device of claim 10, wherein the helical wall has a quadrilateral cross-section or a circular cross-section.
12. The device of claim 10, wherein the helical wall has a winding ratio (windings : diameter) of about 3:1 to about 8:1.
- 25 13. The device of claim 1, wherein the off axis chamber further includes an annular dampening chamber oriented about the central chamber and being filled with an energy absorbent material.
- 30 14. The device of claim 13, wherein the dampening chamber is oriented adjacent the outer shell.

15. The device of claim 13, wherein the energy absorbent material is selected from the group consisting of powder tungsten filament, heavy metal powder, graphite, polymer, aluminum, stainless steel, carbon steels, iron, copper, tantalum, titanium, vanadium, chromium, zirconium, carbides of these, alloys of these, and combinations thereof.

5

16. The device of claim 1, wherein the outer shell includes an end cap assembly at an outlet end of the central chamber and which allows fluid to escape from the off axis chamber.

17. An energy capture and control device, comprising:

- 10 a) a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet;
- b) an off axis chamber oriented within the outer shell in fluid communication with the central chamber, the off axis chamber comprising a winding fluid pathway.

15

18. The device of claim 17, wherein the off axis chamber further comprises a fluid outlet and at least one helical wall defining the winding fluid pathway, the at least one helical wall being configured to produce an axially helical fluid pathway which dissipates energy transferred from the high energy material.

20

19. The device of claim 17, further comprising multiple internal walls defining an axially serpentine fluid pathway, the multiple internal walls being formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces between each adjacent tube, and having alternating ends offset so as to produce a

25 serpentine fluid annular pathway.

25

20. A method for energy capture and control from a high energy device, comprising:

- a) discharging a high energy material from the high energy device through an energy capture and control device comprising a central chamber oriented along a central
- 30 axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet, and an off axis chamber

30

oriented within the outer shell in fluid communication with the central chamber, the off axis chamber comprising a winding fluid pathway; and

- b) capturing energy within the off axis chamber using the winding fluid pathway, the energy being associated with discharge of the high energy material from the high energy discharge device.

5

ENERGY AND CAPTURE AND CONTROL DEVICE

ABSTRACT

An energy capture and control device is disclosed and described. The device can
5 include a central chamber oriented along a central axis within an outer shell, said central
chamber having an inlet configured to receive a high energy material from a high energy
outlet. An off axis chamber can be oriented within the outer shell in fluid communication
with the central chamber. The off axis chamber can have a fluid outlet and multiple
internal walls to produce a serpentine fluid pathway which dissipates energy transferred
10 from the high energy material.

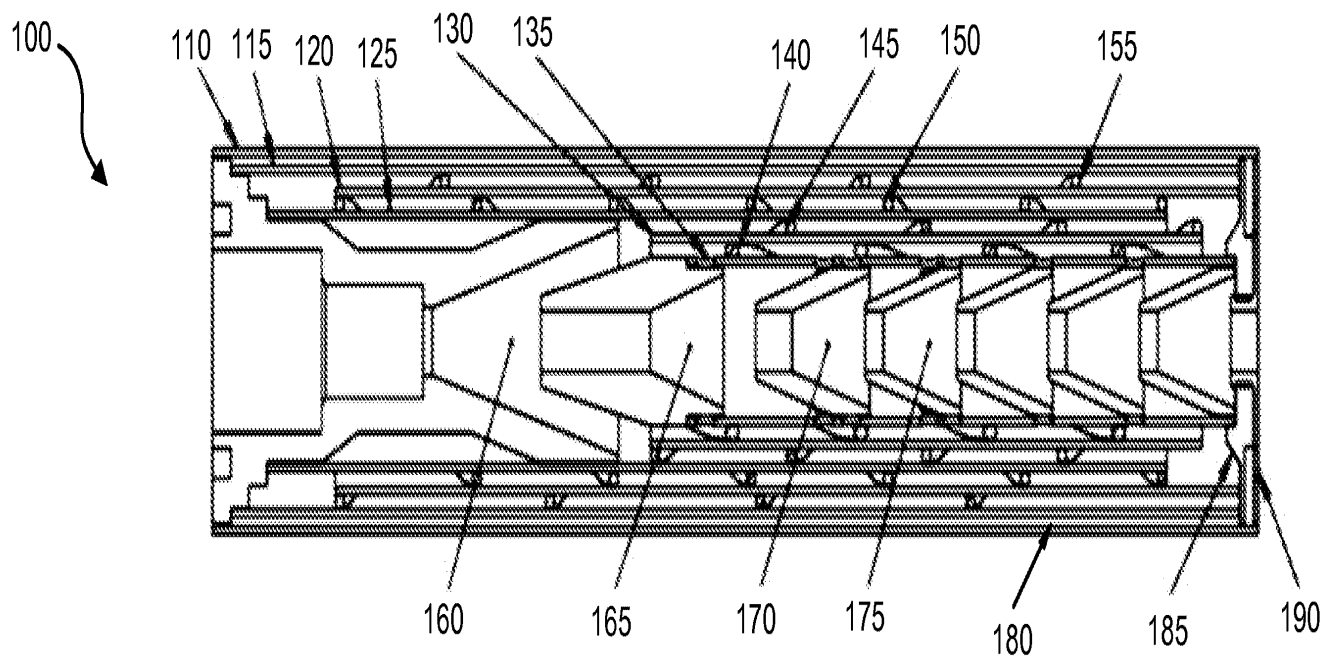


FIG. 1a

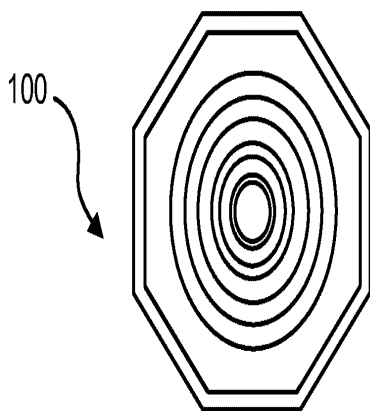


FIG. 1b

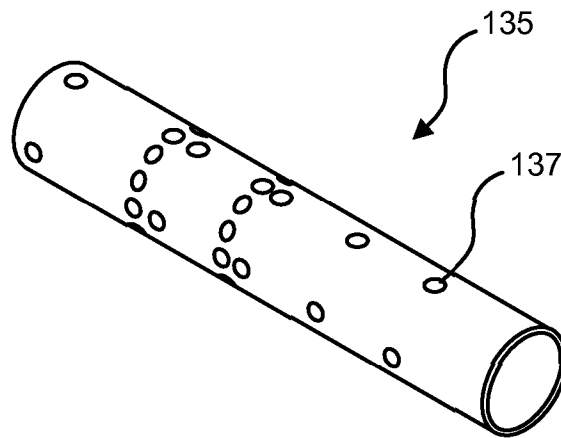


FIG. 2

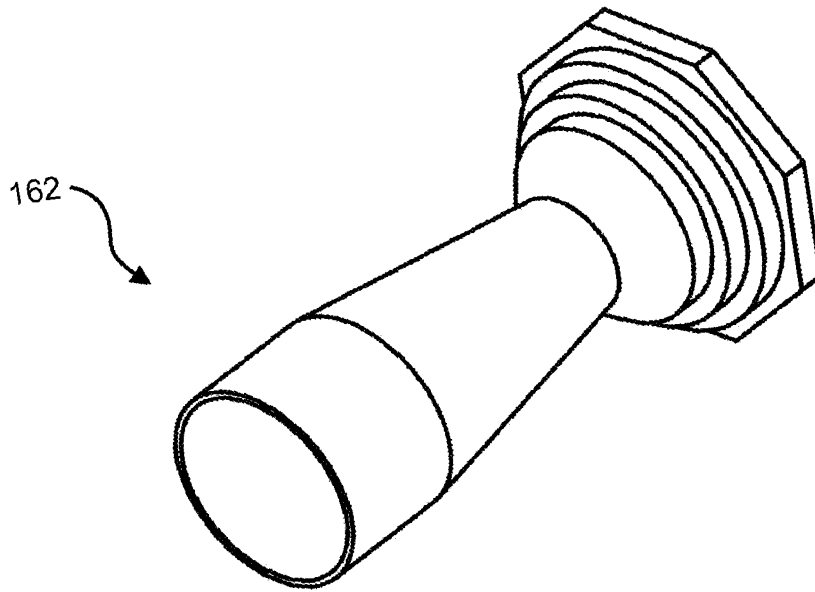


FIG. 3a

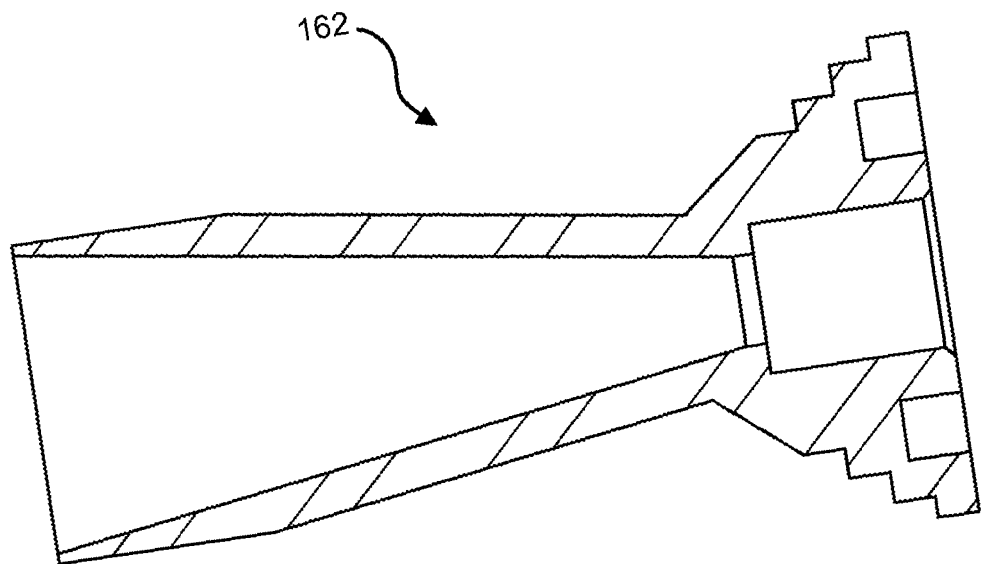


FIG. 3b

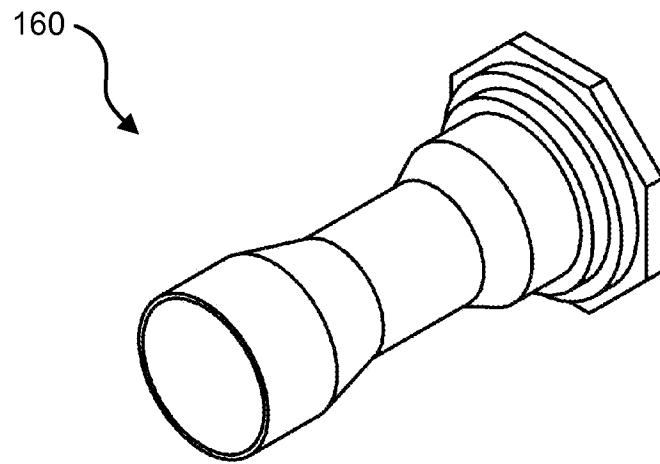


FIG. 4a

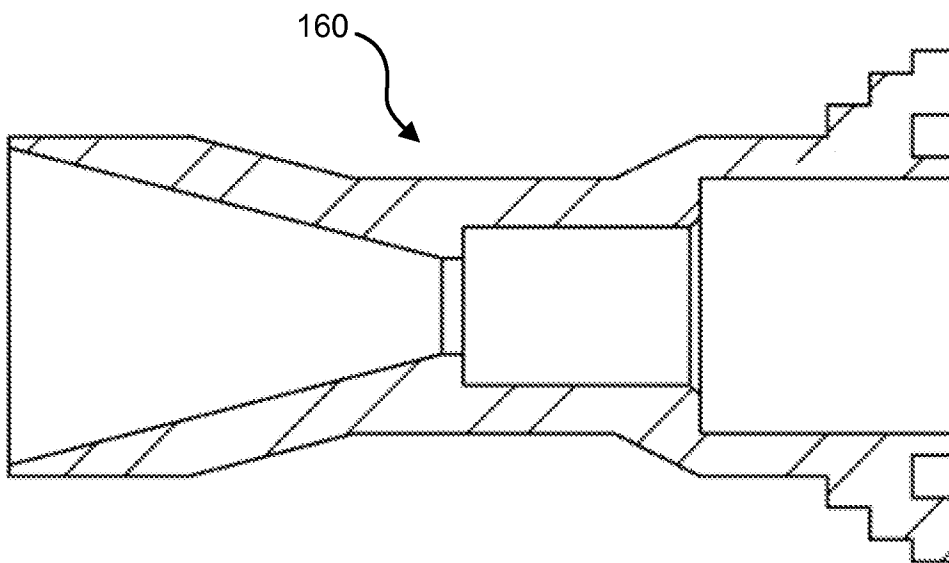


FIG. 4b

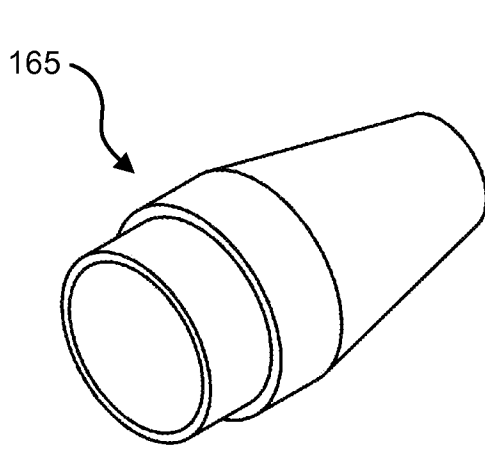


FIG. 5a

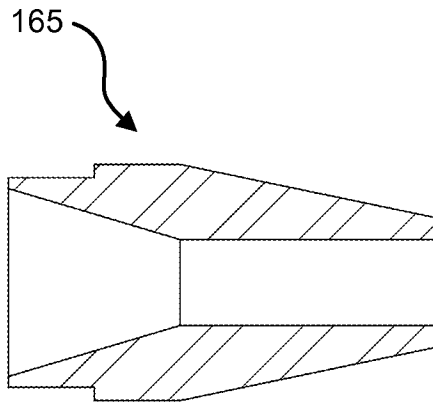


FIG. 5b

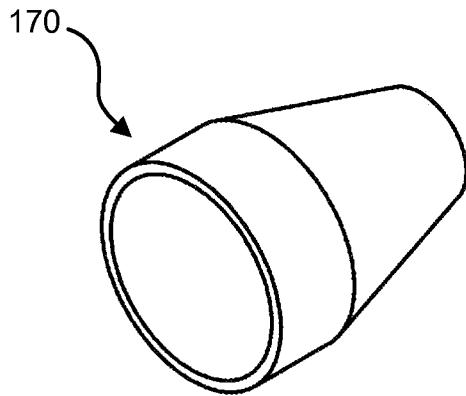


FIG. 6a

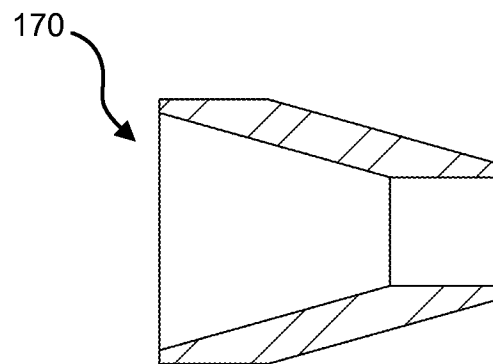


FIG. 6b

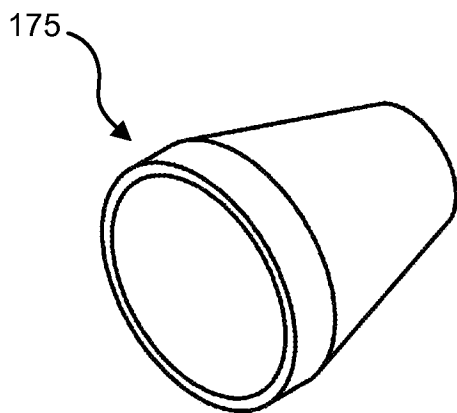


FIG. 7a

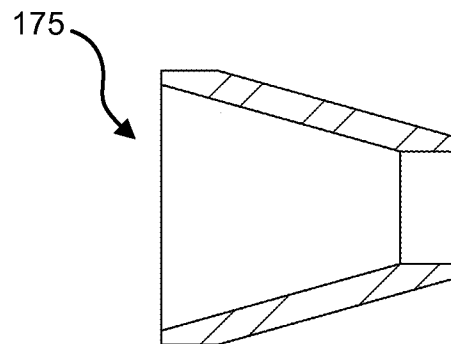


FIG. 7b

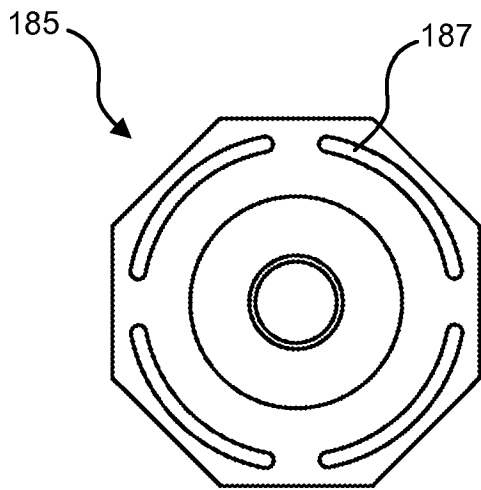


FIG. 8a

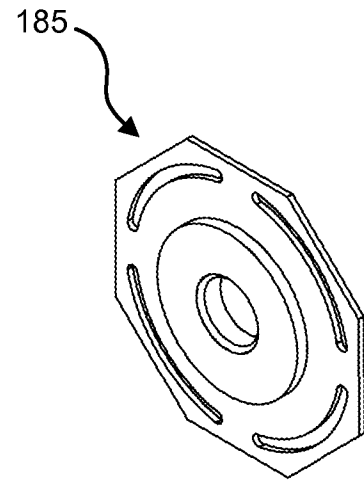


FIG. 8b

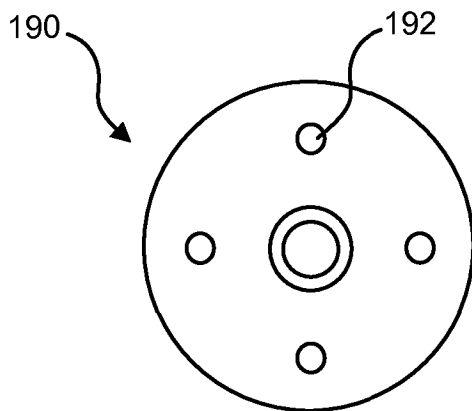


FIG. 9a

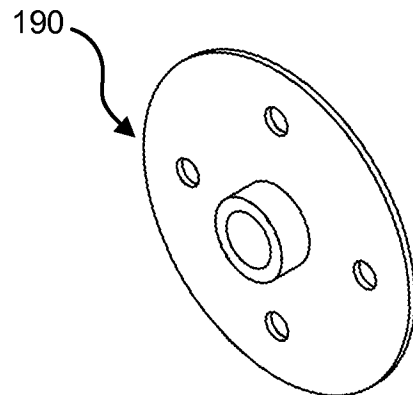


FIG. 9b

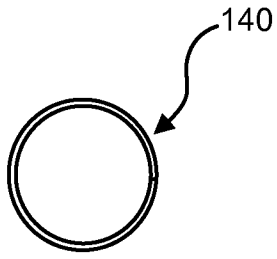


FIG. 10a

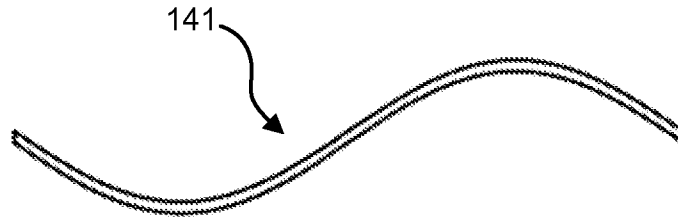


FIG. 10b

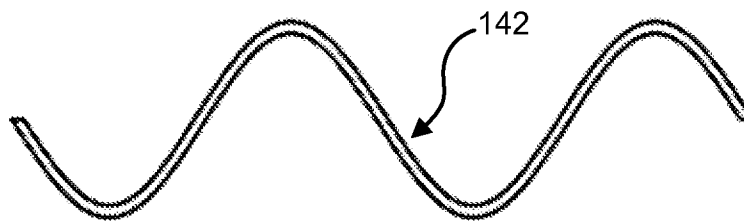


FIG. 11

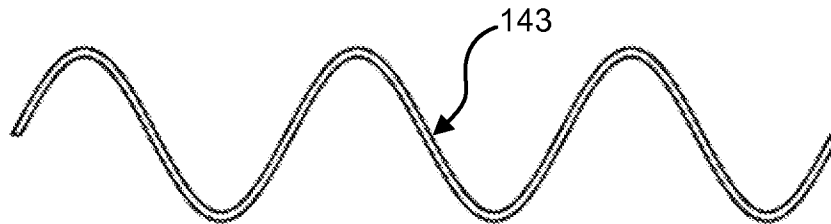


FIG. 12

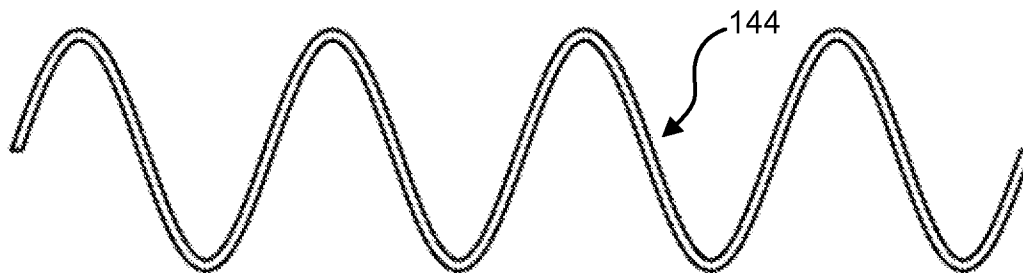


FIG. 13

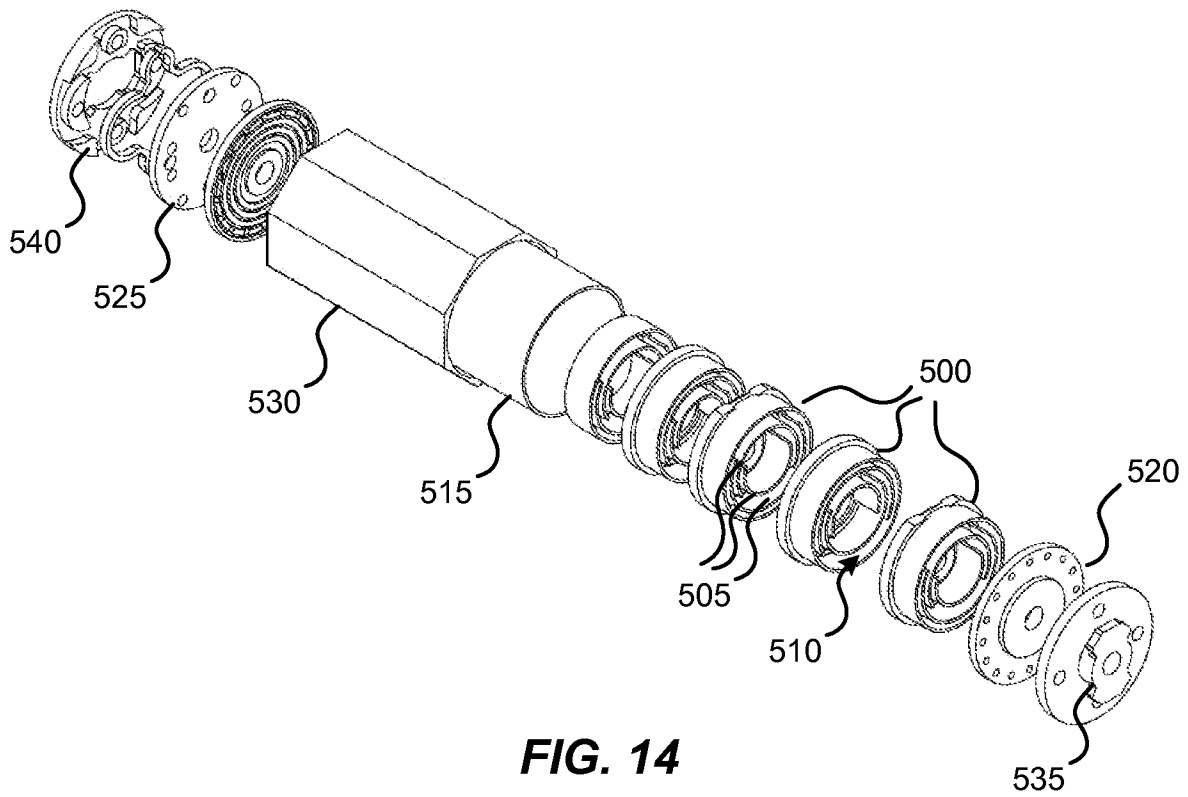


FIG. 14

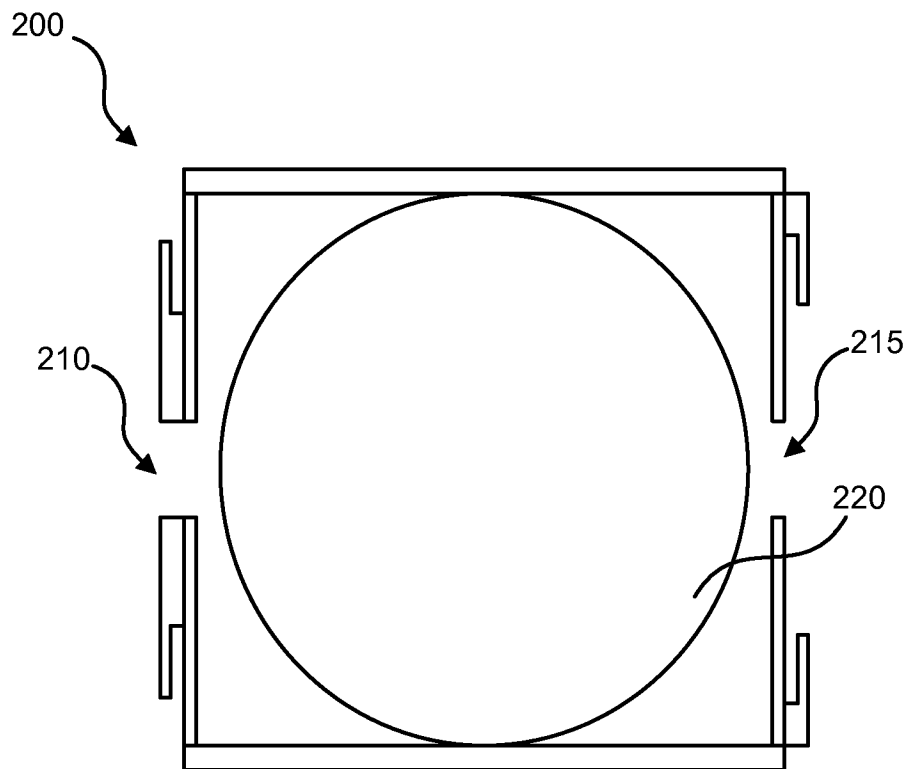


FIG. 15

9/10

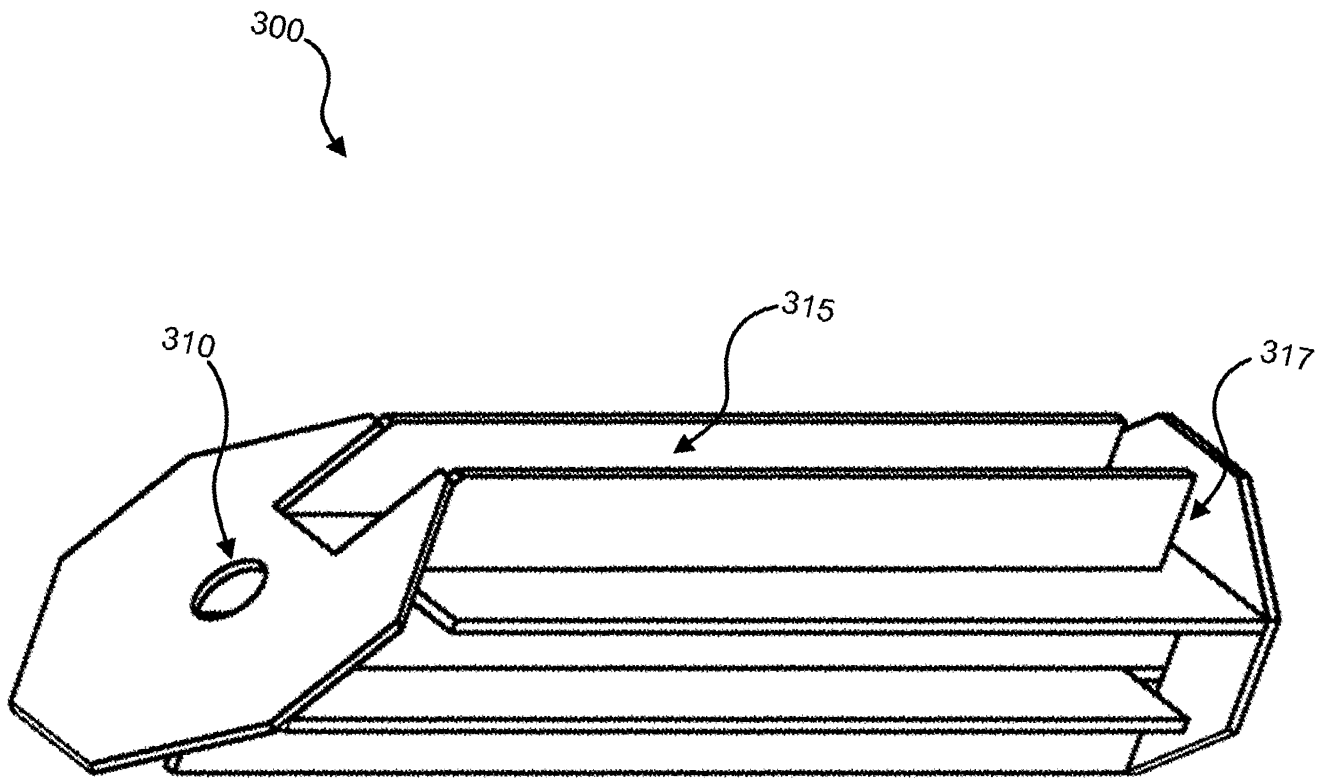


FIG. 16

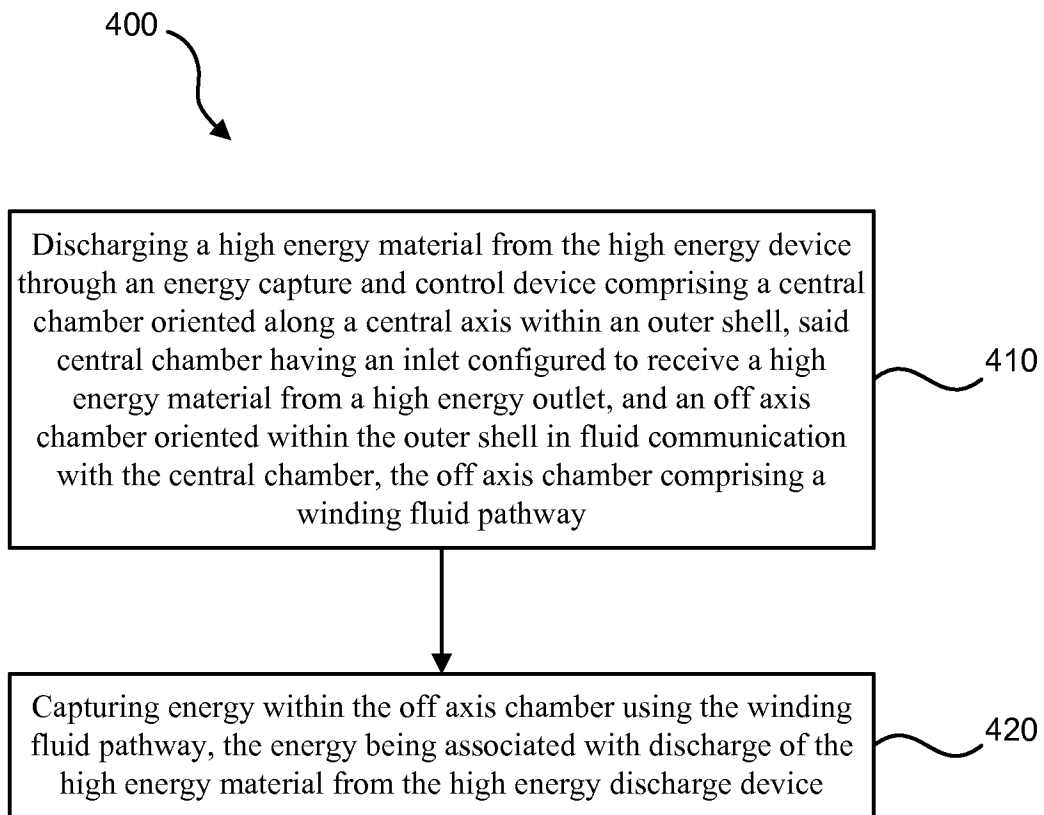


FIG. 17

DECLARATION AND PETITION

As a below named inventor, I, Russell Oliver, hereby declare: that my residence, post office address, and citizenship are as stated below next to my name; that I verily believe I am the original, first, and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **ENERGY CAPTURE AND CONTROL DEVICE**, the specification of which is attached hereto, or which was filed on _____ as **THORPE NORTH & WESTERN, LLP** Docket No. 3212-002.NP4, and given United States Application No. _____, (Assignee's attorney is hereby authorized to insert the specified data, when known); that I have reviewed and understand the contents of the above-identified specification, including the claims; and that I acknowledge the duty to disclose information which is material to patentability of this application as defined in § 1.56 of Title 37 of the Code of Federal Regulations.

I hereby claim the benefit of the earlier filed patent application(s) filed in the United States Patent and Trademark Office as Application No. 61/303,553, filed on February 11, 2010, and Application No. 61/418,285, filed November 30, 2010 and, insofar as the subject matter of each of the claims of these applications is not disclosed in the earlier filed pending applications in the manner provided by the first paragraph of Section 112 of Title 35 of the United States code, I acknowledge the duty to disclose information which is material to this application, as defined in Section 1.56 of Title 37 of the Code of Federal Regulations, which occurred between the filing date of the earlier filed applications and the filing date of this application.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code,

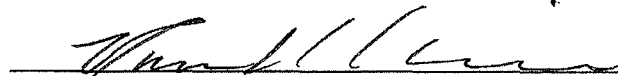
and that such willful, false statements may jeopardize the validity of the application or any patent issuing thereon.

Wherefore, I pray that Letters Patent be granted to me for the invention or discovery described and claimed in the foregoing specification and claims, declaration, and this petition.

Signed this 11th day of February, 2011 at Sandy Utah

_____(City, State).

INVENTOR(S):



Russell Oliver

Residence: (City, State):

Sandy, UT

Citizenship:

US

Post Office Address:

545 West 9460 South

Sandy, UT 84070

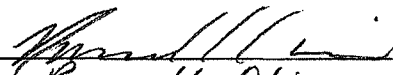
POWER OF ATTORNEY

OS Inc., a corporation organized and existing under the laws of the State of Wyoming, having a business address of 2710 Thomas Ave., Cheyenne, WY 82001, owner of all right, title and interest in the invention entitled **ENERGY CAPTURE AND CONTROL DEVICE** for which an application for United States Letters Patent which is being filed concurrently herewith OR which was filed on _____ as THORPE NORTH & WESTERN, LLP Docket No. 3212-002.NP4, and given U.S. Patent Application Serial No. _____, and empowered to prosecute the U.S. and foreign applications on behalf of the inventors, hereby appoint as its attorneys and/or agents all registered patent practitioners/attorneys associated with Customer Number **20,551**; all with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

All correspondence concerning this application should be directed to **Erik S. Ericksen, M.S.** at the address associated with the above-mentioned Customer Number. (Even though an attorney is listed, please associate the above-mentioned Customer Number with this case.).

Dated this 11th day of February 2011 at Sandy Utah
_____ (place).

OS Inc.

By: 
Name: Russell Oliver
Title: President

WHEN RECORDED RETURN TO:
Erik S. Ericksen, M.S.
Thorpe North & Western, LLP
P.O. Box 1219
Sandy, UT 84091-1219

Docket No. 3212-002.NP4

ASSIGNMENT

WHEREAS, I, Russell Oliver, resident of the State of Utah, whose postal mailing address is 545 West 9460 South, Sandy, UT 84070 (hereinafter "Assignor") have invented a certain new and useful improvement in a **ENERGY CAPTURE AND CONTROL DEVICE**; for which an application for United States Letters Patent is being filed concurrently herewith OR which was filed on _____ as THORPE NORTH & WESTERN L.L.P. Docket No. 3212-002.NP4, and given U.S. Patent Application Serial No. ____; (Thorpe North & Western, LLP is hereby authorized to insert the specified data, when known), and

WHEREAS, OS Inc., a corporation organized and existing under the laws of the State of Wyoming, having a business address of 2710 Thomas Ave., Cheyenne, WY 82001 (hereinafter "Assignee"), is desirous of acquiring the entire right, title, and interest in the same;

NOW, THEREFORE, in consideration of one dollar (\$1.00) and other good and valuable consideration paid to me by the Assignee, the receipt and sufficiency whereof is hereby acknowledged, I the said Assignor, hereby sell, transfer, grant and assign unto the said Assignee, my entire right, title and interest in said invention and in all patent applications based thereon, including but not limited to the above identified United States Patent Application and in all divisions, continuations, and continuations-in-part of said application, or reissues or extensions of Letters Patent or Patents granted thereon, and in all corresponding applications filed in countries foreign to the United States, and in all patents issuing thereon in the United States and foreign countries; the right, power and authority to file and prosecute U.S. and foreign patent applications on said invention, and to do so in its own name wherever such right may be legally exercised, and including the right to claim the priority and benefits of the International

Convention for such applications; and the right to bring actions for infringement of any right in said invention in its own name, including past infringement, in any jurisdiction.

I hereby authorize and request the United States Commissioner of Patents and Trademarks, and such Patent Office officials in foreign countries as are duly authorized by their patent laws to issue patents, to issue any and all Letters Patent on said invention to the said Assignee as the owner of my entire interest, for the sole use and behoof of the said Assignee, its successors, assigns, heirs and legal representatives, to the full end of the term for which said Letters Patent and any reissues or extensions thereof may be granted; as fully and entirely as the same would have been held by me had this assignment and sale not been made.

I hereby agree, without further consideration and without expense to me, to sign all lawful papers and to perform all other lawful acts which the Assignee may request of me to make this Assignment fully effective, including, by way of example but not of limitation, the following: prompt execution of all original, divisional, substitution, reissue, and other United States and foreign patent applications on said invention, and all lawful documents and instruments as requested by the Assignee to further the prosecution of any of such patent applications; and cooperation to the best of my ability including, but not limited to, the execution of all lawful documents and instruments and production of evidence in any actions or proceedings concerning the invention, including, but not limited to, interference, nullification, reissue, extension, and infringement proceedings and litigation involving said invention.

This assignment and agreement shall be binding upon assigns, successors, heirs and legal representatives of Assignor and Assignee.

Page 3 of 3

Sandy Utah

Russell Oliver

County of _____)

_____, 2011.

Notary Public

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		Energy Capture and Control Device		
First Named Inventor/Applicant Name:		Russell Oliver		
Filer:		Erik Sun Ericksen/Marla Howlett		
Attorney Docket Number:		3212-002.NP4		
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	82	82
Utility Search Fee	2111	1	270	270
Utility Examination Fee	2311	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 (\$)				462

Electronic Acknowledgement Receipt

EFS ID:	9430599
Application Number:	13025989
International Application Number:	
Confirmation Number:	3886
Title of Invention:	Energy Capture and Control Device
First Named Inventor/Applicant Name:	Russell Oliver
Customer Number:	20551
Filer:	Erik Sun Ericksen/Marla Howlett
Filer Authorized By:	Erik Sun Ericksen
Attorney Docket Number:	3212-002.NP4
Receipt Date:	11-FEB-2011
Filing Date:	
Time Stamp:	18:06:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$462
RAM confirmation Number	5092
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
-----------------	----------------------	-----------	-------------------------------------	------------------	------------------

1	Transmittal of New Application	3212002NP4Trans.pdf	219356 31bcd8eb1e0c3ee2df03b9f5d08aad08d78cf611	no	1
Warnings:					
Information:					
2	Application Data Sheet	3212002NP4AppData.pdf	28465 b086ad422928d692ef982dbe817d4f7d842c5891	no	1
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
3	Nonpublication request from applicant.	3212002NP4NonPubReq.pdf	135265 bad5defa5b974296096aef437b8ff552af1727c	no	1
Warnings:					
Information:					
4	Petition for review by the Office of Petitions.	3212002NP4Petition.pdf	59796 b5378e24271858d2f3ca59010984f0e4e555b88	no	2
Warnings:					
Information:					
5		3212002NP4App.pdf	135169 9e25473b7a0bce6d144d47d76942f57309803d28	yes	21
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	16	
	Claims		17	20	
	Abstract		21	21	
Warnings:					
Information:					
6	Drawings-only black and white line drawings	3212002NP4Figs.pdf	1380216 c93c62c983b254403b2fe9967b6bdf12ae23cdf	no	10
Warnings:					
Information:					
7		3212002NP4SigDocs.pdf	245209 14541bb4faed40bf86afd6044e35443264b110c9	yes	6

Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Oath or Declaration filed			1	2	
Power of Attorney			3	3	
Miscellaneous Incoming Letter			4	6	
Warnings:					
Information:					
8	Fee Worksheet (PTO-875)	fee-info.pdf	32836	no	2
			ea8863b20aae8b2bea35be4fa19f6b41e21207bc		
Warnings:					
Information:					
Total Files Size (in bytes):			2236312		
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.					