

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.

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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.

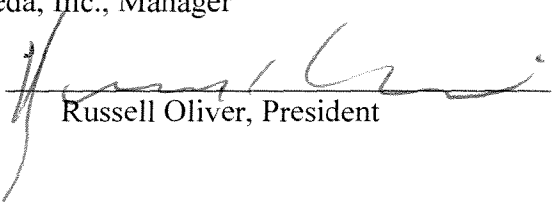
This Intellectual Property Assignment may be executed in any number of counterparts, all of which together shall constitute one and the same document. A photocopied or facsimile signature shall be deemed to be the functional equivalent of a manually executed original for all purposes.

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
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
61/418,285	11/30/2010		110	3212-015.PROV		

CONFIRMATION NO. 1522

20551
THORPE NORTH & WESTERN, LLP.
P.O. Box 1219
SANDY, UT 84091-1219

FILING RECEIPT



Date Mailed: 12/27/2010

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. 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;

Power of Attorney:

Erik Ericksen--48954

If Required, Foreign Filing License Granted: 12/22/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/418,285**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

SOUND REDUCTION MODULE

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.

PROVISIONAL APPLICATION FOR PATENT COVER SHEET – Page 1 of 2

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. Electronically Filed

INVENTOR(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Russell	Oliver	Sandy, UT
<i>Additional inventors are being named on the _____ separately numbered sheets attached hereto.</i>		
TITLE OF THE INVENTION (500 characters max):		
SOUND REDUCTION MODULE		
<i>Direct all correspondence to:</i> CORRESPONDENCE ADDRESS		
☒ The address corresponding to Customer Number: 20,551		
OR ☐ Firm or Individual Name		
Address		
City	State	Zip
Country	Telephone	Email
ENCLOSED APPLICATION PARTS (check all that apply)		
☐ Application Data Sheet. See 37 CFR 1.76 ☐ CD(s), Number of CDs _____		
☒ Drawing(s) <i>Number of Sheets</i> <u>6</u> ☐ Other (specify) _____		
☒ Specification (e.g. description of the invention) <i>Number of Pages</i> <u>21</u>		
Fees Due: Filing Fee of \$220 (\$110 for small entity). If the specification and drawings exceed 100 sheets of paper, an application size fee is also due, which 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).		
METHOD OF PAYMENT OF THE FILING FEE AND APPLICATION SIZE FEE FOR THIS PROVISIONAL APPLICATION FOR PATENT		
☒ Applicant claims small entity status. See 37 CFR 1.27. \$110		
☒ A check or money order made payable to the <i>Director of the United States Patent and Trademark Office</i> is enclosed to cover the filing fee and application size fee (if applicable). TOTAL FEE AMOUNT (\$)		
☐ Payment by credit card. Form PTO-2038 is attached.		
☐ The Director is hereby authorized to charge the filing fee and application size fee (if applicable) or credit any overpayment to Deposit Account Number: <u>20-0100</u> .		

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. 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 8 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, 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.

PROVISIONAL APPLICATION COVER SHEET
Page 2 of 2

PTO/SB/16 (12-08)

Approved for use through 06/30/2010. OMB 0651-0032

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

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

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

SIGNATURE /eriksericksen/ Date November 30, 2010

TYPED or PRINTED NAME Erik S. Ericksen, M.S. REGISTRATION NO. 48954
(if appropriate)

TELEPHONE (801) 566-6633 Docket Number: 3212-015.PROV

UNITED STATES PROVISIONAL PATENT APPLICATION

of

Russell Oliver

for

SOUND REDUCTION MODULE

THORPE, NORTH & WESTERN, LLP

ATTORNEYS AT LAW

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SOUND REDUCTION MODULE

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 the field of firearm sound suppression, basic sound suppression technology has varied only modestly over the past hundred years. Generally, these 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 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

FIG. 1 is a perspective exploded view of a sound reduction module in accordance with an embodiment of the present technology.

FIG. 2 is a close-up exploded view of baffle segments within the sound reduction module of FIG. 1.

FIG. 3 is a cross-sectional view of a sound reduction module having a fluidly isolated gap between the baffles and the shell in accordance with an embodiment of the present technology.

FIG. 4 is a cross-sectional view of a sound reduction module having a gap between the baffles and the shell which is in fluid communication with the baffles in accordance with an embodiment of the present technology.

FIG. 5 is a close-up view of an inlet end of the sound reduction module of FIG. 1.

FIG. 6 shows various different views of the assembled sound reduction module of FIG. 1.

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.

Decibel Reduction Modules and Methods

Sound reduction modules are disclosed and described. A module can include a shell having a central chamber oriented along a central axis, said central chamber having an inlet configured to receive a high energy material from a high energy outlet. Multiple off-axis chambers can be within the shell and can be concentrically and circumferentially interposed around the central chamber. The off-axis chambers can be in fluid communication with the central chamber. The off-axis chambers can include multiple internal walls, and can be defined by the multiple internal walls, the multiple internal walls be operable for dissipating sound transferred from the high energy material radially outwardly from the central axis. In one example, the module can have substantially no moving parts during operation.

FIG. 1 illustrates an exploded view of a sound reduction module in accordance with a more detailed example. As illustrated in FIG. 1, the central chamber can further comprise a locking block oriented at the inlet. The locking block can have an engagement surface configured to attach to the high energy outlet and a hollow interior along the central axis. The hollow interior can have a reducing throat portion and a flared outlet. The central chamber can include a central chamber outlet along the central axis. The high energy material can be a projectile, such as a bullet. The shell and/or the multiple internal walls can be formed of a strong material to withstand energy, sounds, gases, debris, and so forth from the high energy material. For example, the shell and/or walls can be made 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. 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 as shown in FIG. 1. The outer shell can optionally have a circular or polygonal cross-section or any other desired shape (e.g. 5, 6, 7, 8, 9 or 10 sides).

In addition to the locking block at each end of the module, the module includes flow disks which have flow orifices which can be aligned with flow orifices in the locking blocks. Some firearms, silencers, or other firearm attachments will have a fluid outlet for releasing gases, particulates, debris, pressure, and the like when the firearm is fired. The flow orifices can be in a locking block and flow disk can be aligned with the fluid outlet from another device to channel the fluid(s) from the other device and through the sound reduction module. As will be described in further detail below, the sound reduction module can include a fluid flow path for fluids received through the flow orifices.

The shell can be sized and shaped to receive one or more baffles comprising the internal walls defining the concentrically and circumferentially interposed off-axis chambers. Although other shapes may also be used, FIG. 1 illustrates baffles comprising a substantially circular cross section and a shell having a similarly substantially circular cross-section for receiving the baffles. In one example, the baffles can include reference markers for aligning the baffles within the shell. For example, grooves, protrusions, and the like can be used for alignment.

Referring to FIG. 2, a larger view of the baffles of FIG. 1 is shown in accordance with an embodiment. As described above, the module can include a plurality of off-axis chambers within a baffle, concentrically and circumferentially interposed around the central chamber and in fluid communication with the central chamber. The off-axis chambers can include multiple internal walls for dissipating sound, particulates, and/or debris transferred from the high energy material radially outwardly from the central axis, wherein the off-axis chambers are defined by the multiple internal walls.

The shell can include an outer wall. The internal walls can be partially circumferential walls (e.g. C-shape) defining a partially circumferential gap between the internal walls and the outer wall. As illustrated in FIG. 2, the baffle can include an annular band around an outer internal wall of the baffle for providing a space between the shell outer wall and the baffle. The annular band can include a notch formed in the band to enable fluid communication between the gap around one baffle and the gap around another baffle. As shown in the figure, the notches can be arranged opposite from one another to lengthen a fluid flow path from the gap around one baffle to the gap around the next. The outer internal walls of the baffles can have a circular cross-section and substantially close

off or prevent direct fluid communication between the gap and the central chamber. Sounds which are received in the chambers within the baffle can be fluidly communicated to an outermost chamber within the baffle, but in this configuration will not be fluidly communicated to the gap. However, the outer internal wall can absorb at least a portion of the sounds and the sounds can pass through to the gap through vibrations of the outer internal wall. The sounds or sound waves within the gap can then be fluidly communicated to the gaps around other baffles, but will not be easily communicated back to the central chamber to exit from an outlet for the high energy projectile. As shown in FIG. 1 and FIG. 2, the internal walls can be provided as multiple baffle segments oriented in series. Each baffle segment can be isolated from others. Alternatively, the baffle segments can include connecting conduits to allow fluid communication between adjacent baffle segments. In yet another alternative, the chamber can be provided using a single continuous baffle system.

In another example, the outer internal wall of one or more of the baffles can include an opening or gap to provide a more direct fluid communication with the central chamber.

At least one of the off-axis chambers can include an optional dampening chamber. The dampening chamber can be oriented about the central chamber and can be filled with an energy absorbent material. For example, the gap between the baffle and the shell can be the dampening chamber. As another example, the outermost chamber within the outer internal wall can be the dampening chamber. As another example, the dampening chamber can be oriented adjacent an outer wall of the shell. 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 particulate 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.

The off-axis chambers in each baffle can be in fluid communication with the central chamber along a majority of a length of the shell. The “chambers” described herein can refer to a space between one wall and another wall, whether the wall is an internal wall of the baffle, the shell outer wall, or some other wall. In one example, the plurality of off-axis chambers comprise complementarily opposing, off-set, concentric chambers defined by the internal walls. In another example, the internal walls are formed by multiple semi-circular walls having progressively larger diameters so as to form annular spaces between each adjacent wall, wherein each progressively larger diameter semi-circular wall is positioned opposite from each progressively smaller diameter semi-circular wall to achieve the concentrically and circumferentially interposed chambers within the shell. As used herein, the term “semi-circular” can refer to a partially circular shape and is not limited to a half-circular shape. Additionally, a semi-circular wall is a wall that has a semi-circular cross-section. As such, the semi-circular wall can be a cylindrical shape having a longitudinal gap along a length of the wall.

The circumferentially interposed plurality of off-axis chambers can each include an inlet and an outlet and the plurality of off-axis chambers can be circumferentially interposed by offsetting the inlet of an individual chamber from the outlet of another individual chamber. In this way, the internal walls can define a laterally serpentine fluid pathway which dissipates sound, gases and particulates transferred from the high energy material.

In another example, the plurality of off-axis chambers can be a plurality of radially offset chambers which are each offset from the central axis and from each other and are fluidly connected to form a laterally serpentine fluid pathway. In another example, the plurality of off-axis chambers comprises at least three sets of off-axis chambers, each set comprising opposing internal walls wherein wall ends of an individual internal wall are offset from wall ends of another individual wall and wherein at least two of the at least three sets of off-axis chambers are substantially circumscribed by at least one of the at least three sets of off-axis chambers.

As described above, the plurality of off-axis chambers defined by the multiple internal walls may comprise an individual baffle, and the module may comprise a plurality of individual baffles adjacent to one another within the shell. Each baffle can be in fluid communication with the central chamber and otherwise isolated from fluid communication with other baffles. In another example, the gap around each baffle can be in fluid communication with the chambers within the baffle and the gap of one baffle can be in fluid communication with the gap of another baffle. More specifically, each baffle can be in fluid communication with the central chamber, and the plurality of off-axis chambers in each baffle can include a plurality of inner chambers and at least one outer chamber. The plurality of inner chambers of an individual baffle segment can be fluidly isolated from the plurality of inner chambers of another individual baffle (other than through the central chamber), and the at least one outer chamber of an individual baffle can be in fluid communication with the at least one outer chamber of another individual baffle.

Reference will now be made to FIG. 3. FIG. 3 shows a cross sectional view of a module as in FIG. 1. The cross-section is taken along line 'A' shown in FIG. 6. The module includes a shell and a plurality of baffles, each comprising chambers for absorbing and redirecting sound and gases. Reference was made in the discussion of FIG. 1 to fluid flow paths through the module. The fluid flow paths are illustrated in FIG. 3 along the top and bottom of the cross-section. The module can include any desired number of fluid flow paths. In the example shown in FIG. 1, the locking block included four fluid orifices, so four fluid flow paths could be provided through the module. The fluid flow paths can be distributed evenly around the module or in any other desired configuration. The fluid flow paths may comprise a straight and narrow path through the module or may be provided in any other desired configuration. For example, multiple fluid flow paths can wrap helically around the module within the outer wall from the inlet end of the module to the outlet end. As another example, the fluid flow paths can be in fluid communication, one with another. As another example, the fluid orifices can direct fluid into a single fluid flow path which may substantially circumscribe the module and extend along a length of the module.

In the helical flow path example, the fluid flow path may comprise an annular space within the outer wall of the shell and extending along the length of the module. The module can include a helical wall oriented within the annular spaces to direct fluids along

the helical path within the annular space. For example, the helical wall may comprise a helical rod having a spring-like shape. The helical wall can have a square cross-section or any other suitable cross-section (e.g. quadrilateral cross-section or a circular cross-section). The helical wall can have a varying winding ratio or any ratio within a range of fixed 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.). This 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. 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.

The shell can include a fluid inlet, and a fluid outlet, and the fluid flow path can be adjacent to an outer wall of the shell. In one example, the fluid flow path is not in fluid communication with the central chamber or the plurality of off-axis chambers. The fluid inlet can be configured to receive fluid from a portion of the high energy outlet different from a portion of the high energy outlet from which the high energy material is received. In other words, the fluid, such as gases, particulate debris, and the like, can be received via the fluid orifice. The fluid outlet can be configured to enable discharge of the fluid from the fluid flow path. In another example, which will be described in greater detail below, the fluid flow path is in fluid communication one or more of the baffles, or rather with chambers within one or more of the baffles.

In one implementation, the plurality of individual baffles comprises an inlet baffle near the inlet of the module and an outlet baffle near an outlet of the module. The shell comprises a fluid inlet, a fluid outlet, and a fluid flow path adjacent to an outer wall of the shell. The fluid flow path is not in fluid communication with the inlet baffle and the fluid flow path is in fluid communication with the outlet baffle. The fluid inlet can receive fluid from a portion of the high energy outlet different from a portion of the high energy outlet from which the high energy material is received and the fluid outlet can enable discharge of the fluid from the fluid flow path.

In another implementation, the plurality of individual baffles comprises an inlet baffle near the inlet of the module and an outlet baffle near an outlet of the module. The

shell comprises a fluid inlet, and a fluid flow path adjacent to an outer wall of the shell. The fluid flow path is not in fluid communication with the inlet baffle and is in fluid communication with the outlet baffle. The fluid inlet can receive fluid from a portion of the high energy outlet different from a portion of the high energy outlet from which the high energy material is received and fluid discharge can be enabled through the outlet of the module via the outlet baffle.

It is noted that the module of FIG. 3 includes gaps or chambers between each baffle and the shell which are in fluid communication with one another, but which are not in fluid communication with the internal portions of the baffles. FIG. 4 illustrates an example where the outermost baffle chamber is open to the gap to provide fluid communication from the central chamber to the gap and from the gap of one baffle to the gap of another baffle.

In accordance with some examples, gases from the fluid flow path in the shell of the module can be combined with gases from the central chamber. For example, one or more baffles near the outlet can be open to the fluid flow path while one or more baffles near the inlet can be closed from the fluid flow path. In another example, all of the baffles can be open to the fluid flow path. In another example, central baffles, such as the second and third baffle in from the inlet can be in communication with the fluid flow path to enable combination of gases. Various other configurations are also contemplated and are considered to be within the scope of this disclosure.

Referring to FIG. 5, a close-up view of the inlet end of the module, showing the locking mechanism, the fluid orifices, and so forth. An alignment disk is also included which has annular grooves positioned to correspond to walls in an adjacent baffle.

Referring to FIG. 6, a number of different views of the module are provided for illustrating an assembled module using the components shown in the exploded module view of FIG. 1.

The multiple internal walls of the modules described can provide an increased volume for fluid expansion and increased acoustic absorbent path length. In one aspect, the multiple internal walls are formed by multiple concentric tubes having progressively larger diameters so as to form annular spaces between each adjacent tube, as illustrated in FIGs. 1-2. The laterally serpentine fluid pathway can be formed using a variety of wall

configurations. In one 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 or gaps 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. Orifices can be varied in location, size and number for individual designs.

The module may be part of a modular system for adjustable acoustic suppression in the field. For example, the device can be easily attached or detached to increase or decrease acoustic suppression for various applications. As shown in FIG. 1, the ends can include an engagement mechanism to secure different modules together when desired. Non-limiting examples of suitable engagement mechanisms can include threaded engagement, recessed locking, interference fit, detent locking, and the like.

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).

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.

This technology can resolve or mitigate adverse effects that traditional sound suppressors 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 substantially reduced using the configurations described herein.

Although the devices described are exemplified in terms of firearms, 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.

PROVISIONAL CLAIMS

What is claimed is:

1. A sound reduction module, comprising:

5 a shell having a central chamber oriented along a central axis, said central chamber having an inlet configured to receive a high energy material from a high energy outlet;

10 a plurality of off-axis chambers within the shell concentrically and circumferentially interposed around the central chamber and in fluid communication with the central chamber, the off-axis chambers comprising multiple internal walls for dissipating sound transferred from the high energy material radially outwardly from the central axis, wherein the off-axis chambers are defined by the multiple internal walls.

15 2. The module of claim 1, wherein the shell further comprises an outer wall and the internal walls comprise partially circumferential walls defining a partially circumferential gap between the internal walls and the outer wall.

20 3. The module of claim 1, wherein the off-axis chambers are in fluid communication with the central chamber along a majority of a length of the shell.

4. The module of claim 1, wherein the plurality of off-axis chambers comprise complementarily opposing, off-set, concentric chambers defined by the internal walls.

25 5. The module of claim 1, wherein the internal walls are formed by multiple semi-circular walls having progressively larger diameters so as to form annular spaces between each adjacent wall, wherein each progressively larger diameter semi-circular wall is positioned opposite from each progressively smaller diameter semi-circular wall to achieve the concentrically and circumferentially interposed chambers within the shell.

6. The module of claim 1, wherein at least one of the off-axis chambers further comprises a dampening chamber oriented about the central chamber and being filled with an energy absorbent material.

7. The module of claim 6, wherein the dampening chamber is oriented adjacent an outer wall of the shell.

8. The module of claim 6, wherein the energy absorbent material is a powder tungsten filament.

9. The module of claim 6, wherein the energy absorbent material is a particulate selected from the group consisting of aluminum, stainless steel, carbon steels, iron, copper, tantalum, titanium, vanadium, chromium, zirconium, carbides of these, alloys of these, and combinations thereof.

10. The module of claim 1, wherein the shell comprises a fluid inlet, a fluid outlet, and a fluid flow path adjacent to an outer wall of the shell and not in fluid communication with the central chamber or the plurality of off-axis chambers, wherein:

the fluid inlet is configured to receive fluid from a portion of the high energy outlet different from a portion of the high energy outlet from which the high energy material is received; and

the fluid outlet is configured to enable discharge of the fluid from the fluid flow path.

11. The module of claim 1, wherein the device has substantially no moving parts during operation.

12. The module of claim 1, wherein the central chamber includes a central chamber outlet along the central axis and the high energy material is a bullet.

13. The module of claim 1, wherein at least one of the shell and the multiple internal walls are formed substantially of titanium.

14. The module of claim 1, wherein the plurality of off-axis chambers comprise a plurality of radially offset chambers which are each offset from the central axis and from each other and are fluidly connected to form a laterally serpentine fluid pathway.

15. The module of claim 1, wherein the plurality of off-axis chambers comprises at least 3 sets of off-axis chambers, each set comprising opposing internal walls wherein wall ends of an individual internal wall are offset from wall ends of another individual wall and wherein at least two of the at least three sets of off-axis chambers are substantially circumscribed by at least one of the at least three sets of off-axis chambers.

16. The module of claim 1, wherein the plurality of off-axis chambers defined by the multiple internal walls comprise an individual baffle, and wherein the module comprises a plurality of individual baffles adjacent to one another within the shell.

17. The module of claim 16, wherein each baffle is in fluid communication with the central chamber and otherwise isolated from fluid communication with other baffles.

18. The module of claim 16, wherein each baffle is in fluid communication with the central chamber, and wherein the plurality of off-axis chambers in each baffle comprises a plurality of inner chambers and at least one outer chamber, wherein the plurality of inner chambers of an individual baffle are fluidly isolated from the plurality of inner chambers of another individual baffle other than through the central chamber, and wherein the at least one outer chamber of an individual baffle is in fluid communication with the at least one outer chamber of another individual baffle.

19. The module of claim 16, wherein:

the plurality of individual baffles comprises an inlet baffle near the inlet of the module and an outlet baffle near an outlet of the module;

the shell comprises a fluid inlet, a fluid outlet, and a fluid flow path adjacent to an outer wall of the shell;

the fluid flow path is not in fluid communication with the inlet baffle;

the fluid flow path is in fluid communication with the outlet baffle;

5 the fluid inlet is configured to receive fluid from a portion of the high energy outlet different from a portion of the high energy outlet from which the high energy material is received; and

the fluid outlet is configured to enable discharge of the fluid from the fluid flow path.

10

20. The module of claim 16, wherein:

the plurality of individual baffles comprises an inlet baffle near the inlet of the module and an outlet baffle near an outlet of the module;

the shell comprises a fluid inlet, and a fluid flow path adjacent to an outer wall of the shell;

15

the fluid flow path is not in fluid communication with the inlet baffle;

the fluid flow path is in fluid communication with the outlet baffle;

the fluid inlet is configured to receive fluid from a portion of the high energy outlet different from a portion of the high energy outlet from which the high energy material is received; and

20

the fluid discharge is enabled through the outlet of the module via the outlet baffle.

21. The module of claim 1, wherein the circumferentially interposed plurality of off-axis chambers each comprise an inlet and an outlet and the plurality of off-axis chambers are circumferentially interposed by offsetting the inlet of an individual chamber from the outlet of another individual chamber.

25

22. A sound reduction module, comprising:

a shell having a central chamber oriented along a central axis, said central chamber having an inlet configured to receive a high energy material from a high energy outlet;

a plurality of baffles within the shell, wherein each baffle comprises internal walls defining concentric chambers at least partially circumscribing the central chamber and in fluid communication with the central chamber, the concentric chambers comprising chambers of different diameters, wherein the internal walls are configured to dissipate sound transferred from the high energy material outwardly from the central axis.

23. The module of claim 22, wherein the internal walls define a laterally serpentine fluid pathway which dissipates sound transferred from the high energy material.

24. 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;

an off axis chamber oriented within the outer shell in fluid communication with the central chamber, the off axis chamber comprising a plurality of sound chambers defined by internal walls having semi-circular cross-sections, wherein the sound chambers each comprise different diameters and are alternately opposed one from another.

25. 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;

an off axis chamber oriented within the outer shell in fluid communication with the central chamber, the off axis chamber comprising a plurality of sound chambers formed by multiple semi-circular walls having progressively larger diameters so as to form annular spaces between each adjacent wall, wherein each

progressively larger diameter semi-circular wall is positioned opposite from each progressively smaller diameter semi-circular wall.

26. A sound reduction module, comprising:

5 a shell having a central chamber oriented along a central axis, said central chamber having an inlet configured to receive a high energy material from a high energy outlet; and

10 a plurality of baffles within the shell, wherein each baffle comprises internal walls defining concentric chambers at least partially circumscribing the central chamber and in fluid communication with the central chamber, the concentric chambers comprising chambers of different diameters, wherein the internal walls are configured to dissipate sound transferred from the high energy material outwardly from the central axis;

wherein:

15 the plurality of baffles comprises an inlet baffle near the inlet of the shell and an outlet baffle near an outlet of the shell;

the shell comprises a fluid inlet, and a fluid flow path adjacent to an outer wall of the shell;

20 the fluid flow path is not in fluid communication with the inlet baffle;

the fluid flow path is in fluid communication with the outlet baffle;

the fluid inlet is configured to receive fluid from a portion of the high energy outlet different from a portion of the high energy outlet from which the high energy material is received; and

25 the fluid discharge is enabled through the outlet of the module via the outlet baffle.

27. A sound reduction module, comprising:

30 a shell having a central chamber oriented along a central axis, said central chamber having an inlet configured to receive a high energy material from a high energy outlet; and

a plurality of baffles within the shell, wherein each baffle comprises internal walls defining concentric chambers at least partially circumscribing the central chamber and in fluid communication with the central chamber, the concentric chambers comprising chambers of different diameters, wherein the internal walls are configured to dissipate sound transferred from the high energy material outwardly from the central axis;

wherein:

the plurality of baffles comprises an inlet baffle near the inlet of the shell and an outlet baffle near an outlet of the shell;

the shell comprises a fluid inlet, a fluid outlet, and a fluid flow path adjacent to an outer wall of the shell and not in fluid communication with the central chamber or the plurality baffles;

the fluid inlet is configured to receive fluid from a portion of the high energy outlet different from a portion of the high energy outlet from which the high energy material is received; and

the fluid outlet is configured to enable discharge of the fluid from the fluid flow path.

SOUND REDUCTION MODULE

ABSTRACT OF THE DISCLOSURE

Sound reduction modules are disclosed and described. A module can include a
5 shell having a central chamber oriented along a central axis, said central chamber having an
inlet configured to receive a high energy material from a high energy outlet. Multiple off-
axis chambers can be within the shell and can be concentrically and circumferentially
interposed around the central chamber. The off-axis chambers can be in fluid
communication with the central chamber. The off-axis chambers can include multiple
10 internal walls, and can be defined by the multiple internal walls, the multiple internal walls
be operable for dissipating sound transferred from the high energy material radially
outwardly from the central axis.

15

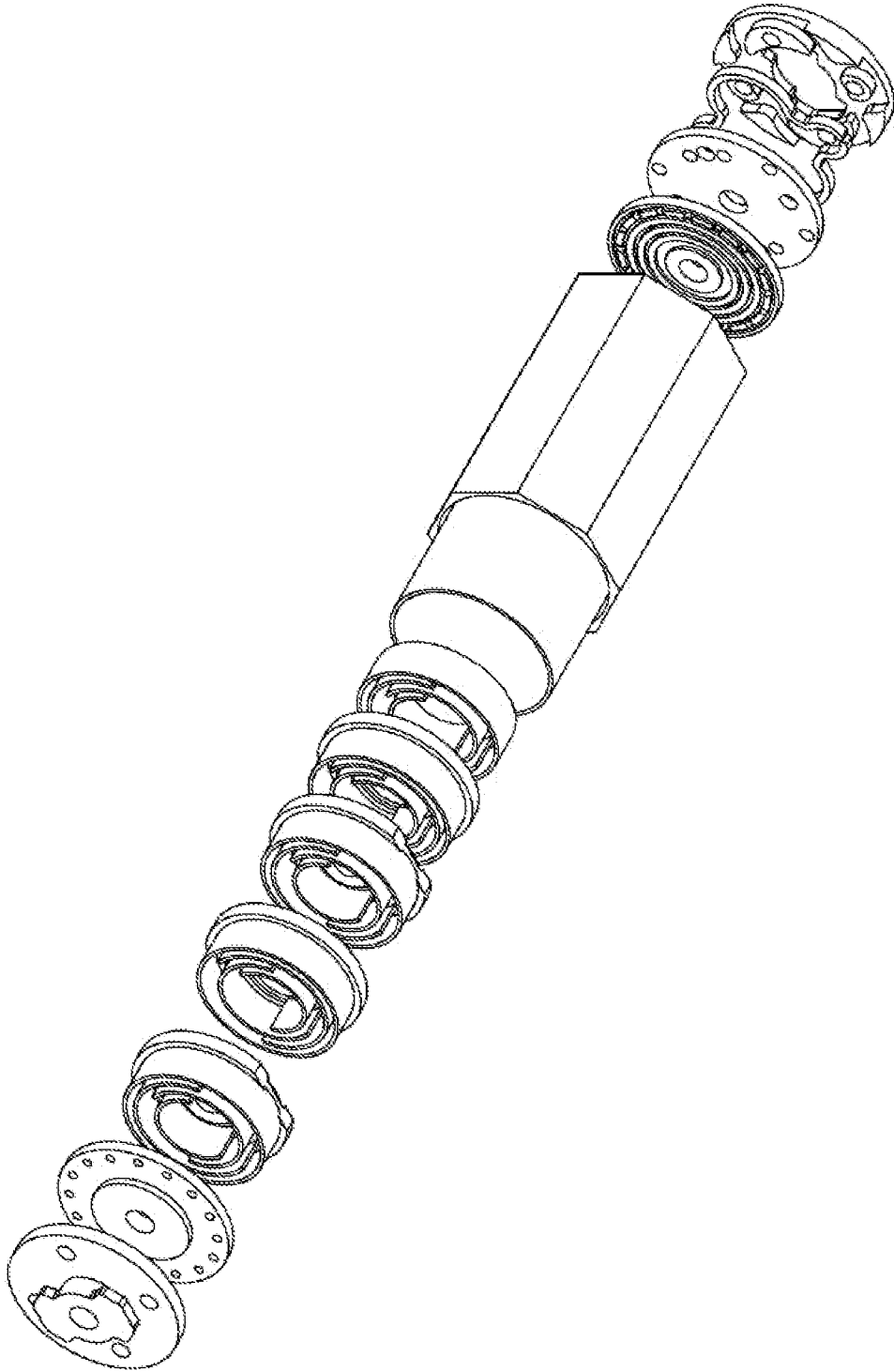


FIG. 1

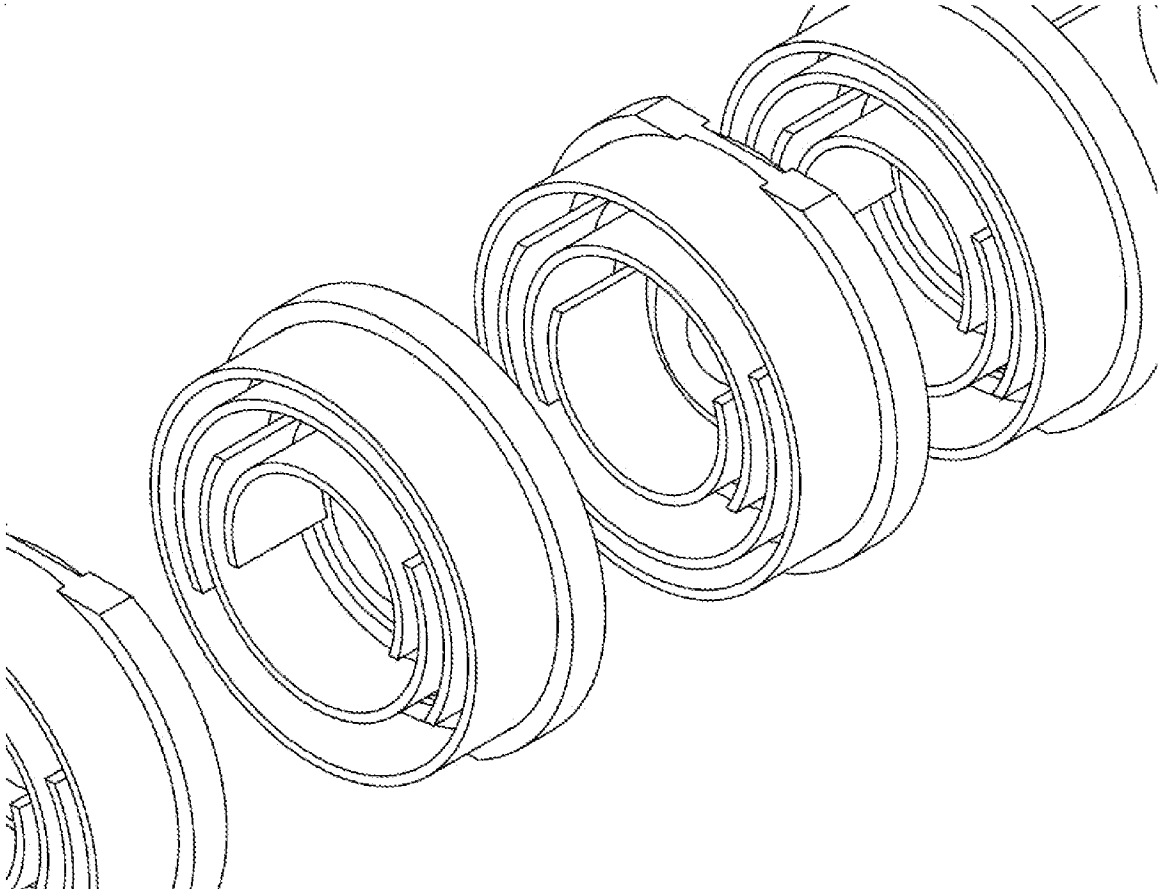
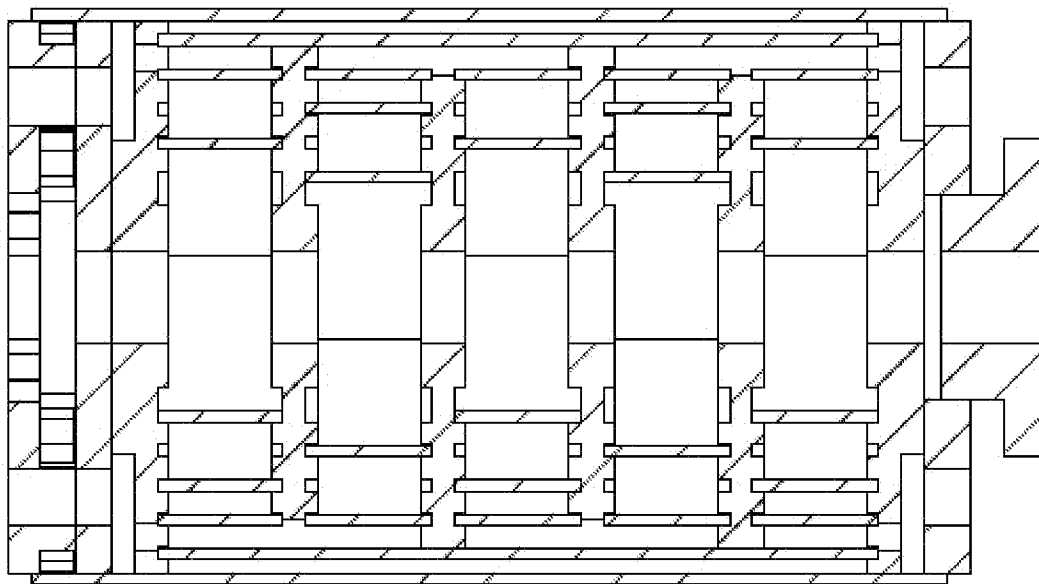
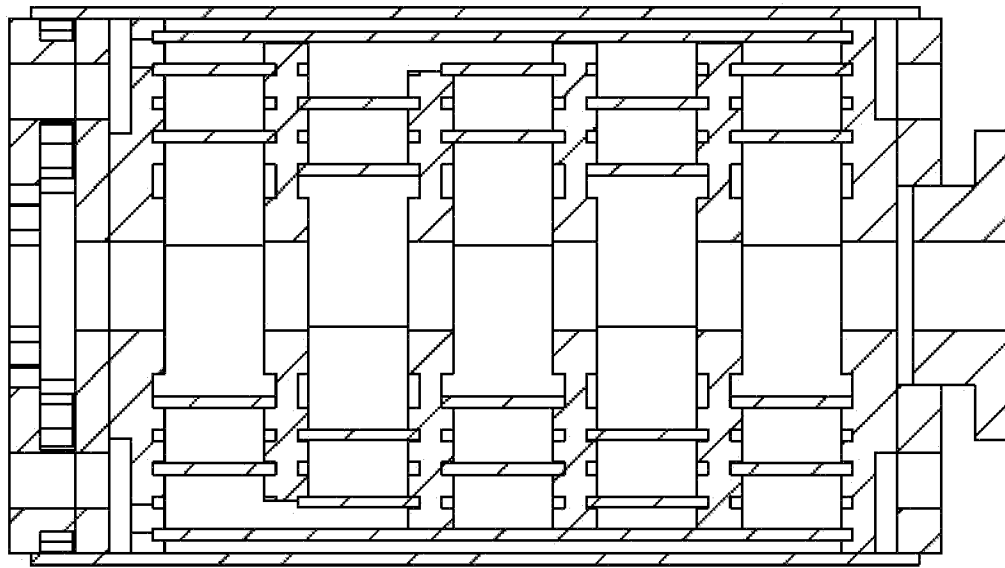


FIG. 2



SECTION A-A
SCALE 1 : 1

FIG. 3



SECTION A-A
SCALE 1 : 1

FIG. 4

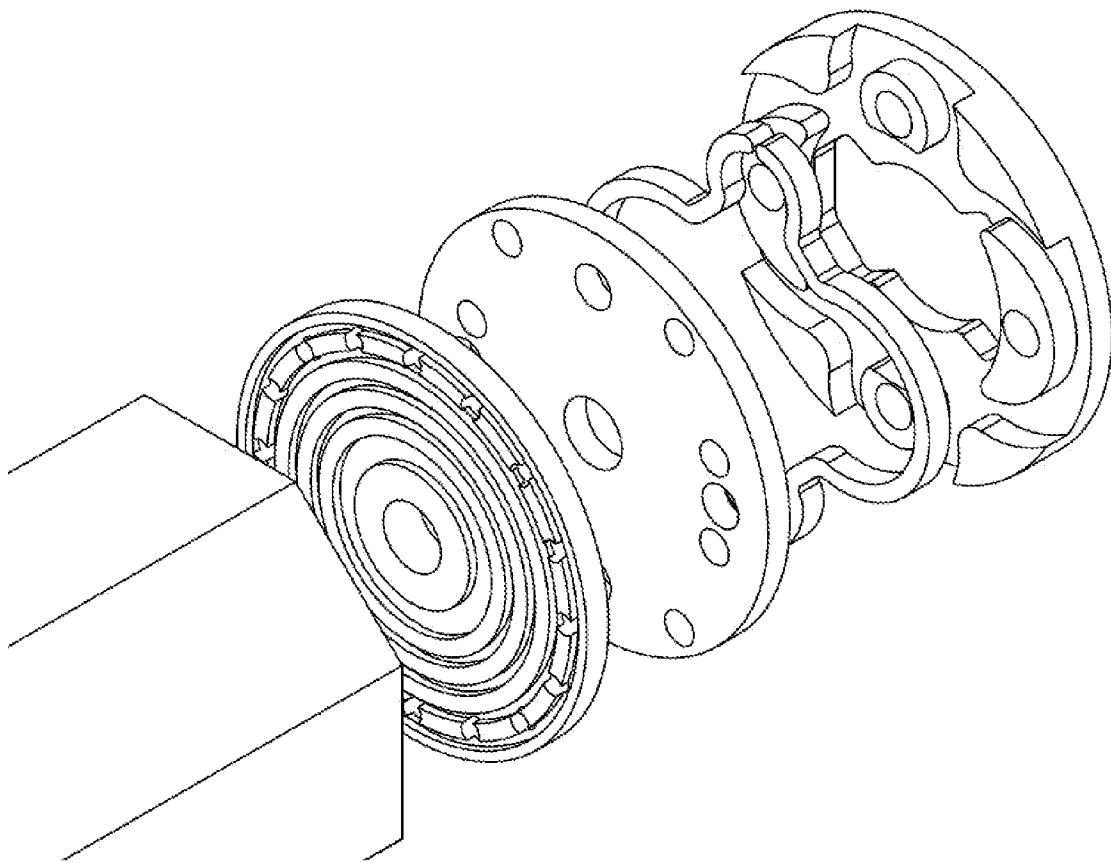


FIG. 5

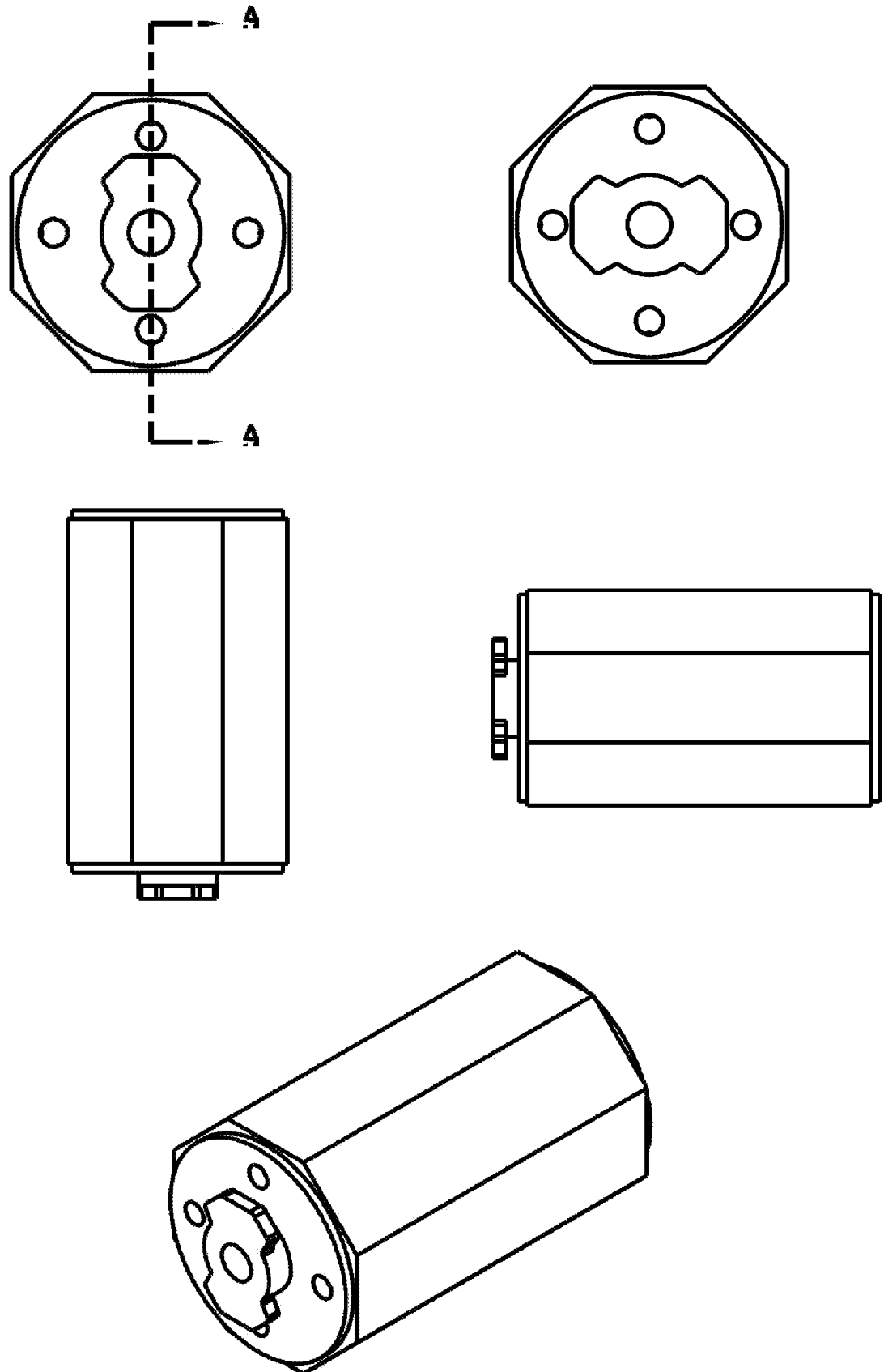


FIG. 6

Electronic Patent Application Fee Transmittal

Application Number:

Filing Date:

Title of Invention:

SOUND REDUCTION MODULE

First Named Inventor/Applicant Name:

Russell Oliver

Filer:

Erik Sun Ericksen/Marla Howlett

Attorney Docket Number:

3212-015.PROV

Filed as Small Entity

Provisional Filing Fees

Description

Fee Code

Quantity

Amount

**Sub-Total in
USD(\$)**

Basic Filing:

Provisional Application filing fee

2005

1

110

110

Pages:

Claims:

Miscellaneous-Filing:

Petition:

Patent-Appeals-and-Interference:

Post-Allowance-and-Post-Issuance:

Extension-of-Time:

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				110

Electronic Acknowledgement Receipt

EFS ID:	8934354
Application Number:	61418285
International Application Number:	
Confirmation Number:	1522
Title of Invention:	SOUND REDUCTION MODULE
First Named Inventor/Applicant Name:	Russell Oliver
Customer Number:	20551
Filer:	Erik Sun Ericksen/Brenda Wiseman
Filer Authorized By:	Erik Sun Ericksen
Attorney Docket Number:	3212-015.PROV
Receipt Date:	30-NOV-2010
Filing Date:	
Time Stamp:	18:29:28
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	\$ 110
RAM confirmation Number	6266
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Transmittal of New Application	3212015Trans.pdf	917383	no	2
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2		3212015ProvApp.pdf	134595	yes	21
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	Specification		1	13	
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Warnings:					
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3	Drawings-only black and white line drawings	3212015Figs.pdf	838543	no	6
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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

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