

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		
	First Named Inventor	David Steimke	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	014.5009	

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Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	6343536	B1	2002-02-05	Rossier et al.			
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	1	20080236379	A1	2008-10-02	Steimke et al.			
	2	20090077852	A1	2009-03-26	Steimke et al.			
	3	20090120276	A1	2009-05-14	Steimke et al.			
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	1							☐

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	First Named Inventor	David Steinke	
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	Attorney Docket Number	014.5009	

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵	
	1		☐	
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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.				

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	Filing Date		
	First Named Inventor	David Steinke	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	014.5009	

CERTIFICATION STATEMENT			
Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):			
☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).			
OR			
☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).			
☐ See attached certification statement.			
☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.			
☒ A certification statement is not submitted herewith.			
SIGNATURE			
A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.			
Signature	/CHAD C. ANDERSON/	Date (YYYY-MM-DD)	2012-07-30
Name/Print	Chad C. Anderson	Registration Number	44505
This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.			

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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.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	014.5009
		Application Number	
Title of Invention	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

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

Applicant 1						Remove	
Applicant Authority ☒ Inventor		☐ Legal Representative under 35 U.S.C. 117		☐ Party of Interest under 35 U.S.C. 118			
Prefix	Given Name	Middle Name	Family Name		Suffix		
	David		Steimke				
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service							
City	La Burlington	State/Province	VT	Country of Residence i	US		
Citizenship under 37 CFR 1.41(b) i		US					
Mailing Address of Applicant:							
Address 1		120 Nottingham					
Address 2							
City	La Burlington	State/Province	VT				
Postal Code	05408	Countryi	US				
Applicant 2						Remove	
Applicant Authority ☒ Inventor		☐ Legal Representative under 35 U.S.C. 117		☐ Party of Interest under 35 U.S.C. 118			
Prefix	Given Name	Middle Name	Family Name		Suffix		
	Glenn		Rossier				
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service							
City	Ferrisburg	State/Province	VT	Country of Residence i	US		
Citizenship under 37 CFR 1.41(b) i		US					
Mailing Address of Applicant:							
Address 1		5220 Rt 7					
Address 2							
City	Ferrisburg	State/Province	VT				
Postal Code	05456	Countryi	US				
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add							

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	014.5009
		Application Number	
Title of Invention	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		

☐ An Address is being provided for the correspondence information of this application.

Customer Number	73411		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		
Attorney Docket Number	014.5009	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	26	Suggested Figure for Publication (if any)	

Publication Information:

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

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

Representative Information:

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Customer Number	73411		

Domestic Benefit/National Stage Information:

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

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61526580	2011-08-23
Prior Application Status		Remove	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	014.5009
		Application Number	
Title of Invention	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61526569	2011-08-23
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

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This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).			
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Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			☐ Yes ☒ No
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Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.			
Assignee 1			Remove
If the Assignee is an Organization check here. ☒			
Organization Name	GENERAL DYNAMICS ARMAMENT AND TECHNICAL PRODUCTS, INC.		
Mailing Address Information:			
Address 1	Four LakePointe Plaza		
Address 2	2118 Water Ridge Parkway		
City	Charlotte	State/Province	NC
Country ⁱ	US	Postal Code	28217-4526
Phone Number		Fax Number	
Email Address			
Additional Assignee Data may be generated within this form by selecting the Add button.			Add

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.			
Signature	/CHAD C. ANDERSON/		Date (YYYY-MM-DD)
			2012-07-30
First Name	Chad C.	Last Name	Anderson
		Registration Number	44505

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	014.5009
		Application Number	
Title of Invention	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		

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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.
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Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		
First Named Inventor/Applicant Name:		David Steimke		
Filer:		Chad Clifford Anderson		
Attorney Docket Number:		014.5009		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	380	380
Utility Search Fee	1111	1	620	620
Utility Examination Fee	1311	1	250	250
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 (\$)				1250

Electronic Acknowledgement Receipt	
EFS ID:	13375813
Application Number:	13562078
International Application Number:	
Confirmation Number:	1130
Title of Invention:	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP
First Named Inventor/Applicant Name:	David Steimke
Customer Number:	13864
Filer:	Chad Clifford Anderson/Aileen Shrestha
Filer Authorized By:	Chad Clifford Anderson
Attorney Docket Number:	014.5009
Receipt Date:	30-JUL-2012
Filing Date:	
Time Stamp:	18:54:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 1250
RAM confirmation Number	6264
Deposit Account	502091
Authorized User	INGRASSIA FISHER & LORENZ PC
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20120730_FinalApp_0145009.pdf	165280	yes	35
			0aac65d5b8327f371c2ce89b5f4ea410214b0d89		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	29	
	Claims		30	34	
	Abstract		35	35	
Warnings:					
Information:					
2	Drawings-only black and white line drawings	20120730_FormalDrawings_0145009.pdf	2474846	no	26
			04440ebca4c6ff56ffde56a4849f32b54a8d074		
Warnings:					
Information:					
3	Oath or Declaration filed	20120730_Declaration_0145009.pdf	790577	no	3
			5fd899b030460de8222ea559595c60bad1a95018		
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Form (SB08)	20120730_IDS_0145009.pdf	612217	no	4
			d79010cd2064640ffe79606fb6ba52c0700ad1		
Warnings:					
Information:					
5	Application Data Sheet	20120730_ADS_0145009.pdf	837478	no	5
			473f6a91189e5902a61cb6295f0889fc4e68d1c		
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	33167	no	2
			e2fe1c6a567fd1ee7148f5099d4c44e42b63b		
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Total Files Size (in bytes):			4913565		

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National Stage of an International Application under 35 U.S.C. 371

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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.

UTILITY PATENT APPLICATION

WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP

PRIORITY CLAIMS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/526,569, filed August 23, 2011, and U.S. Provisional Application No. 61/526,580, filed August 23, 2011, each of which is hereby incorporated by reference.

TECHNICAL FIELD

[0002] The present invention generally relates to weapon systems, and more particularly relates to automatic weapon systems with short recoil impulse averaging operating groups.

BACKGROUND

[0003] The desirability of more powerful, yet smaller, machine guns and other types of automatic weapon systems is increasing. In some conventional weapon systems, operating systems with impulse averaging have been used to mitigate the recoil loads and receiver excitation, particularly in systems that use higher impulse rounds. Typically, these operating systems require fixing the barrel to the operating group to create a relatively massive, long recoil stroke operating group.

[0004] There are several drawbacks to these conventional systems. The long stroke excursion of such a large mass may reduce firing rate and add complexity to the weapon. Additionally, such weapons may be sensitive to recoiling mass, and therefore, barrel weight. Moreover, such weapons may be sensitive to variation in friction and gravity effects.

[0005] Accordingly, it is desirable to provide improved weapon systems to address these issues. Furthermore, other desirable features and characteristics of the present invention will become apparent from the subsequent detailed

UTILITY PATENT APPLICATION

description of the invention and the appended claims, taken in conjunction with the accompanying drawings and this background of the invention.

BRIEF SUMMARY

[0006] In accordance with an exemplary embodiment, a weapon system is provided for firing a round. The weapon system includes a receiver and an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition. The operating group includes a barrel extension at least partially housed within the receiver and arranged to axially translate relative to the receiver; an operating rod (op-rod) assembly at least partially housed and arranged to axially translate within the barrel extension in the charge condition, the firing condition, and the recoil condition; and a bolt assembly coupled to the op-rod assembly and at least partially housed and arranged to axially translate within the barrel extension. The system further includes a barrel coupled to the barrel extension and defining a chamber; a gas accelerator with a first end coupled to the barrel and a second end coupled to the op-rod assembly; and a buffer assembly including a drive spring having a first end coupled to the receiver and a second end coupled to the op-rod assembly. In the charged condition, the op-rod assembly and the bolt assembly are retracted against the drive spring. In the firing condition, the op-rod assembly and bolt assembly are driven by the drive spring such that the round is guided into the chamber and the op-rod assembly and bolt assembly are locked to the barrel extension and a forward momentum of the op-rod assembly is imparted to the operating group and the round is fired. A portion of an impulse of the fired round stops the forward momentum of the operating group. In the recoil condition, the operating group is driven rearward by the remaining portion of the impulse of the fired round, the gas accelerator imparts additional rearward momentum to the op-rod assembly and bolt assembly and stops rearward momentum of the barrel and

UTILITY PATENT APPLICATION

barrel extension, and the op-rod assembly and the bolt assembly are stopped by the drive spring.

[0007] In accordance with another exemplary embodiment, a method is provided for firing a weapon. The method includes retracting a bolt assembly and an operating rod (op-rod) assembly relative to a barrel extension against a drive spring; driving the bolt assembly and the op-rod assembly with a forward momentum within the barrel extension such that the bolt assembly chambers a round and contacts the barrel extension, imparting forward momentum to the op-rod assembly, the bolt assembly and the barrel extension such that the round is fired, whereby the firing of the round stops the forward momentum and imparts an impulse of rearward momentum on the op-rod assembly, the bolt assembly, and the barrel extension; guiding gases from the round with a gas accelerator to drive the op-rod assembly rearward and to stop the rearward momentum of the barrel extension; and absorbing the rearward momentum of the op-rod assembly with the drive spring.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The present invention will hereinafter be described in conjunction with the following drawing figures, wherein like numerals denote like elements, and

[0009] FIG. 1 is an isometric view of a weapon system 10 according to an exemplary embodiment;

[0010] FIG. 2 is an isometric view of a receiver assembly of the weapon system of FIG. 1 according to an exemplary embodiment;

[0011] FIG. 3 is an isometric view of a receiver of the receiver assembly of FIG. 2 according to an exemplary embodiment;

[0012] FIG. 4 is a top isometric view of a feeder assembly of the weapon system of FIG. 1 according to an exemplary embodiment;

[0013] FIG. 5 is a top isometric view of a feed tray of the feeder assembly of FIG. 4 according to an exemplary embodiment;

UTILITY PATENT APPLICATION

[0014] FIG. 6 is an isometric view of the underside of a feeder of the feeder assembly of FIG. 4 according to an exemplary embodiment;

[0015] FIG. 7 is an isometric view of an operating group of the weapon system of FIG. 1 according to an exemplary embodiment;

[0016] FIG. 8 is an isometric view of a barrel extension of the operating group of FIG. 7 according to an exemplary embodiment;

[0017] FIG. 9 is a longitudinal cross-sectional view of the barrel extension of FIG. 8 according to an exemplary embodiment;

[0018] FIG. 10 is an isometric view of a bolt assembly of the operating group of FIG. 7 according to an exemplary embodiment;

[0019] FIG. 11 is a partial cross-sectional isometric view of the bolt assembly of FIG. 10 according to an exemplary embodiment;

[0020] FIG. 12 is an isometric view of an op-rod assembly of the operating group of FIG. 7 according to an exemplary embodiment;

[0021] FIG. 13A is a partial longitudinal cross-sectional view of the op-rod assembly of FIG. 12 according to an exemplary embodiment;

[0022] FIG. 13B is a partial end view of the op-rod assembly of FIG. 12 according to an exemplary embodiment;

[0023] FIG. 14 is an exploded isometric, partially cross-sectional view of the operating group of FIG. 7 according to an exemplary embodiment;

[0024] FIG. 15 is an isometric view of a barrel assembly and a gas accelerator of the weapon system of FIG. 1 according to an exemplary embodiment,

[0025] FIG. 16 is a cross-sectional view of the gas accelerator of FIG. 15 according to an exemplary embodiment;

[0026] FIG. 17 is a cross-sectional view of a buffer assembly of the weapon system of FIG. 1 according to an exemplary embodiment;

[0027] FIGS. 18A, 18B, and 19-24 are partial cross-sectional views of the weapon system of FIG. 1 in various positions of an exemplary firing cycle;

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[0028] FIG. 25 is a graph depicting velocity over time during the firing cycle depicted in FIGS. 18B-24 according to an exemplary embodiment;

[0029] FIG. 26 is a partial cross-sectional view of a barrel release mechanism for the weapons system according to an exemplary embodiment; and

[0030] FIG. 27 is a graph depicting examples of recoil reduction as a function of mount stiffness for exemplary weapon system relative to conventional weapon systems.

DETAILED DESCRIPTION

[0031] The following detailed description is merely exemplary in nature and is not intended to limit the invention or the application and uses of the invention. As used herein, the word “exemplary” means “serving as an example, instance, or illustration.” Thus, any embodiment described herein as “exemplary” is not necessarily to be construed as preferred or advantageous over other embodiments. Throughout the specification, the use of the terms “front” or “forward” refer to the muzzle end of the firearm or toward the muzzle, and the terms “aft,” “rear,” or “rearward” refer to the buttstock end of the firearm or toward the buttstock. Some of the figures discussed below may include a legend clarifying these directions relative to the respective view. Similarly, the use of the term “axial” refers to a direction parallel to the longitudinal axis of the weapon system and the term “radial” refers to a direction perpendicular to the longitudinal axis of the weapon system. All of the embodiments described herein are exemplary embodiments provided to enable persons skilled in the art to make or use the invention and not to limit the scope of the invention which is defined by the claims. Furthermore, there is no intention to be bound by any expressed or implied theory presented in the preceding technical field, background, brief summary, or the following detailed description.

[0032] FIG. 1 is an isometric view of a weapon system 10 according to an exemplary embodiment. The weapon system 10 generally includes a receiver

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assembly 100, a feeder assembly 200, an operating group 300, a barrel assembly 400, a gas accelerator 500, and a buffer assembly 600. As described in greater detail below, the components or assemblies of the weapon system 10 cooperate to fire a round according to a short recoil impulse averaging principle of operation. Each of the components or assemblies will be introduced prior to a more detailed explanation of the firing cycle.

[0033] FIG. 2 is an isometric view of the receiver assembly 100 removed from the other components of the weapon system 10 according to an exemplary embodiment. With continuing reference to FIG. 1, in general, the receiver assembly 100 functions to at least partially house the operating group 300 and to provide interfaces for operating the weapon system 10. As shown, the receiver assembly 100 includes a receiver 110, a trigger group 150, and a buttstock assembly 170. The buttstock assembly 170 is mounted onto the aft end of the receiver 110 to provide a rest or brace for the user. The trigger group 150 is mounted on the underside of the receiver 110 to actuate the weapon system 10, as described below. In one exemplary embodiment, the trigger group 150 includes a grip 152, a trigger 154, a trigger guard 156, and a safety lever 158. As discussed below, the trigger 154 is coupled to a sear that selectively engages the operating group 300. As such, when charged, pulling the trigger 154 pivots the sear to release the operating group 300 to initiate firing of the weapon system 10. The trigger group 150 may be configured for automatic or semi-automatic modes.

[0034] FIG. 3 is an isometric view of the receiver 110 removed from the receiver assembly 100 of FIG. 2. As shown, the receiver 110 includes a receiver housing 112, an aft rail 114, forward rails 120, a cover 130, a buttstock interface 132, a trigger interface 134, a charger rail 140, a feeder hinge 144, an operating group guide 146, and first and second grips 148.

[0035] With continuing reference to FIGS. 1-2, as described in greater detail below, the receiver housing 112 functions to at least partially house the operating group 300 and to support the other components of the receiver 110. Generally,

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the receiver housing 112 is U-shaped with two side walls 180, 182 and a bottom wall 184 that define a cavity 186. The cover 130 spans the side walls 180, 182 to at least partially enclose the cavity 186. One or both side walls 180, 182 define a charging port 141 for accommodating actuation of a charger handle (not shown) during operation. Similarly, the charger rail 140 is positioned on the sides of the receiver housing 112 around the charging port 141 to guide movement of the charger handle (not shown). As discussed below, the charger handle is arranged to charge the weapon and initiate the firing cycle. One or both side walls 180, 182 additionally define an ejection window 183.

[0036] Still referring to FIG. 2, the buttstock interface 132 is formed on the receiver housing 112 and/or cover 130 to facilitate attachment and detachment of the buttstock assembly 170 relative to the receiver 110. Similarly, the trigger interface 134 provides attachment points to facilitate attachment and detachment of the trigger group 150. Any suitable pin, detent, catch, or other coupling feature may be provided as part of the buttstock and trigger interfaces 132 and 134. As also discussed in greater detail below, the feeder hinge 144 provides an interface for mounting the feeder assembly 200, and the operating group guide 146 provides a radial guide for axial movement of the operating group 300.

[0037] The first and second grips 148 are arranged at positions on the receiver housing 112 to provide a comfortable grip for the user. The aft rail 114 is mounted on the cover 130, generally on the top side of the receiver 110, and the forward rails 120 are mounted on the front of the receiver housing 112 with the forward grip 148, generally on the side of the receiver 110, to enable attachment of complimentary weapon system elements.

[0038] With continuing reference to FIGS. 1-3, FIG. 4 is a top isometric view of the feeder assembly 200 removed from the other components of the weapon system 10 according to an exemplary embodiment. Generally, the feeder assembly 200 is mounted on the receiver assembly 100 to provide rounds 202 to the operating group 300. The feed assembly 200 includes a feed tray 210 and a

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feeder 250. As shown in FIG. 4, the feed tray 210 is positioned underneath the feeder 250 such that the feed tray 210 supports and guides a series of rounds 202 indexed by the feeder 250. Consecutive rounds 202 are coupled together by links creating an ammunition belt, and each round 202 typically includes a bullet, a case, a primer, and propellant. The general structure of the feed tray 210 and feeder 250 will be described with reference to FIGS. 5 and 6, and a more detailed description of operation will be discussed below with reference to the firing cycle.

[0039] FIG. 5 is a top isometric view of the feed tray 210 of FIG. 4 in accordance with an exemplary embodiment. The feed tray 210 has a body 212 with side walls 216, 218 and a tray base 220. As shown, the side walls 216, 218 define a bellmouth inlet 214 for receiving the linked rounds 202. During operation, and as discussed in greater detail below, the rounds 202 are indexed through the bellmouth inlet 214, fed to the operating group 300 at round stops 222, and the empty link is ejected through eject guide 224.

[0040] FIG. 6 is an isometric view of the underside of the feeder 250 of FIG. 4 in accordance with an exemplary embodiment. The feeder 250 includes a housing 252 that mates with the receiver assembly 100 and houses the other components of the feeder assembly 200. For example, the housing 252 has side walls 254, 256 defining a feed port 258 and a link eject port 260 that respectively accommodate the inlet 214 and eject guide 224 discussed in reference to FIG. 5. The feeder 250 further includes a feed index cam 270 mounted on the underside of the housing 252 and configured to rotate about pivot 276. The feed index cam 270 includes a cam path 272 and a lever 274 coupled to the cam path 272. A support rail 278 is also mounted to the housing 252 and cooperates to actuate the feed index cam 270 during operation. The lever 274 functions to actuate a drive pawl 280 and feed shuttle 282 mounted to translate laterally on the underside of the housing 252. Forward and aft cartridge guides 283 and cartridge stripping guide 285 are mounted to the underside of the housing 252 to position and guide the rounds 202 indexed through the feeder 250. Cartridge stripping guide 285

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also holds the ammunition link to the rear during cartridge ram. FIG. 6 additionally illustrates hinge assembly 290 that interacts with the feeder hinge 144 (FIG. 3) of the receiver assembly 100 (FIG. 1) to pivot the housing 252 during loading operations. Generally, the feeder assembly 200 is sized and located to accommodate the maximum forward and aft positions of the operating group 300 while enabling the bolt to translate beneath it and enabling presentation of rounds 202 approximately one half a cartridge length aft of the barrel for chambering.

[0041] With continuing reference to FIGS. 1-6, FIG. 7 is an isometric view of the operating group 300 removed from the other components of the weapon system 10 according to an exemplary embodiment. In general, the operating group 300 functions to position and fire the round 202, eject the cartridge case and empty link, and in cooperation with other components, enable short recoil impulse averaging operation. As described in more detail below, the operating group 300 generally includes a barrel extension 310, a bolt assembly 340, and an operating rod (“op-rod”) assembly 370. In one exemplary embodiment, the operating group 300 is at least partially housed in the receiver housing 112 for axial translation. The bolt assembly 340 and op-rod assembly 370 translate within the barrel extension 310, and during various positions discussed below, the barrel extension 310, bolt assembly 340, and op-rod assembly 370 are secured and released from one another for joint or independent movement.

[0042] FIG. 8 is an isometric view of the barrel extension 310 removed from the other components of the operating group 300 according to an exemplary embodiment, and FIG. 9 is a longitudinal cross-sectional view of the barrel extension 310 of FIG. 8. FIGS. 8 and 9 will be discussed together.

[0043] The barrel extension 310 has a number of elements that cooperate with the bolt assembly 340 and op-rod assembly 370, as well as the other components of the weapon system 10, to assist in weapon operation. In general, the barrel extension 310 is mounted within the receiver assembly 100 to move freely

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forward and aft with little or no resistance to prevent or mitigate energy storage or transfer to the receiver assembly 100.

[0044] As shown in FIG. 8, the outer surface of the barrel extension 310 defines longitudinal receiver tracks 312 on opposite sides of the barrel extension 310. The receiver tracks 312 provide an interface for axial translation of the barrel extension 310 relative to the receiver assembly 100. The top side of the barrel extension 310 is generally open to interface with the feed assembly 200, while the underside of the barrel extension 310 is also generally open to receive the bolt assembly 340 and op-rod assembly 370. The side surfaces of the barrel extension 310 define an ejection window 313 that lines up with the ejection window 183 (FIG. 3) of the receiver assembly 100.

[0045] As best shown by the cross-sectional view of FIG. 9, the interior surface of the barrel extension 310 defines axially extending bolt tracks 320 to guide the bolt assembly 340 relative to the barrel extension 310. The bolt tracks 320 further define a barrel extension lock 319 extending from the interior surface of the barrel extension 310 that functions to temporarily lock the barrel extension 310 to the bolt assembly 340 during a portion of the firing cycle. The bolt assembly 340 is further guided, as discussed below, by hold-up cams 321 defined in the side surfaces of the barrel extension 310. Each hold-up cam 321 extends in an axial direction and terminates at a cam relief 323 on a forward end. The cam relief 323 extends radially downward relative to the main portion of the hold-up cams 321.

[0046] With continuing reference to FIGS. 1-7, as further illustrated in FIGS. 8 and 9, the interior surface of the barrel extension 310 further defines op-rod tracks 322 to guide the rear of the op-rod assembly 370 relative to the barrel extension 310. The forward end of the barrel extension 310 defines a barrel interface 330 for the barrel assembly 400, and a buffer interface 334 for coupling the barrel extension 310 to the buffer assembly 600. The barrel interface 330 includes locking lugs 331 formed on the interior surface of the forward end of the

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barrel extension 310 and a helix lock surface 332 extending around an upper periphery of the aft end of the barrel extension 310. As such, the locking lugs 331 are raised relative to the interior surface in circumferential sections, and the helix lock surface 332 is a flange defining at least one gap. The locking lugs 331 and helix lock surface 332 cooperate with corresponding elements of the barrel assembly 400 to form a quick release mechanism. The buffer interface 334 is a downwardly extending protrusion that is configured to guide the forward portion of the op-rod assembly 370 and mate with an extension of the buffer assembly 600, which functions to resist axial movement of the barrel extension 310 with little or no return energy. As also shown in FIG. 9 and discussed in greater detail below, the barrel extension 310 further includes a round guide 314 and ejector 316 for respectively guiding a round and round casing during the firing cycle. In particular, the round guide 314 is fixed sloping downward to guide a round 202 presented by the feed assembly 200 into a chamber of the barrel assembly 400 (FIG. 16), and the ejector 316 is fixed, extending radially inward to engage one side of a round case base to rotate the case out of the weapon system 10, as discussed below.

[0047] With continuing reference to FIGS. 1-9, FIG. 10 is an isometric view of the bolt assembly 340 removed from the other components of the operating group 300 according to an exemplary embodiment, and FIG. 11 is a partial cross-sectional isometric view of the bolt assembly 340 according to an exemplary embodiment. As shown, the bolt assembly 340 includes a lock block 342 coupled to a bolt 360. The bolt assembly 340 generally includes first and second rails 344, 346 extending from a base 347. The base 347 defines a rear face 341 that engages the barrel extension 310 at some positions of the firing cycle.

[0048] On one end of the lock block 342, a cam shaft 348 mounted between the two rails 344, 346. The cam shaft 348 includes a central portion 349 between the two rails 344, 346 and end portions 350 extending outside of the two rails 344,

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346. As described below, the cam shaft 348 is positioned to engage corresponding cams in the barrel extension 310 and the op-rod assembly 370.

[0049] The bolt 360 is coupled to the lock block 342 and generally includes a body 362 with a rammer 364 extending from the top of the body 362 and an extractor 366 mounted on the side of the body 362. The body 362 of the bolt 360 further defines an ejector slot 368. The rammer 364 is mounted in a groove formed in the top side of the bolt 360 to pivot about an axis perpendicular to the bolt axis. A rammer spring 365 biases the rammer 364 in an up-pivoting position. The extractor 366 is mounted in a groove formed on the bolt 360 so as to pivot about an axis perpendicular to the bolt axis against the bias of an extractor spring (or springs) 367. As described in greater detail below, the rammer 364 functions to position a round for firing, and the extractor 366 guides the case from the fired round on the bolt face until contacted by ejector 316 through the ejector slot 368. The body 362 further defines a firing pin guide 363 for guiding a firing pin 390.

[0050] In this exemplary embodiment, the firing pin 390 is housed on in the bolt assembly 340, and a hold spring 392 on the bolt assembly 340 generally holds the firing pin 390 in a retracted position. In the depicted position, partially shown in FIG. 11 and depicted in greater detail in subsequent FIGS, the interaction of a hold cam protrusion 396 extending from the firing pin 390 and a hold cam 394 formed on the inclined surface of the lock block 342 prevents the firing pin 390 from moving forward. During the firing cycle, as described below, the lock block 342 may pivot downward due to the interaction of aft end of the lock block 342 and a forward end of the op-rod assembly 370 and/or due to the interaction of a cam shaft 348 on the lock block 342 and a cam 286 on the op-rod assembly 370. Other embodiments may be arranged differently, such as an embodiment in which a firing pin is mounted on the op-rod assembly.

[0051] FIG. 12 is an isometric view of the op-rod assembly 370 removed from the other components of the operating group 300 (FIG. 7) according to an exemplary embodiment. FIG. 13A is a longitudinal cross-sectional view and a

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partial end view, respectively, of the op-rod assembly 370 of FIG. 12. FIGS. 12, 13A and 13B will be discussed together.

[0052] As best shown by FIG. 12, and with continuing reference to FIGS. 1-11, the op-rod assembly 370 has an elongated body portion 372 and a top portion 380 on a top surface of an aft end 375 of the body portion 372. As discussed below, the body portion 372 of the op-rod assembly 370 is generally situated underneath the barrel extension 310. As also discussed below, the body portion 372 includes a forward extension 374 coupled to the gas accelerator 500 and an aft end 375. The aft end 375 is housed within the receiver assembly 100 and accommodates the buffer assembly 600 in a cavity 376 defined by side rails 378, 379. The op-rod assembly 370 is coupled to or otherwise engages a charging handle 371 that extends horizontally from the side of the body portion 372 and out of one of the charging ports 141 of the receiver assembly 100, as particularly shown in FIG. 13B. The charging handle 371 enables an operator to translate the op-rod assembly 370 in a rearward direction to charge the weapon system 10 in preparation for firing.

[0053] The top portion 380 of the op-rod assembly 370, as best shown in FIG. 13A, includes an upwardly extending feed roller 382 mounted on a roller shaft 384. As also shown in FIG. 13A and discussed in more detail below, the op-rod assembly 370 includes a spring retainer 371 to engage a drive spring (e.g., drive spring 670 in FIG. 17). The top portion 380 further defines a cam 386 for interacting with other components of the operating group 300. Additionally, the top portion 380 has a forward face 381 that functions as a forward stop surface relative to the bolt assembly 340 during operation, and an aft face 382 that functions as an aft stop surface relative to the buffer assembly 600 during operation. In general, the op-rod assembly 370 has a relatively long excursion compared to the barrel extension 310 during operation.

[0054] In this exemplary embodiment, a firing pin 388 is mounted in the bolt assembly 340, although in other embodiments, a firing pin may be positioned on

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other components. The feed roller 382, cam 386, and firing pin 388 will be discussed in greater detail below in the description of the firing and feed cycles.

[0055] FIG. 14 is an exploded isometric, partially cross-sectional view of the operating group 300 and more clearly shows the interaction of the barrel extension 310, the bolt assembly 340, and the op-rod assembly 370. As introduced above, the bolt assembly 340 is configured to translate within the barrel extension 310 on bolt tracks 320. As described below, during portions of the firing cycle, the cam shaft ends 350 of the bolt assembly 340 are positioned within the hold-up cam 321. As indicated by the dashed lines, the central portion 349 of the cam shaft 348 is positioned within the cam 386 of the op-rod assembly 370. As a result of this arrangement, the cams 321, 386 cooperatively guide the position of the bolt assembly 340 during the op-rod 370 translation through the barrel extension 310.

[0056] FIG. 15 is an isometric view of the barrel assembly 400 and the gas accelerator 500 removed from the other components of the weapon system 10 according to an exemplary embodiment, and FIG. 16 is a cross-sectional view of the gas accelerator 500 according to an exemplary embodiment. The barrel assembly 400 generally includes a barrel 410 defining a chamber 411 and a bore 412 for guiding a fired round out of the weapon system 10 (FIG. 1). A flash suppressor 414 or other ancillary device may be mounted on the forward end of the barrel 410, and a barrel handle 416 and a release (or quick-release) mechanism 450 may be mounted on the aft end of the barrel 410 for coupling and decoupling the barrel assembly 400 to the barrel extension 310 (FIG. 8). In general, the release mechanism 450 includes barrel locking lugs 451 extending in partial helix sections around the outer surface of the aft end of the barrel sleeve, which is able to rotate about the barrel axis through a sector from locked to unlocked positions. The release mechanism 450 also includes a barrel lock 452 and lock projection 453 mounted for radial actuation on the barrel handle 416. Although not shown, the release mechanism 450 includes a locking spring housed in the barrel handle

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416 that biases the barrel lock 452 and the lock projection 453 downward, towards the chamber 441. The release mechanism 450 is discussed in greater detail below with reference to FIG. 26.

[0057] The gas accelerator 500 is mounted on the barrel 410. Particularly, as best shown in FIG. 16, the gas accelerator 500 has a housing body 510 with an inlet 512 fluidly coupled to the bore 412 via a port 417 in the barrel 410. The inlet 512 is fluidly coupled to a chamber 514 defined by the body 510. A vented cap 516 covers one end of the chamber 514. A poppet valve 520 defines the other end of the chamber 514 and is positioned to axially translate within the body 510. An end portion 522 of the poppet valve 520 is configured to be coupled to op-rod assembly 370. The poppet valve 520 and/or body 510 may define vents 526. As the poppet valve 520 moves forward and aft through the body 510, at least some of the gas within the body 510 may be forced out of the vents 526, thereby preventing or mitigating stagnant gases and the accumulation of dirt or debris in the gas accelerator 500.

[0058] As shown, in the illustrated exemplary embodiment, the gas accelerator 500 is arranged completely outside of the receiver assembly 100. In this respect, the gas accelerator 500 may be considered self-cleaning since the vents 526 of the poppet valve 520 do not vent gas from the barrel 410 into the interior of the receiver assembly 100. This prevents dirt and other debris from fouling the receiver assembly 100 and/or operating group 300. Additional details about the operation of the gas accelerator 500 are discussed below.

[0059] FIG. 17 is a cross-sectional view of the buffer assembly 600 in accordance with an exemplary embodiment. As described in greater detail below, the buffer assembly 600 axially couples the barrel extension 310 to the receiver assembly 100 to generally prevent or mitigate transfer of energy between the operating group 300 (and barrel assembly 400) and the receiver assembly 100. The buffer assembly 600 includes a housing 610 that houses a centering spring 620 and a piston assembly 640. In general, the centering spring 620 is a

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preloaded double acting spring which functions as bias spring keeping the barrel Extension in the same position under static loading and provide an energy absorption mechanism that tends to mitigate energy storage or return during firing when the preload is exceeded.

[0060] A piston rod 650 extends in a forward direction through and out of the housing 610 to couple the buffer assembly 600 to the barrel extension 310 via an attachment ball 654 at buffer interface 334 (FIG. 9). The piston assembly 640 includes a piston 642 with fluid conduits 644 configured to translate within a chamber 646 containing hydraulic fluid. The hydraulic fluid flows through the conduits 644 to resist movement based on the velocity of the piston 642. At higher velocities, the resistance is increased. The position of the piston 642 within the chamber 646 is generally maintained by self-centering spring 620 arranged on the piston rod 650. The piston rod 650 additionally extends out of the housing 610 to couple the buffer assembly 600 to the barrel extension 310 (FIG. 1) via an attachment ball 654.

[0061] The buffer assembly 600 further includes a drive spring 670 mounted on the housing 610. One end 672 of the drive spring 670 is coupled to the receiver assembly 100 (FIG. 2), and the other end 674 engages the op-rod assembly 370 (FIG. 12). The forward end 674 of the drive spring 670 contacts the spring retainer 373 (FIG. 13A) which engages and biases the op-rod assembly 370 forward such that the op-rod assembly 370 may be translated in a rearward direction to charge the weapon system and initiate the firing cycle, as will now be discussed.

[0062] As an introduction, the firing cycle may be summarized as follows, with continuing reference to FIGS. 1-17: 1) the barrel assembly 400 with the barrel extension 310, the op-rod assembly 370, and the bolt assembly 340 are generally arranged to translate axially relative to the receiver assembly 100; 2) the op-rod assembly 370 and bolt assembly 340 are charged rearward and driven forward by the drive spring 670; 3) the bolt assembly 340 chambers the round

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202, unlocks from the op-rod assembly 370, locks to the barrel extension 310, and transfers forward momentum to the barrel extension 310; 4) the op-rod assembly 370 transfers forward momentum to the barrel extension 310 and fires the round; 5) the forward momentum of the barrel extension 310, the op-rod assembly 370, and the bolt assembly 340 are stopped by the round impulse and driven rearward; 6) the gas accelerator 500 drives the op-rod assembly 370 rearward and stops the rearward momentum of the barrel extension 310; and 7) the op-rod assembly 370 is stopped by the drive spring 670 and any extra energy of the op-rod is stopped by impacting the buffer ball 654 and transferring that energy to the barrel extension. Any excessive energy due to impulse imbalance or op-rod transfer energy on the barrel extension 310 is stopped by the buffer assembly 600. This energy balance occurs with little or no energy being transferred to the receiver assembly 100, and thus, the operator. A more detailed description of the firing cycle will be provided with the assistance of FIGS. 18A, 18B and 19-24.

[0063] FIG. 18A is a complete cross-sectional view of the weapon system 100 described below. FIGS. 18B and 19-24 are partial, more detailed cross-sectional views of the weapon system 10 in various positions during the firing cycle. FIGS. 18B and 19-24 will be discussed consecutively below. In the discussion of FIGS. 18B and 19-24, reference is additionally made to FIG. 25, which is a graph depicting velocity over time for the barrel group (e.g., which, in the discussion below includes barrel assembly 400 and barrel extension 310), the bolt assembly 340, and the op-rod assembly 370 with velocity represented on the vertical axis and time represented on the horizontal axis. Line 2510 represents the velocity of the barrel group; line 2520 represents the velocity of the bolt assembly 340; and line 2530 represents the velocity of the op-rod assembly 370. The velocities of the barrel group, bolt assembly 340, and the op-rod assembly 370 at various times, labeled as points 2550-2557, will be discussed with respect to the positions depicted in FIGS. 18B and 19-24.

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[0064] FIG. 18B is a partial cross-sectional view of the weapon system 10 in a first position of a firing cycle according to an exemplary embodiment. The position depicted in FIG. 18B may be considered a charged condition.

[0065] In the first position of FIG. 18B, represented by point 2550 in FIG. 25, the op-rod assembly 370 and the bolt assembly 340 of the operating group 300 have been retracted relative to the barrel extension 310 to charge the weapon system 10. Specifically, the charging handle 371 (FIG. 12) has been pulled rearward by an operator, toward the buttstock assembly 170, thus retracting the op-rod assembly 370. As noted above, the op-rod assembly 370 engages the drive spring 670 via the spring retainer 373 to compress the drive spring 670 as the op-rod assembly 370 retracts. In this position, the round 202 is arranged by the feed assembly 200 laterally in line with the chamber 411 and held in position by the cartridge stop 222 and cartridge hold pawls 223.

[0066] As also noted above, the cam shaft 348 engages the cam 386 of the op-rod assembly 370 such that the bolt assembly 340 retracts with the op-rod assembly 370. In this position, the bolt assembly 340 is “locked” or otherwise secured to the op-rod assembly 370. Although not shown in FIG. 18, the op-rod assembly 370 and thus, the bolt assembly 340, are held in the retracted position by a sear 1800 that engages the op-rod assembly 370 and that may be released by the trigger 154.

[0067] FIG. 19 is a partial cross-sectional view of the weapon system 10 in a second position of the firing cycle according to an exemplary embodiment, subsequent to the position of FIG. 18. The position depicted in FIG. 19 may be considered a chambering condition.

[0068] In the position of FIG. 19, the trigger 154 (FIG. 2) has been pulled, releasing the op-rod assembly 370 and the bolt assembly 340 such that the drive spring 670 forces the op-rod assembly 370 and bolt assembly 340 forward. In this exemplary embodiment, the drive spring 670 is sized to provide a forward momentum at the firing position that is approximately one-third to one-half of the

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subsequent impulse of the fired round. As shown in FIG. 19, as the bolt assembly 340 moves forward, the rammer 364 engages the round 202. FIG. 25 depicts the forward movement of the op-rod assembly 370 and bolt assembly 340 approximately mid-way between points 2550 and 2551.

[0069] Further shown in FIG. 19, the op-rod assembly 370 and the bolt assembly 340 continue to be driven forward by the drive spring 670 and the rammer 364 contacts the base of the round 202 to guide the round 202 out of the link into the chamber 411 of the barrel 410. As noted above, the round guide 314 of the barrel extension 310 assists in guiding the round 202 downward into the chamber 411 of the barrel 410 while the cartridge stripping guide 285 (FIG. 6) retains the link. FIG. 20 is a partial cross-sectional view of the weapon system 10 in a further position of a firing cycle according to an exemplary embodiment, subsequent to the position of FIG. 19. In this position, the op-rod assembly 370 and the bolt assembly 340 have been driven forward until the round stops against the chamber, the extractor 366 snaps over the round rim and the bolt assembly 340 engages the forward interior face of the barrel extension 310, as depicted in point 2551 of FIG. 25. The bolt assembly 340 transfers its forward momentum to the barrel extension 310.

[0070] At this point, the bolt assembly 340 is generally axially unsecured from the op-rod assembly 370 such that the bolt assembly 340 stops and the op-rod assembly 370 continues forward. More specifically, the cam shaft 348 of the bolt assembly 340 has reached the cam relief 323 of the hold-up cam 321 on each side of the barrel extension 310. As such, the hold-up cam 321 no longer maintains the radial position of the cam shaft 348, and thus, the radial position of the lock block 342. However, after disengagement with the hold-up cam 321, the cam shaft 348 of the bolt assembly 340 is still guided by the cam 386 of the op-rod assembly 370. As such, as the cam 386 continues to move forward and the bolt assembly 340 is pressed against the barrel extension 310, the cam shaft 348 is guided down the cam 386 to press the aft end of the lock block 342 downward.

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[0071] FIG. 21 is a partial cross-sectional view of the weapon system 10 in a further position of the firing cycle according to an exemplary embodiment, subsequent to the position of FIG. 20. Between FIGS. 20 and 21, the lock block 342 is actuated downward, the hold cam 394 is moved away from the cam protrusion 396. In one exemplary embodiment, the hold cam 394 is moved away from the cam protrusion 396 at approximately three-quarters of the lock block 342 movement. At this point, the firing pin 390 is released from the lock block 342, and the forward movement of the op-rod assembly 370 forces the firing pin 390 forward to initiate firing, as also described in greater detail below. The relative movement is timed such that the complete momentum of the op-rod assembly 370 is transferred to the other components of the operating group before the impulse of the round is fully absorbed. At this point, the operating group is coupled to the barrel group to receive the round momentum and be driven rearward, such that this embodiment may reduce gas accelerator requirements.

[0072] In the position of FIG. 21, the op-rod assembly 370 and the bolt assembly 340 have been driven forward until the bolt assembly 340 engages the forward interior face of the barrel extension 310 and the forward end of the op-rod assembly 370 engages the aft end of the barrel assembly 340. In this position, the cam shaft 348 of the bolt assembly 340 has reached the termination point of the cam 386 of the op-rod assembly 370 such that the op-rod assembly 370 cannot move forward relative to the bolt assembly 340. In this position, depicted by points 2552 and 2553 in FIG. 25, the firing pin 390 as driven by the op-rod is about to impart at least some of the energy of the op-rod assembly 370 to initiate firing of the round 202. The remaining energy of the op-rod assembly 370 is transferred to the barrel extension 310 via the bolt assembly 340. As additionally shown in FIG. 21, the downward position of the bolt assembly 340 is such that rear face 341 of the bolt assembly 340 engages the barrel extension lock 319 of the barrel extension 310 to momentarily lock or otherwise secure the bolt assembly 340 to the barrel extension 310. During forward movement of the op-

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rod assembly 370, the forward extension 374 moves the poppet valve 520 forward in chamber 514 (FIGS. 12 and 16).

[0073] FIG. 22 is a partial cross-sectional view of the weapon system 10 in a further position of the firing cycle according to an exemplary embodiment, subsequent to the position of FIG. 21. The positions depicted in FIGS. 22-24 may be considered a recoil condition.

[0074] In the position of FIG. 22, the round 202 has been ignited by the firing pin 388 and the resulting forward momentum of the round 202 drives the barrel extension 310, the bolt assembly 340, the op-rod assembly 370, and the barrel assembly 400 reverses velocity, represented by point 2554 in FIG. 25, which is the point that the op-rod assembly 370 begins acceleration rearward and the bolt assembly 340 and barrel assembly 400 are decelerated and begin to unlock from one another. Subsequent to the initial rearward movement, as shown in FIG. 23, the cam shaft 348 travels up the cam 386 of the op-rod assembly 370 to disengage the rear face 341 of the bolt assembly 340 from the barrel extension lock 319 of the barrel extension 310, and thus, releases the bolt assembly 340 from the barrel extension 310, as represented by point 2555 in FIG. 25. In other words, the op-rod assembly 370 and bolt assembly 340 unlock from the barrel extension 310 between points 2554 and 2555, which concludes with the bolt assembly 340 traveling rearward with the op-rod assembly 370. As also shown in FIG. 22, as the op-rod assembly 370 moves rearward, the hold spring 392 returns the firing pin 390 to the initial position, at which the lock block 342 is pivoted upward to reengage the cam protrusion 394.

[0075] As noted above, the ignition of the round 202 imparts forward momentum to the bullet and associated propellant gas of the round 202 with an equal change of momentum to the operating group 300 to the rear, which is represented by point 2554 in FIG. 25. The net change in momentum of the operating group 300 is approximately twice the forward momentum of the drive spring 670 to op-rod assembly 370 such that the resulting rearward momentum on

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the op-rod assembly 370 is approximately equal to the forward momentum imparted by the drive spring 670 (FIG. 17). The buffer assembly 600 absorbs a portion of the rearward momentum through the centering spring 620 and fluid damping of the hydraulic fluid through the piston 642. Similarly, the buffer assembly 600 absorbs the forward energy of the operating group 300 in the event the round 202 does not fire or dry fires.

[0076] FIG. 23 is a partial cross-sectional view of the weapon system 10 in a further position of the firing cycle according to an exemplary embodiment, subsequent to the position of FIG. 22. In this position, the bullet of the fired round 202 has travelled past the port 417 in the barrel 410. A portion of the gas from the burnt propellant flows through the port 417 into the chamber 514 of the gas accelerator 500 to force the poppet valve 520 rearward. The forward extension 374 of the op-rod assembly 370 is coupled to the poppet valve 520 such that the op-rod assembly 370 is accelerated rearward, and a corresponding forward momentum is transferred to the barrel assembly 400 to slow rearward momentum, which, as noted above is represented by point 2555 in FIG. 25.

[0077] As the bolt assembly 340 travels rearward, the cam shaft ends 350 engage the hold-up cam 321, and the bolt assembly 340 and op-rod assembly 370 move as a unit rearward. During rearward motion of the bolt assembly 340, the claw portion of the extractor 366 (FIG. 11) pulls the case of the fired round rearward, out of the chamber 411 until the case impacts the ejector 316 (FIG. 9) on the barrel extension 310, which rotates the case out through the ejection windows 313, 183 (FIG. 2) in the barrel extension 310 and receiver housing 112, respectively. The extraction action may occur approximately at point 2577. Typically, the windows 183, 313 are slightly larger than an unfired round to facilitate ejection of a dud round. The momentum from the gas accelerator 500 continues to drive the op-rod assembly 370 and bolt assembly 340 until slowed and stopped by the drive spring 670, as represented by point 2558 in FIG. 25 and additionally corresponding to the charged position of FIG. 18 in preparation of

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repeating the firing cycle. If the op-rod assembly 370 has excessive energy, the op-rod assembly 370 will bottom out on the barrel extension 310 and the buffer assembly 600 will absorb this energy, as shown by the max recoil position of FIG. 24. The firing cycle repeats until the trigger 154 (FIG. 2) is released and the sear re-engages the op-rod assembly 370.

[0078] Throughout the cycle, the stroke of the operating group 300, particularly the barrel extension 310, is relatively short. For example, in a weapon system with a length of 150 calibers and a barrel with a length of 70 calibers the stroke of the barrel extension may be, for example, +/- 2 calibers with associated an associated op-rod assembly stroke of 19-21 calibers and a bolt assembly stroke of 15-17 Calibers.

[0079] Reference is briefly made to FIGS. 5, 6, 12, 13, and 18-24 to describe the operation of the feed assembly 200 during the firing cycle. As the op-rod assembly 370 moves forward (e.g., FIGS. 18-21), the feed roller 382 engages the cam path 272 of the feed index cam 270 of the feeder 250. The cam path 272 is curved, so as the op-rod assembly 370 travels an axial path, the feed roller 382 forces the feed index cam 270 to pivot about pivot 276. As the feed index cam 270 pivots, the pivoting lever 274 engages the drive pawl 280 and feed shuttle 282 (FIG. 6) to index the rounds one position. The action of feeding the round pushes the loose link in the strip position out of the side of the feed assembly 200. During op-rod rearward travel, the feed index cam returns to its beginning position; the hold pawls 223 in the feed tray hold the ammunition belt in position. As such, as the operating group 300 chambers a round and fires the chambered round, the feed assembly 200 positions a subsequent round for chambering and firing during a subsequent firing cycle. Although the depicted embodiments show a feed system in which linked rounds are indexed through the feeder, in other embodiments, the rounds may be individually chambered by an operator or the rounds may be biased into the chamber from a magazine.

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[0080] FIG. 26 is a partial cross-sectional view of the barrel assembly 400 coupled to the barrel extension 310 and particularly shows the release mechanism 450 for expedient removal of the barrel assembly 400 from the weapon system 10 during disassembly. In the assembled condition, as shown, the helical locking lugs 331 of the barrel extension 310 engage the helical locking lugs 451 of the barrel assembly 400 to prevent relative axial movement between the barrel extension 310 and the barrel assembly 400. In this position, the lock projection 453 extends into the gap of the helix lock surface 332 to prevent rotation of the barrel assembly 400 relative to the barrel extension 310, thus ensuring that the lugs 331, 451 remain engaged. As noted above, the locking lugs 451 are on a rotating sleeve 459, similar to as a nut on the barrel assembly 400 with interrupted threads that engages mating threads of locking lugs 331 on the barrel extension 310. In general, the trigger projection 453 and lock surface 332 may be formed by any angled or cam surfaces that prevent relative movement. The helical locking lugs are designed to rotate until the barrel is positioned aftward against a stop surface in the barrel extension thus insuring a constant headspace for the weapon. The trigger projection and lock surface are structured such that they will always engage under any final locked position of the barrel sleeve. To remove the barrel assembly 400, a user pulls the barrel lock 452 upward (or otherwise radially outward). This retracts the lock projection 453 from the helix lock surface 332, thus enabling relative circumferential movement between the barrel extension 310 and the sleeve 459 of the barrel assembly 400. As the barrel sleeve 459 rotates, the lugs 451 disengage from the lugs 331, e.g., instead of the lugs 331 and 451 being circumferentially aligned, the lugs 331 and 451 are offset such that the lugs 451 are positioned within the gaps between the lugs 331 and vice versa. In this position, the barrel assembly 400 may be pulled in an axial direction and separated from the barrel extension 310.

[0081] To reattach, the barrel assembly 400 is slid back onto the barrel extension 310 with the lugs 331 and 451 offset from one another, then the barrel

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sleeve 459 is rotated to align the lugs 331 and 451 as the spring biases the trigger projection 453 into the lock surface 332, thus locking the barrel assembly 400 onto the barrel extension 310. The lugs 331 and 451 may be canted or otherwise angled relative to one another to facilitate engagement. When the locking lugs 451 rotate to lock the barrel assembly 400, the barrel assembly 400 does not rotate. Instead, the barrel assembly 400 is keyed in rotation to the barrel extension 310 and the accelerator 500 engaging the front of the receiver assembly 100.

[0082] A more detailed description of impulse averaging model associated with the firing cycle and the resulting impact on the receiver (and thus, operator) will now be mathematically described with Equations (1)-(20), which use the following assumptions: 1) no friction or non-conservative forces are present; 2) the barrel extension 310, and thus the barrel 410, are free to travel forward or aft relative in the receiver assembly 100 with very little resistance and no appreciable stored energy; 3) collisions are perfectly elastic.; and 4) the cartridge impulse resulting from the pressure time curve frequency is several orders of magnitude above the operating frequencies. .

[0083] Equation (1) describes the basic equation for return velocity of a moving operating group:

$$I_r = M_{bg} * V_r \quad \text{Equation (1)}$$

wherein

I_r is the rearward momentum;

M_{bg} is the mass of the barrel group; and

V_r is the rearward velocity of the barrel group.

[0084] Equation (1) may be modified to account for any forward velocity of the operating group, as represented by Equation (2):

$$I_r = M_{bg} * V_r + M_{bg} * V_f \quad \text{Equation (2)}$$

wherein

V_f is the forward velocity of the barrel group.

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[0085] For perfect impulse averaging (e.g., $V_f = V_i$), Equations (1) and (2) can be rewritten as Equation (3):

$$I_r = 2 M_{bg} * V_f \quad \text{Equation (3)}$$

[0086] For an open gas accelerator, Equation (3) may be modified as represented by Equation (4):

$$I_r = 2 M_{bg} * V_f + I_g \quad \text{Equation (4)}$$

wherein,

I_g is the momentum imparted by the gas accelerator to the barrel group.

[0087] Equation (4) can be rewritten as Equation (5) to solve for V_f .

$$V_f = (I_g - I_r) / 2 M_{bg} \quad \text{Equation (5)}$$

[0088] In a perfectly elastic collision between the operating group and barrel group, the momentum relationship may be represented by Equation (6):

$$(M_{bg} + M_{or}) V_f = M_{or} * V_{fi} \quad \text{Equation (6)}$$

wherein

M_{or} is the mass of the operating rod; and

V_{fi} is the velocity of the operating rod before the collision.

[0089] Considering the barrel group and operating group act as a single mass after collision ($M_i = M_{bg} + M_{or}$), Equation (6) may be rewritten as Equation (7).

$$V_f = M_{or} * V_{fi} / M_t \quad \text{Equation (7)}$$

wherein

M_t is the total mass.

[0090] A combination of Equations (5) and (7) may be expressed as Equation (8).

$$(I_r - I_g) / 2 M_{bg} = M_{or} * V_{fi} / M_t \quad \text{Equation (8)}$$

[0091] Upon solving for V_{fi} , Equation (8) may be expressed as Equation (9).

$$V_{fi} = M_t (I_r - I_g) / (2 * M_{bg} * M_{or}) \quad \text{Equation (9)}$$

[0092] Equation (10) describes the kinetic and potential energy balance between the drive spring and op-group.

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$$1/2 M_{or} V_{1f}^2 = 1/2 K_{or} * x_{op}^2 \quad \text{Equation (10)}$$

wherein

K_{or} is the spring constant of the drive spring; and

x_{op} is the distance the operating rod is retracted from a position of rest.

[0093] The force equation of drive spring is expressed in Equation (11).

$$F = K_{or} * x_{op} \quad \text{Equation (11)}$$

[0094] Equations (10) and (11) may be combined as Equation (12).

$$V_{1f}^2 = F^2 / (K_{or} * M_{or}) \quad \text{Equation (12)}$$

[0095] Equations (9) and (12) may be combined as Equation (13).

$$[M_t(Ir - Ig) / (2 * M_{bg} * M_{or})]^2 = F^2 / (K_{or} * M_{or}) \quad \text{Equation (13)}$$

[0096] Solving for force, Equation (13) may be expressed as Equation (14).

$$F = 1/2 * (K_{or} / M_{or}) * \{1 + M_{or} / M_{bg}\} * \{Ir - Ig\} \quad \text{Equation (14)}$$

[0097] Equation (14) may be expressed as Equation (15).

$$F = 1/2 * \omega_{nor} (1 + M_{or} / M_{bg}) * (Ir - Ig) \quad \text{Equation (15)}$$

wherein

ω_{nor} is the natural frequency of the op-rod and spring; and

$$\omega_{nor} = \sqrt{K_{or} / M_{or}}$$

[0098] The gas accelerator should supply enough energy to return the op-rod to a charged position, as represented by Equation (16).

$$Ig = M_{or} * V_{1f} \quad \text{Equation (16)}$$

[0099] The energy balance between the drive spring and op-rod assembly corresponds to a kinetic energy balance with spring potential energy and may be represented by Equation (17).

$$V_{1f}^2 = x(k_{or} / m_{or})^{1/2} \quad \text{Equation (17)}$$

[00100] Combining Equations (16) and (17) results in Equation (18).

$$Ig = X_{op} * M_{or} * \omega_{nor} \quad \text{Equation (18)}$$

[00101] Combining Equations (15) and (18) results in Equation (19), which represents an exemplary maximum force imparted to the receiver in the exemplary embodiments discussed herein.

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$$F=1/2*\omega_{nor}(1+M_{or}/M_{bg})*[I_r-X_{op}*M_{or}*\omega_{nor}] \quad \text{Equation (19).}$$

[00102] In a conventional weapon system in which the barrel group is fixed to the receiver and a gas acceleration system, the max force is represented by Equation (20).

$$F=\omega_{ngun}(I_r-I_g) \quad \text{Equation (20)}$$

[00103] In other words, using similar reasoning for the gas impulse requirements of Equation 18, the total force may be represented by Equation (21):

$$F=\omega_{ngun} [I_r-X_{op}*M_{or}*\omega_{nor}] \quad \text{Equation (21)}$$

[00104] The force of a short recoil impulse averaging weapon, such as that described above may be compared to the force of a conventional gas operated system as represented by Equation (22):

$$F_{SRIA}/F_{Conv}=1/2*\omega_{nor}(1+M_{or}/M_{bg})*[I_r-X_{op}*M_{or}*\omega_{nor}]/\omega_{ngun} [I_r-X_{op}*M_{or}*\omega_{nor}]$$

Equation (22)

[00105] Equation (22) may be rearranged with assumptions of equal component weights and internal spring rates, as represented below in Equation (23):

$$F_{SRIA}/F_{Conv}=1/2*\omega_{nor}(1+M_{or}/M_{bg})/\omega_{ngun} \quad \text{Equation (23)}$$

[00106] As a result, under this evaluation, one variable may be the weapon mount spring to ground which drives the weapon natural frequency for the conventional gun. The weapon mount spring to ground can vary from 160 lb/in (manned) to 6000 lb/in (hard mounted), as examples.

[00107] FIG. 27 is a graph depicting examples of recoil reduction as a function of mount stiffness for exemplary weapon system relative to conventional weapon systems. As shown in FIG. 27, the exemplary embodiments such as discussed herein may reduce the recoil by 75% over conventional weapons for man firing and by 95% for hard mounting.

[00108] Accordingly, the weapon system 10 discussed above may provide a number of advantages relative to conventional weapons, including a lower recoil force for high impulse rounds, more weapon control at a lighter weight, a

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reduction in sensitivity to recoil mass, higher firing rates, and a safer and simpler weapon.

[00109] While at least one exemplary embodiment has been presented in the foregoing detailed description of the invention, it should be appreciated that a vast number of variations exist. It should also be appreciated that the exemplary embodiment or exemplary embodiments are only examples, and are not intended to limit the scope, applicability, or configuration of the invention in any way. Rather, the foregoing detailed description will provide those skilled in the art with a convenient road map for implementing an exemplary embodiment of the invention. It being understood that various changes may be made in the function and arrangement of elements described in an exemplary embodiment without departing from the scope of the invention as set forth in the appended claims.

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CLAIMS

What is claimed is:

1. A weapon system for firing a round, comprising:
 - a receiver;
 - an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition, the operating group comprising
 - a barrel extension at least partially housed within the receiver and arranged to axially translate relative to the receiver;
 - an operating rod (op-rod) assembly at least partially housed and arranged to axially translate within the barrel extension in the charge condition, the firing condition, and the recoil condition; and
 - a bolt assembly coupled to the op-rod assembly and at least partially housed and arranged to axially translate within the barrel extension;
 - a barrel coupled to the barrel extension and defining a chamber;
 - a gas accelerator with a first end coupled to the barrel and a second end coupled to the op-rod assembly; and
 - a buffer assembly comprising a drive spring having a first end coupled to the receiver and a second end coupled to the op-rod assembly,
- wherein, in the charged condition, the op-rod assembly and the bolt assembly are retracted against the drive spring;
- wherein, in the firing condition, the op-rod assembly and bolt assembly are driven by the drive spring such that the round is guided into the chamber and the op-rod assembly and bolt assembly are locked to the barrel extension and a forward momentum of the op-rod assembly is imparted to the operating group and the round is fired, wherein a portion of an impulse of the fired round stops the forward momentum of the operating group; and

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wherein, in the recoil condition,

the operating group is driven rearward by the remaining portion of the impulse of the fired round,

the gas accelerator imparts additional rearward momentum to the op-rod assembly and bolt assembly and stops rearward momentum of the barrel and barrel extension, and

the op-rod assembly and the bolt assembly are stopped by the drive spring.

2. The weapon system of claim 1, wherein the buffer further includes a hydraulic piston configured to resist forward and rearward movement of the barrel extension.

3. The weapon system of claim 2, wherein the buffer further includes a self-centering spring configured to resist forward and rearward movement of the barrel extension.

4. The weapon system of claim 3, wherein the hydraulic piston and the self-centering spring are configured such that any force transfer between the barrel extension and the receiver occurs through the hydraulic piston and the self-centering spring.

5. The weapon system of claim 1, further comprising a lock assembly configured to secure the bolt assembly to the op-rod assembly in the charged condition through chambering the round.

6. The weapon system of claim 5, wherein the lock assembly is configured to release the bolt assembly from the op-rod assembly in the firing condition.

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7. The weapon system of claim 6, wherein the lock assembly is further configured to secure the bolt assembly to the barrel extension in the firing condition.

8. The weapon system of claim 7, wherein the lock assembly includes a lock pin, a first cam defined in the op-rod assembly, and a second cam in the barrel extension, wherein the lock pin engages the first cam and the second cam to secure and release the bolt assembly relative to the barrel extension and the op-rod group.

9. The weapon system of claim 8, wherein in a first portion of the firing condition, the lock pin is engaged by the first cam and the second cam to secure the bolt assembly to the op-rod assembly such that the op-rod assembly forces the bolt assembly forward, and

wherein, in a second portion of the firing condition upon contact of the bolt assembly and the barrel extension, the lock pin disengages from the second cam and the first cam guides the lock pin such that the bolt assembly forms a locking engagement with the barrel extension.

10. The weapon system of claim 9, wherein, in the recoil condition, the rearward movement of the op-rod assembly guides the lock pin within the second cam such that the bolt assembly is released relative to the barrel extension.

11. The weapon system of claim 1, wherein in an ejection condition, a case of the round is coupled to the bolt assembly.

12. The weapon system of claim 11, wherein the barrel extension includes an extractor such that, in the ejection condition, the extractor engages the case

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during the rearward movement of the bolt assembly to remove round from chamber and eject the case from the weapon system.

13. A method for firing a weapon, comprising:

retracting a bolt assembly and an operating rod (op-rod) assembly relative to a barrel extension against a drive spring;

driving the bolt assembly and the op-rod assembly with a forward momentum within the barrel extension such that the bolt assembly chambers a round and contacts the barrel extension, imparting forward momentum to the op-rod assembly, the bolt assembly and the barrel extension such that the round is fired, whereby the firing of the round stops the forward momentum and imparts an impulse of rearward momentum on the op-rod assembly, the bolt assembly, and the barrel extension;

guiding gases from the round with a gas accelerator to drive the op-rod assembly rearward and to stop the rearward momentum of the barrel extension; and

absorbing the rearward momentum of the op-rod assembly with the drive spring.

14. The method of claim 13, wherein the driving step includes driving the bolt assembly and the op-rod assembly with the forward momentum that is approximately one-third to one-half of the impulse of the round.

15. The method of claim 13, further comprising the step of restraining movement of the op-rod assembly in forward and aft directions with a buffer assembly.

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16. The method of claim 15, wherein the restraining step includes restraining movement of the barrel extension assembly in forward and aft directions with a soft spring and a hydraulic piston valve of the buffer assembly

17. The method of claim 13, wherein the driving step includes securing the bolt assembly to the op-rod assembly in the charged condition until the bolt assembly engages the barrel extension.

18. The method of claim 17, wherein the driving step includes releasing the bolt assembly from the op-rod assembly when the bolt assembly engages the barrel extension.

19. The method of claim 18, wherein the driving step includes securing the bolt assembly to the barrel extension during the contact with the barrel extension.

20. The method of claim 19, wherein the step of securing the bolt assembly to the barrel extension includes guiding a cam on the bolt assembly into a cam relief of a hold-up cam on the barrel extension and down an op-rod cam on the op-rod assembly such that a first lock surface of bolt assembly pivots to engage a second lock surface of the bolt assembly.

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ABSTRACT OF THE DISCLOSURE

A weapon system includes a receiver and an operating group with a barrel extension arranged to axially translate relative to the receiver. In the firing condition, the op-rod assembly and bolt assembly are driven by the drive spring such that the round is guided into the chamber and the op-rod assembly and bolt assembly are locked to the barrel extension and a forward momentum of the op-rod assembly is imparted to the operating group and the round is fired. A portion of an impulse stops the forward momentum of the operating group. In the recoil condition, the operating group is driven rearward by the remaining portion of the impulse, the gas accelerator imparts additional rearward momentum to the op-rod assembly and bolt assembly and stops rearward momentum of the barrel and barrel extension, and the op-rod assembly and the bolt assembly are stopped by the drive spring.

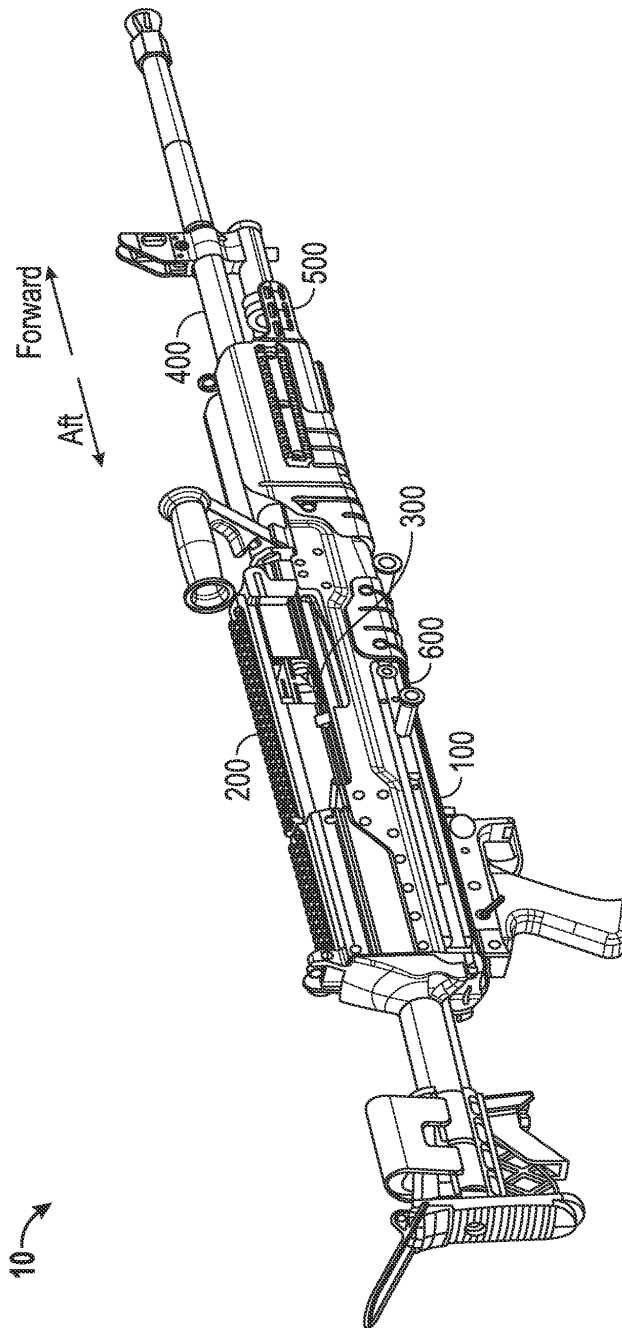


FIG. 1

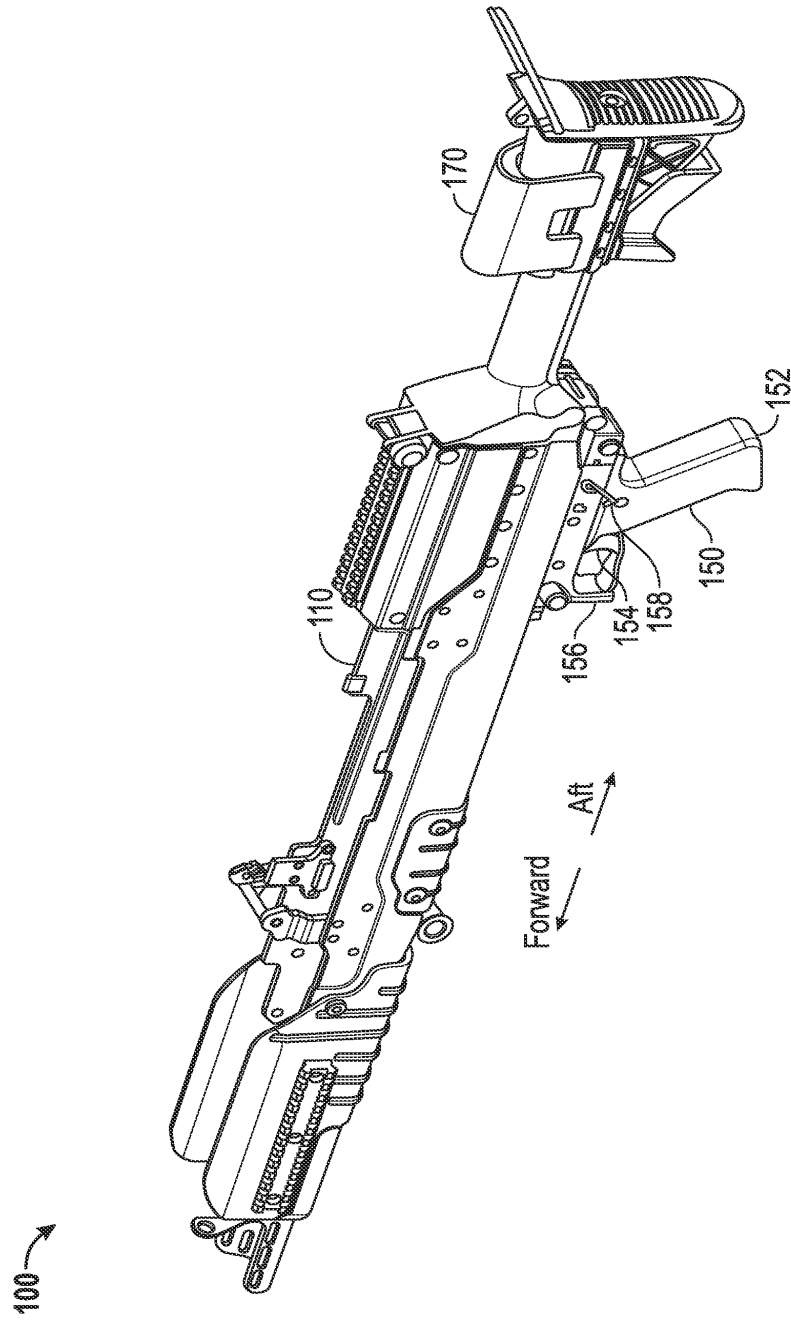


FIG. 2

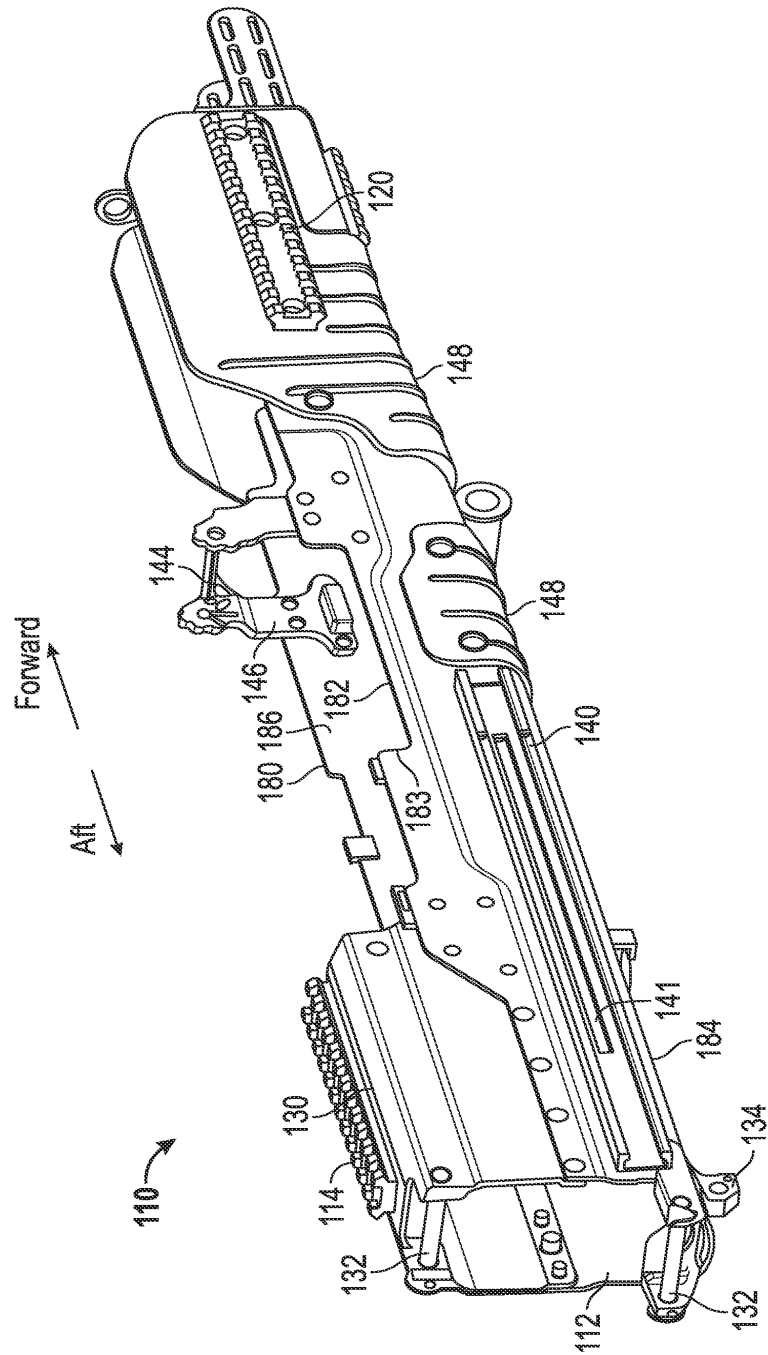


FIG. 3

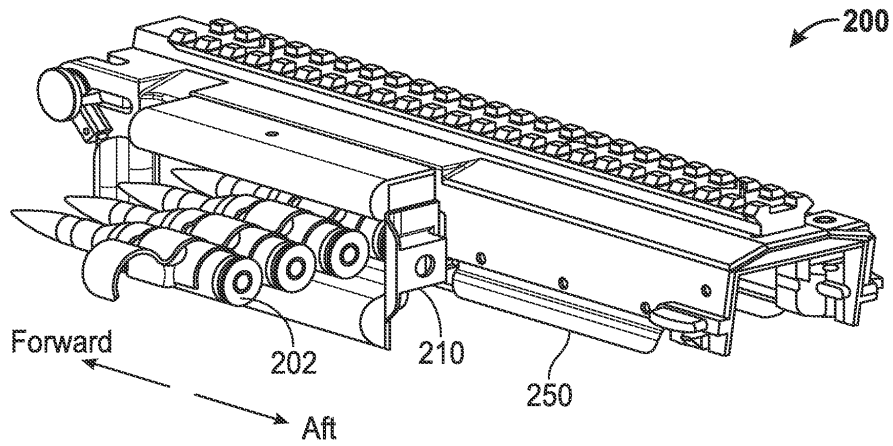


FIG. 4

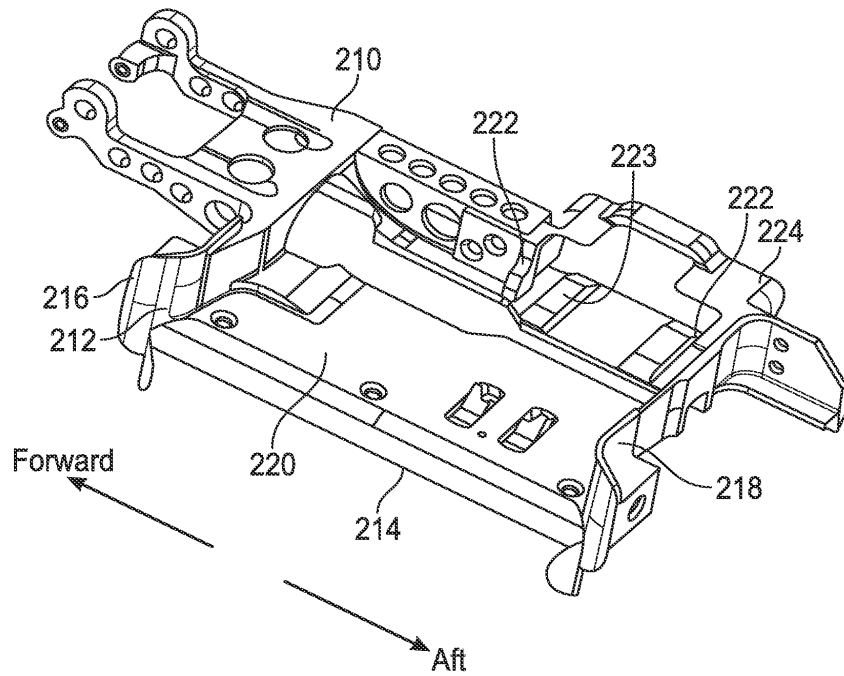


FIG. 5

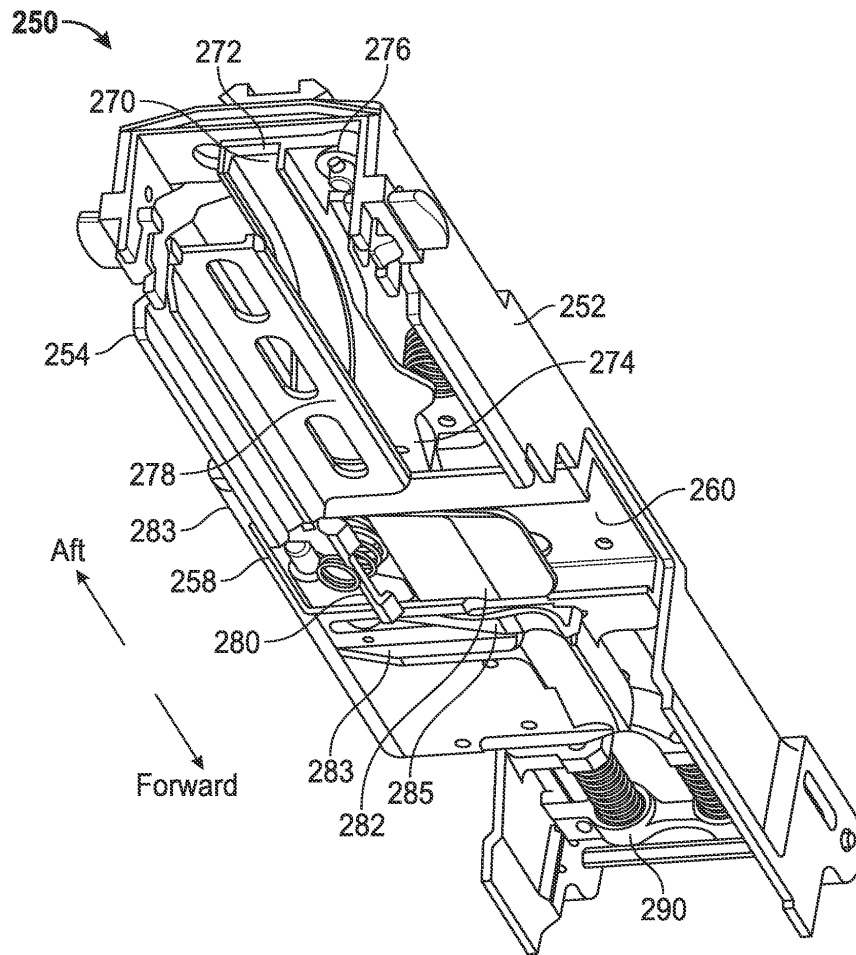


FIG. 6

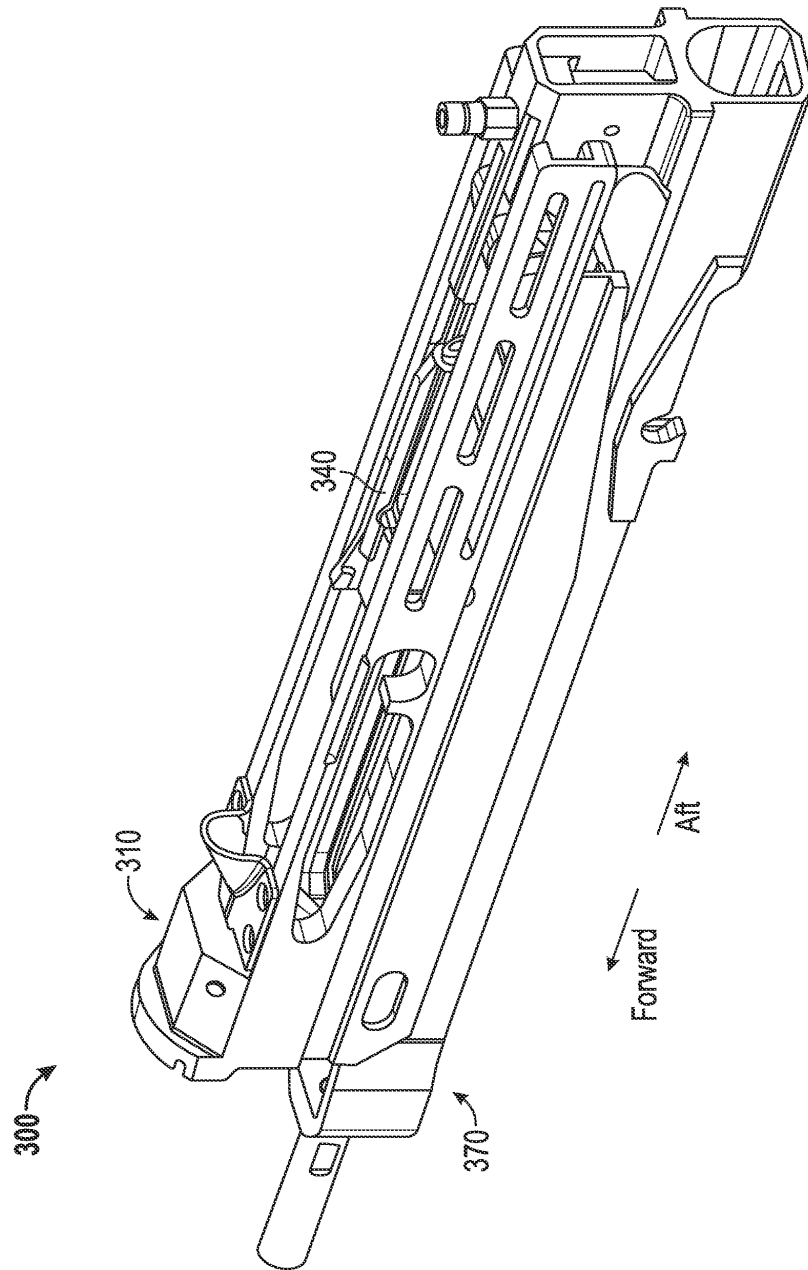


FIG. 7

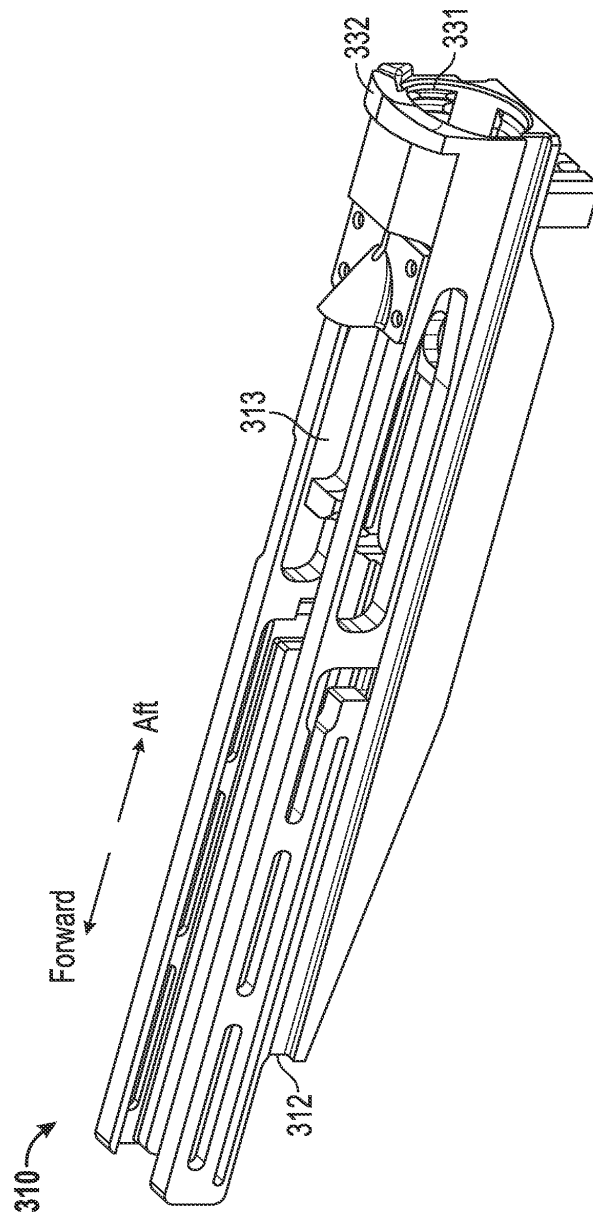


FIG. 8

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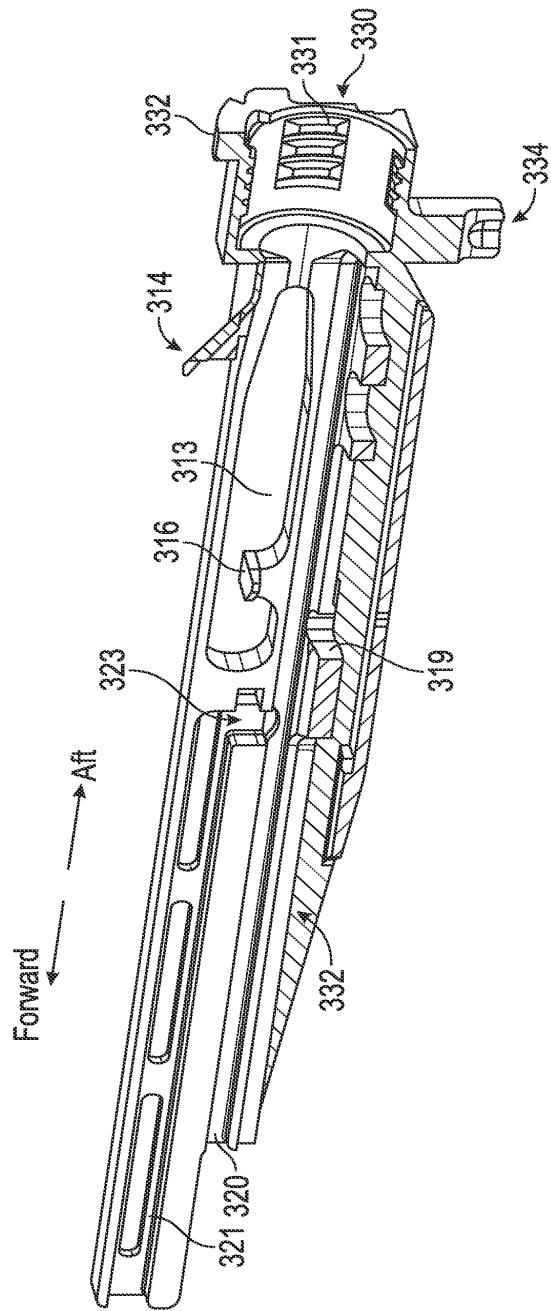


FIG. 9

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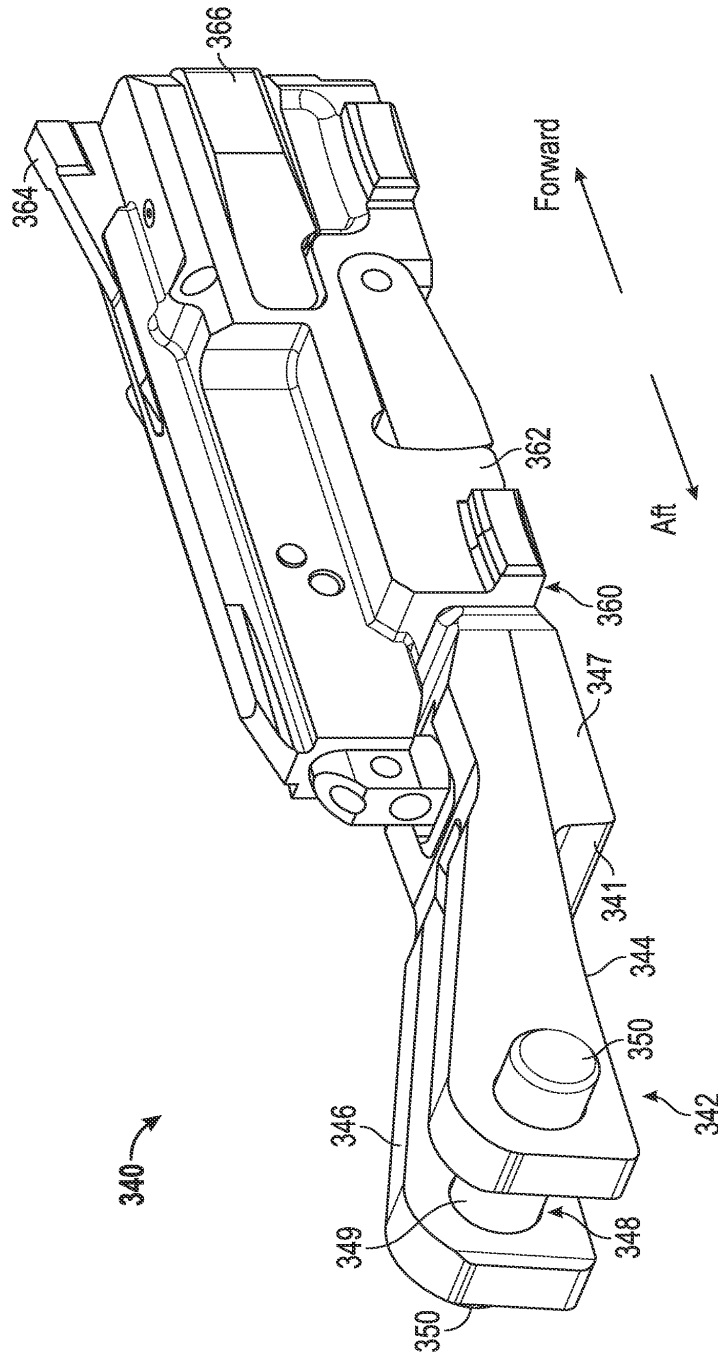
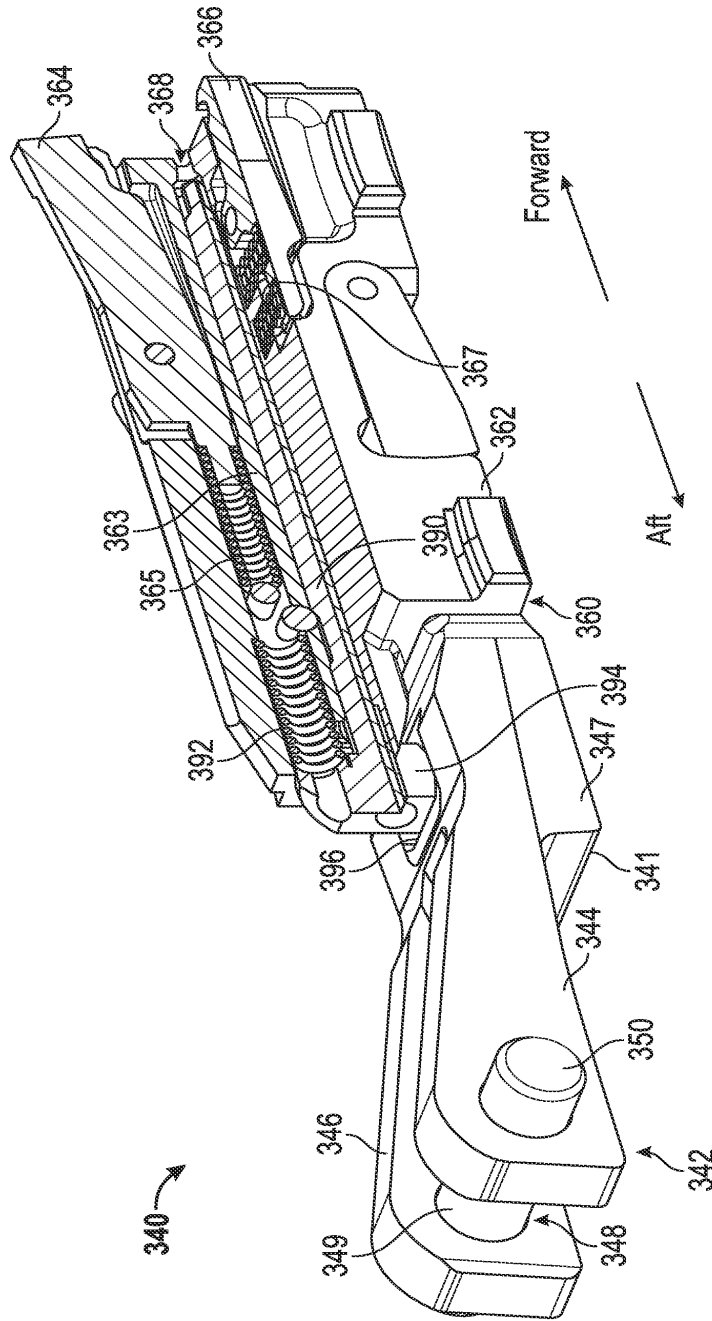


FIG. 10



1100

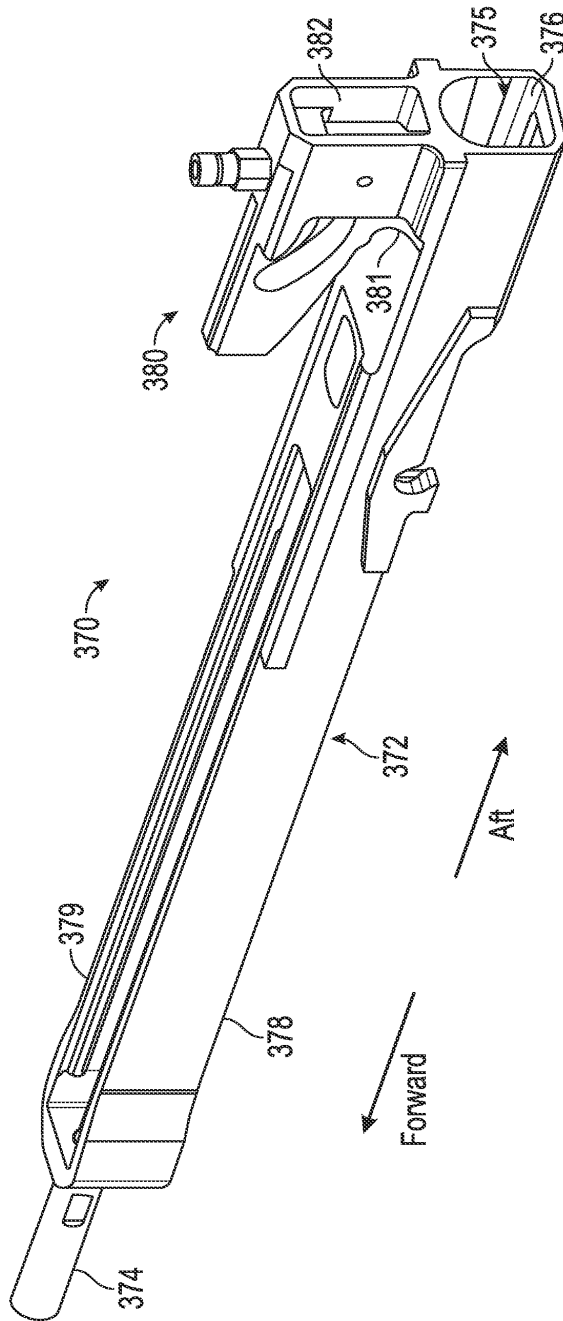


FIG. 12

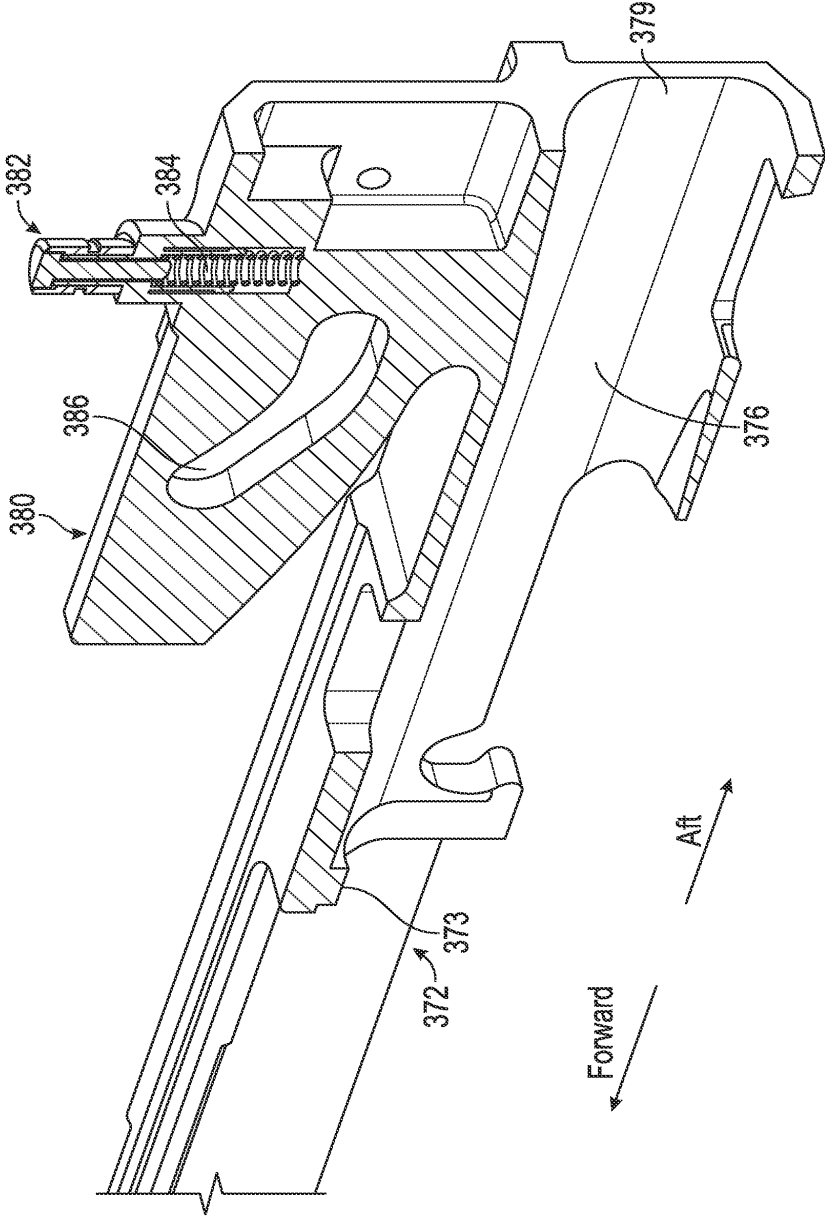


FIG. 13A

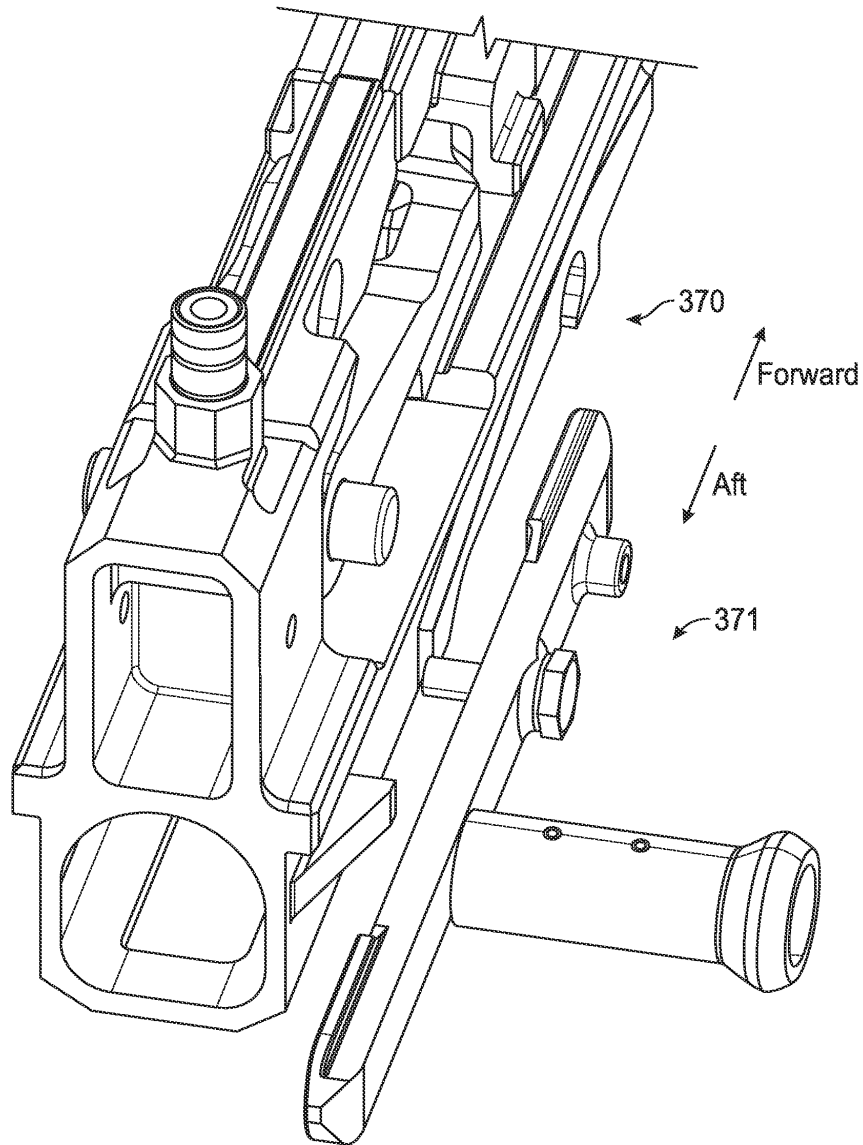


FIG. 13B

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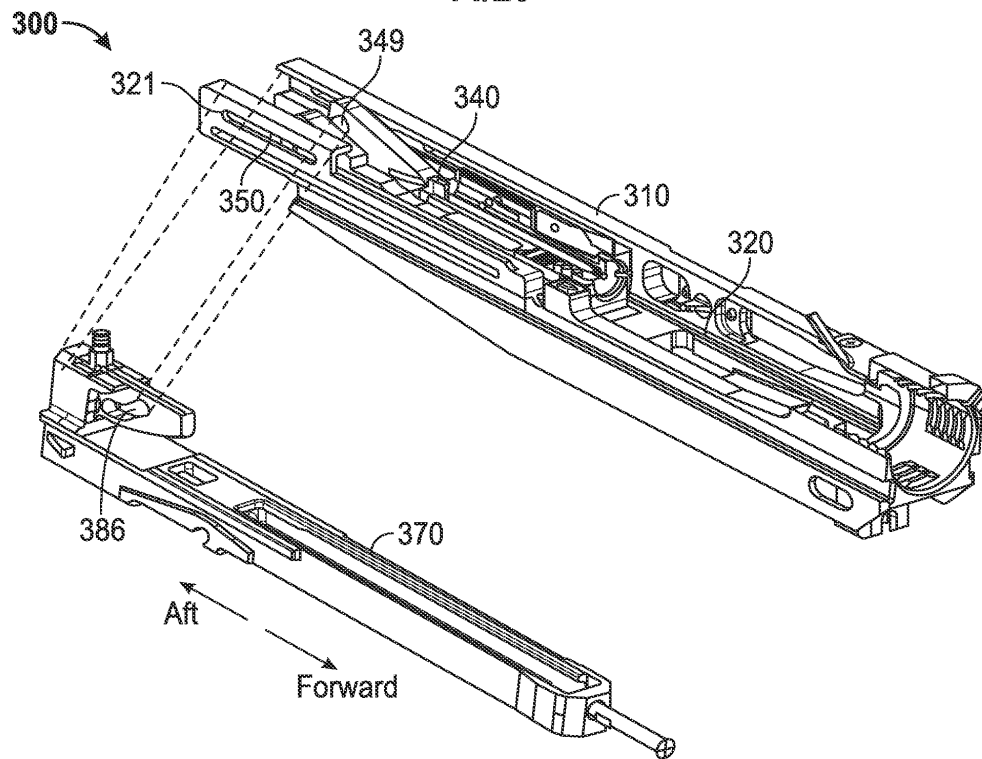


FIG. 14

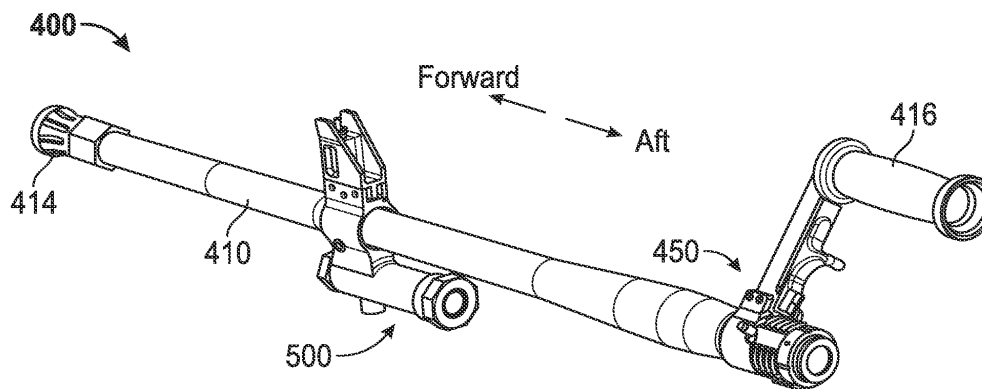


FIG. 15

Forward Aft

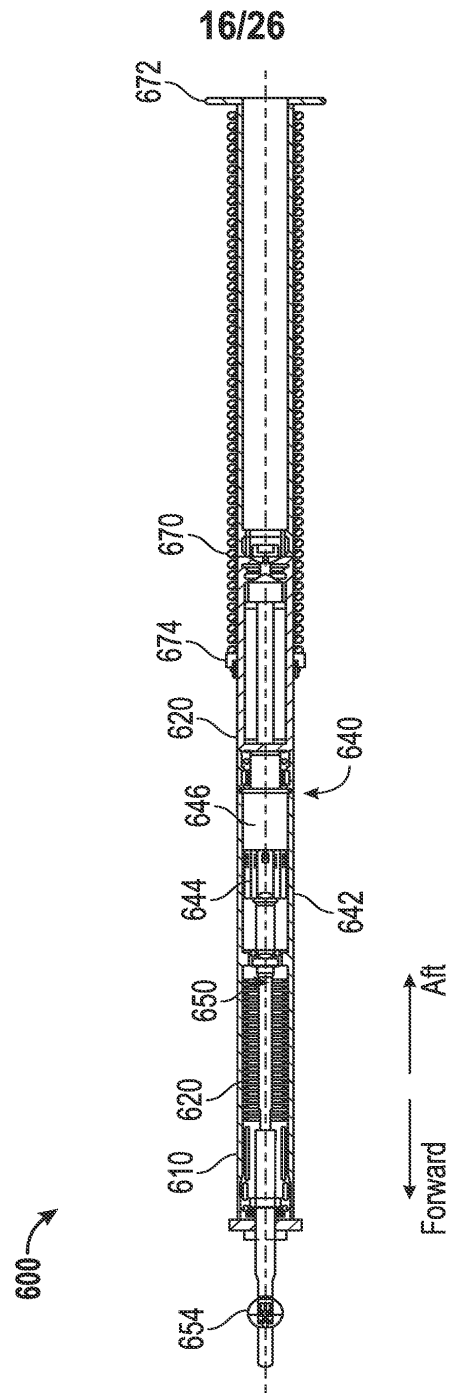


FIG.17

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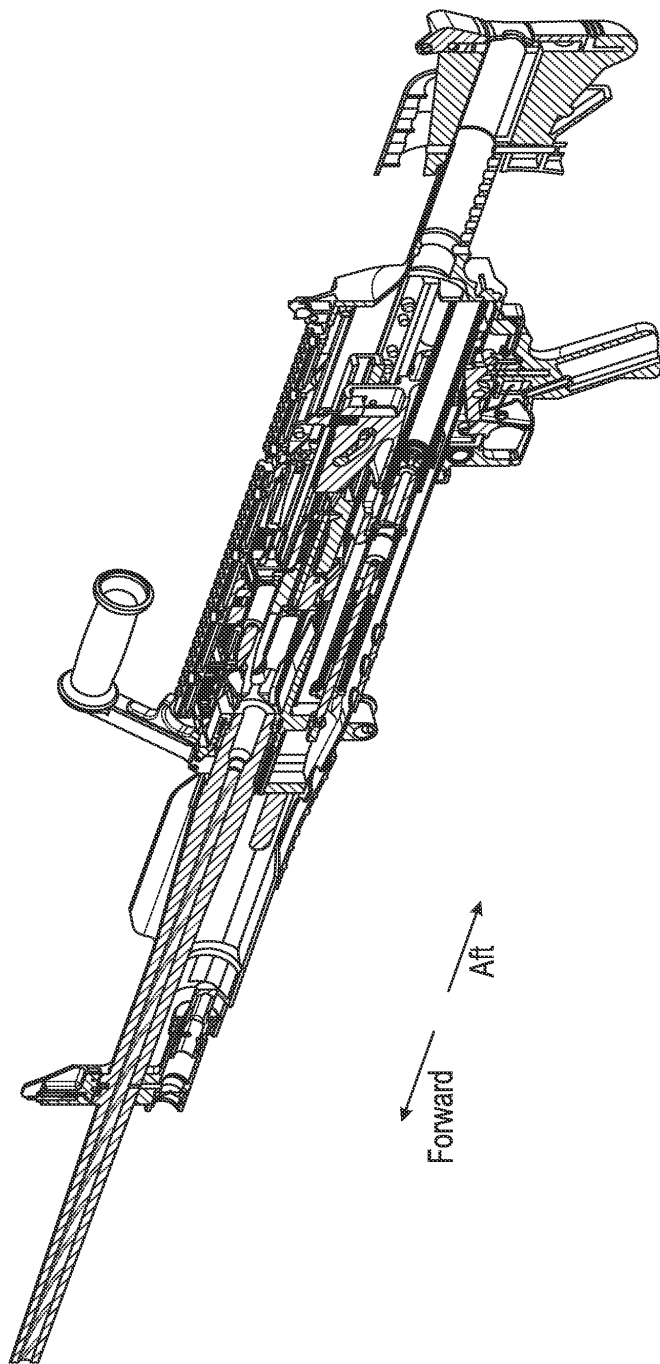


FIG.18A

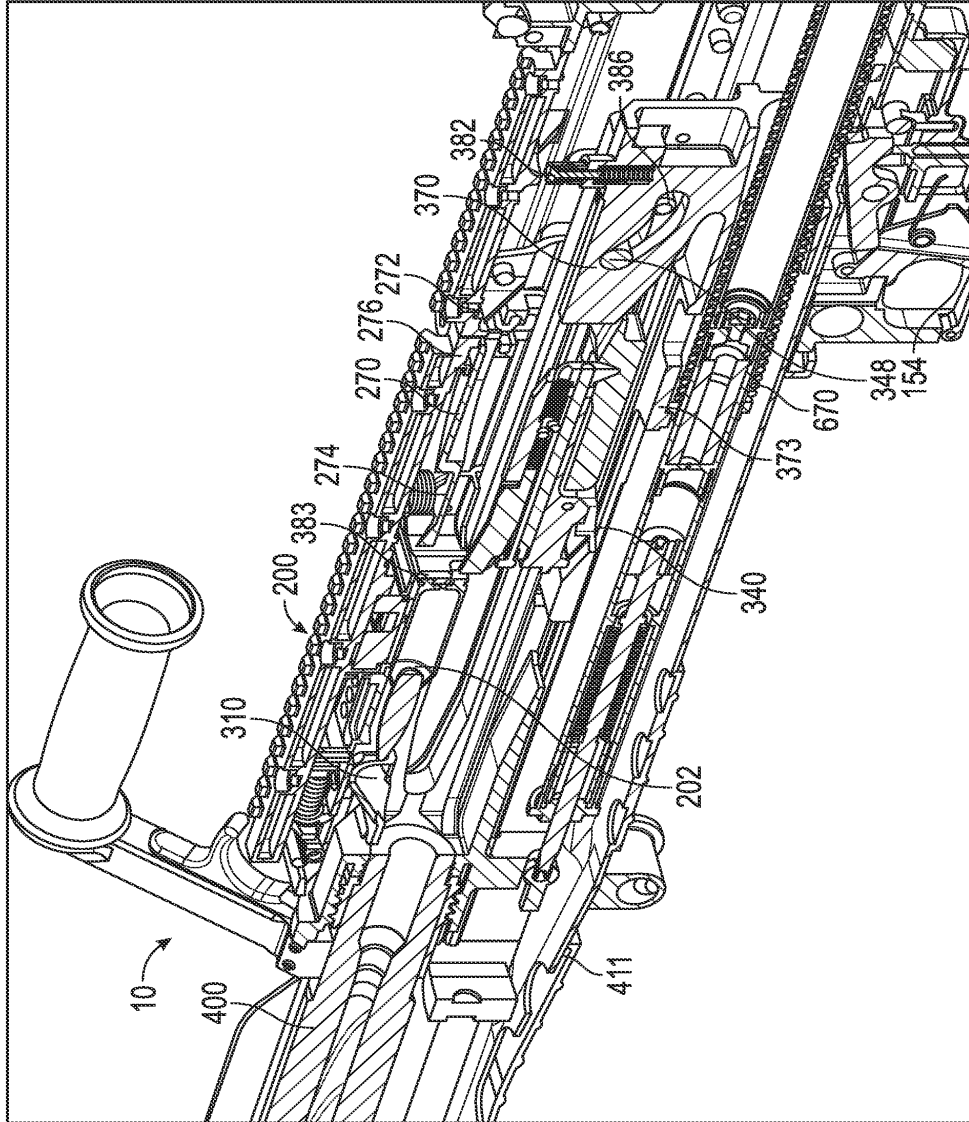


FIG. 18B

FIG. 19

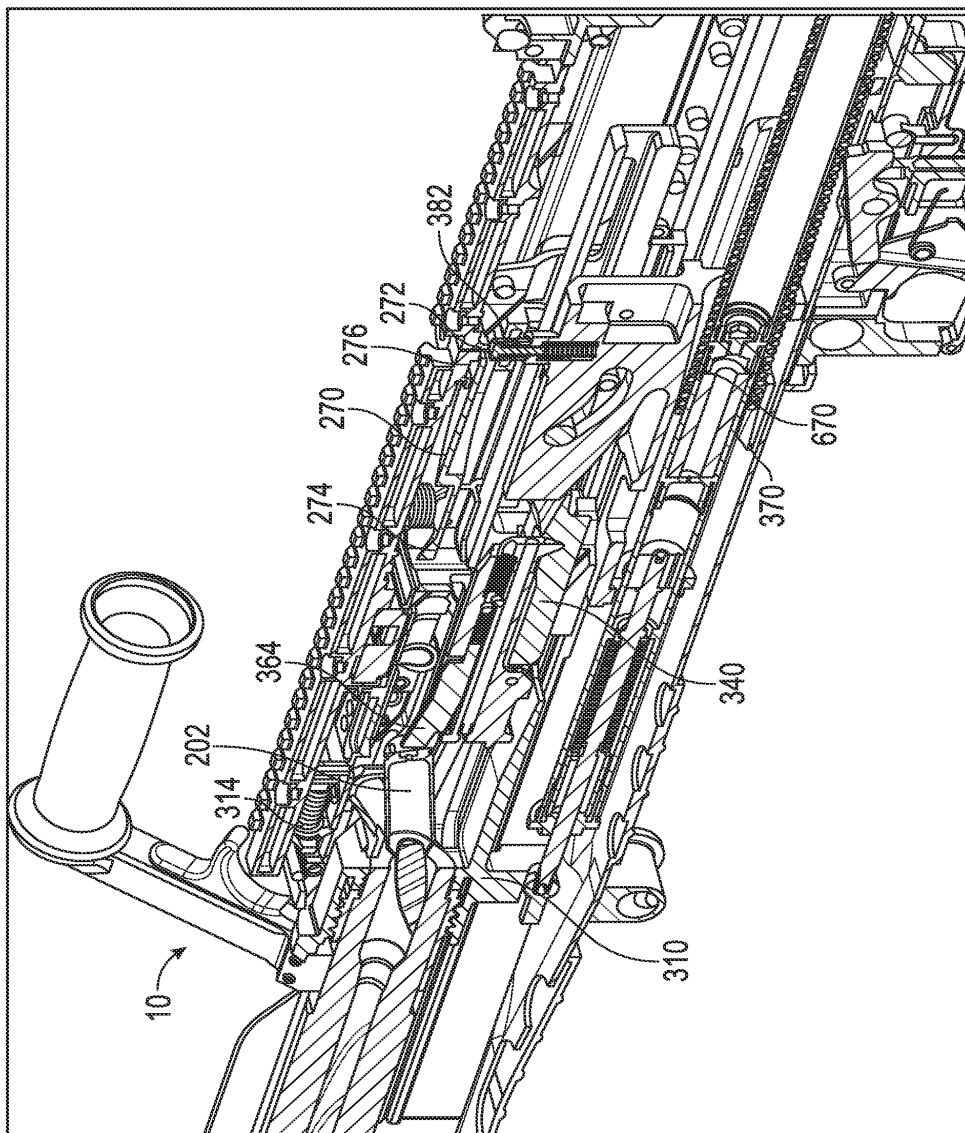
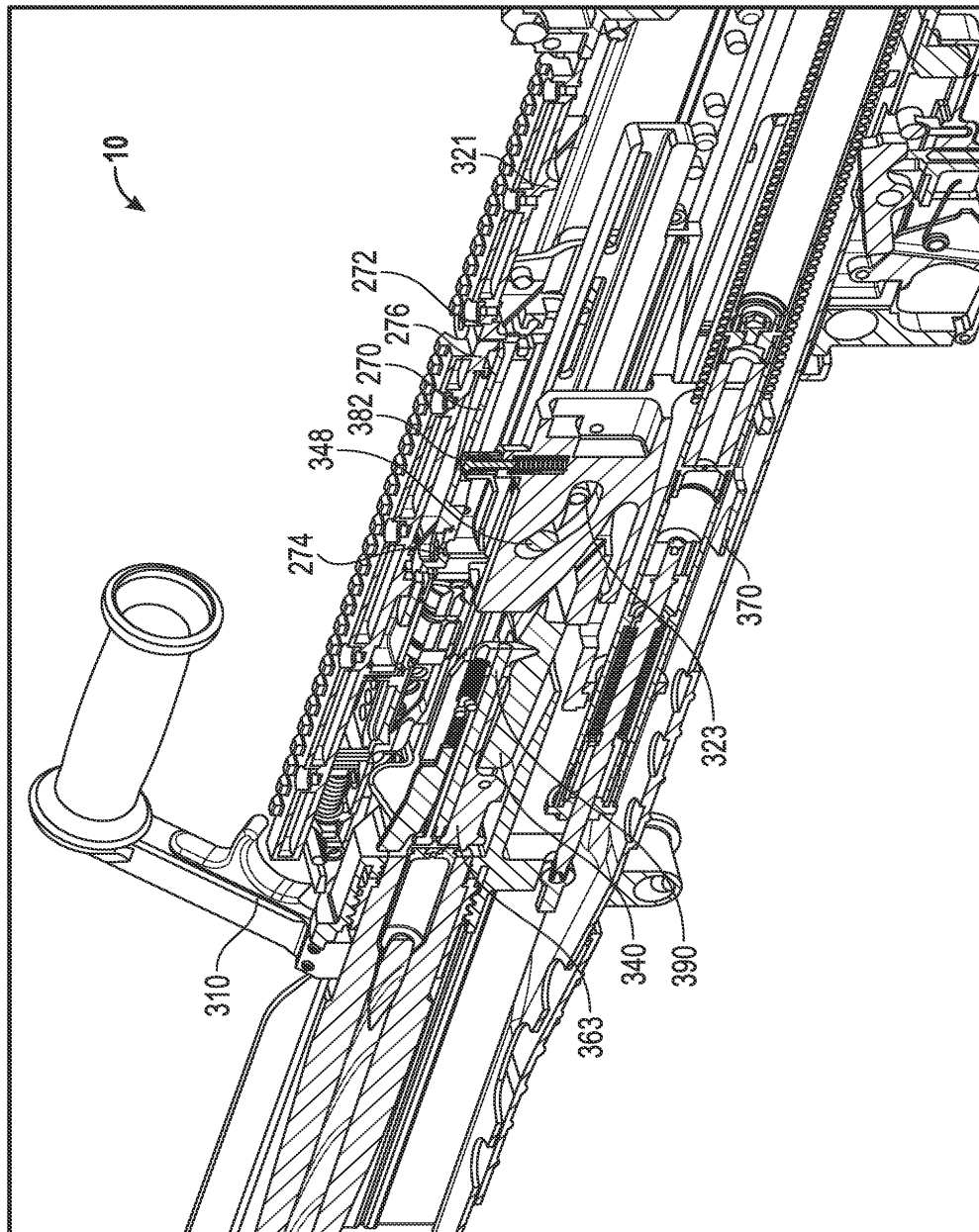
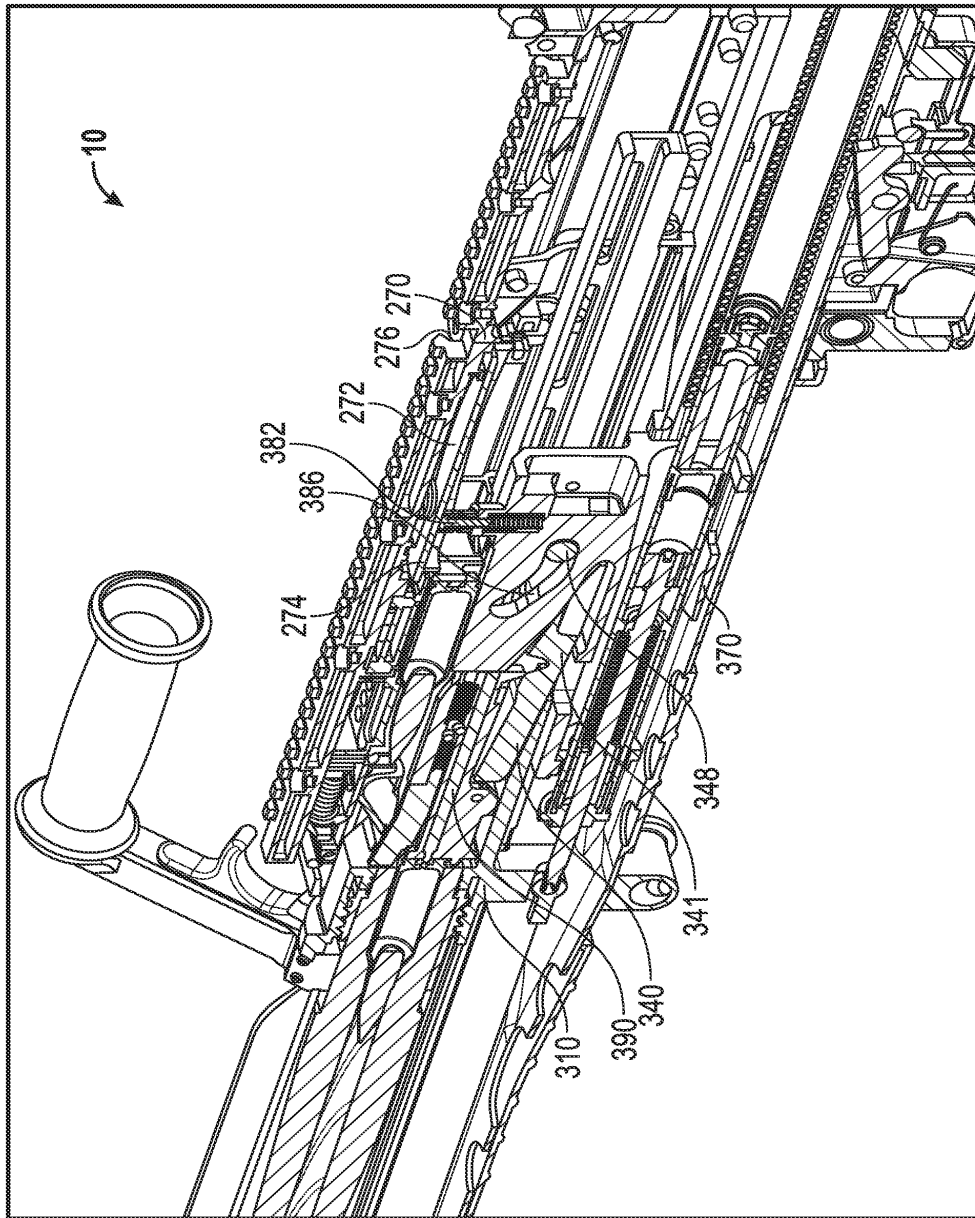
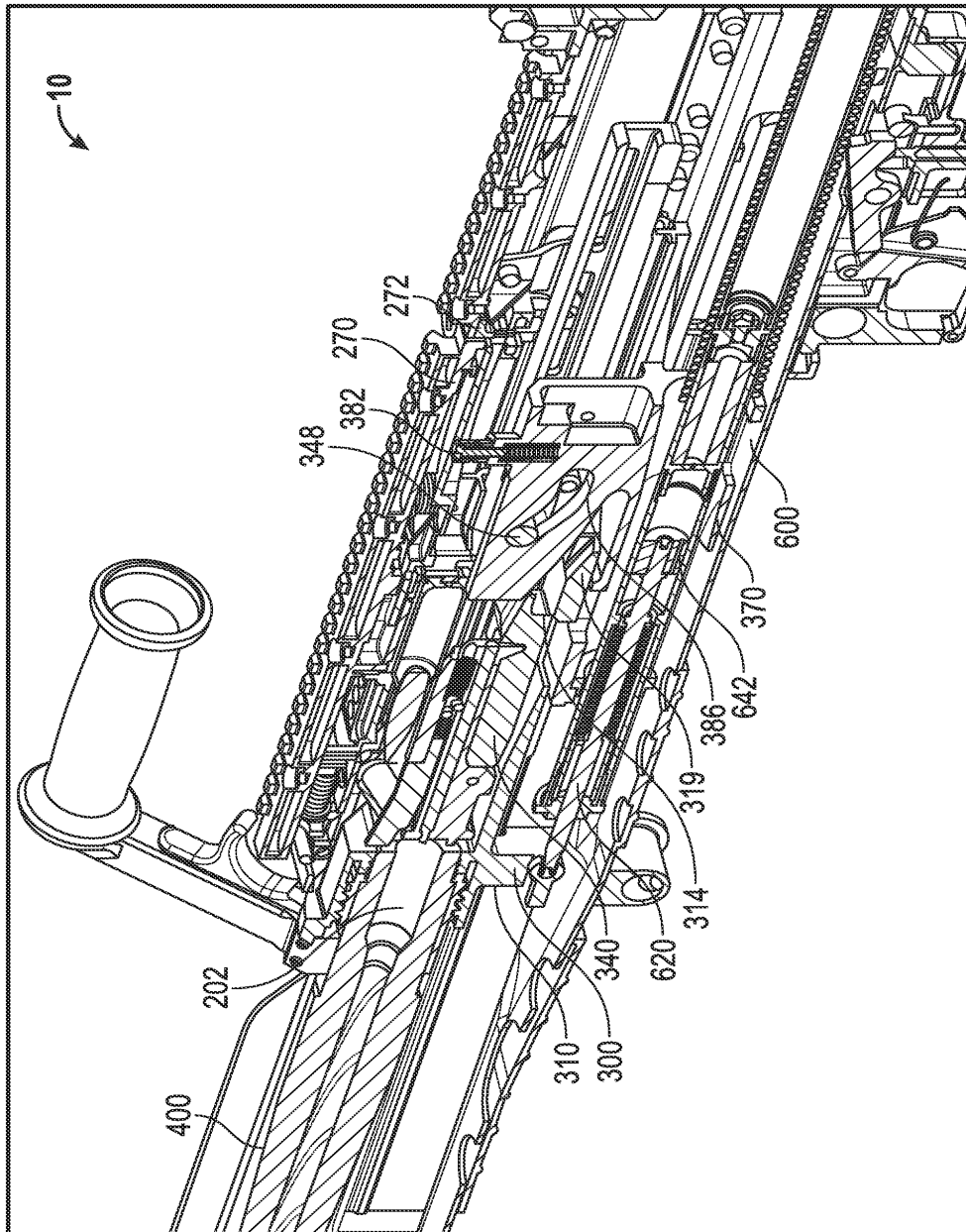


FIG. 20







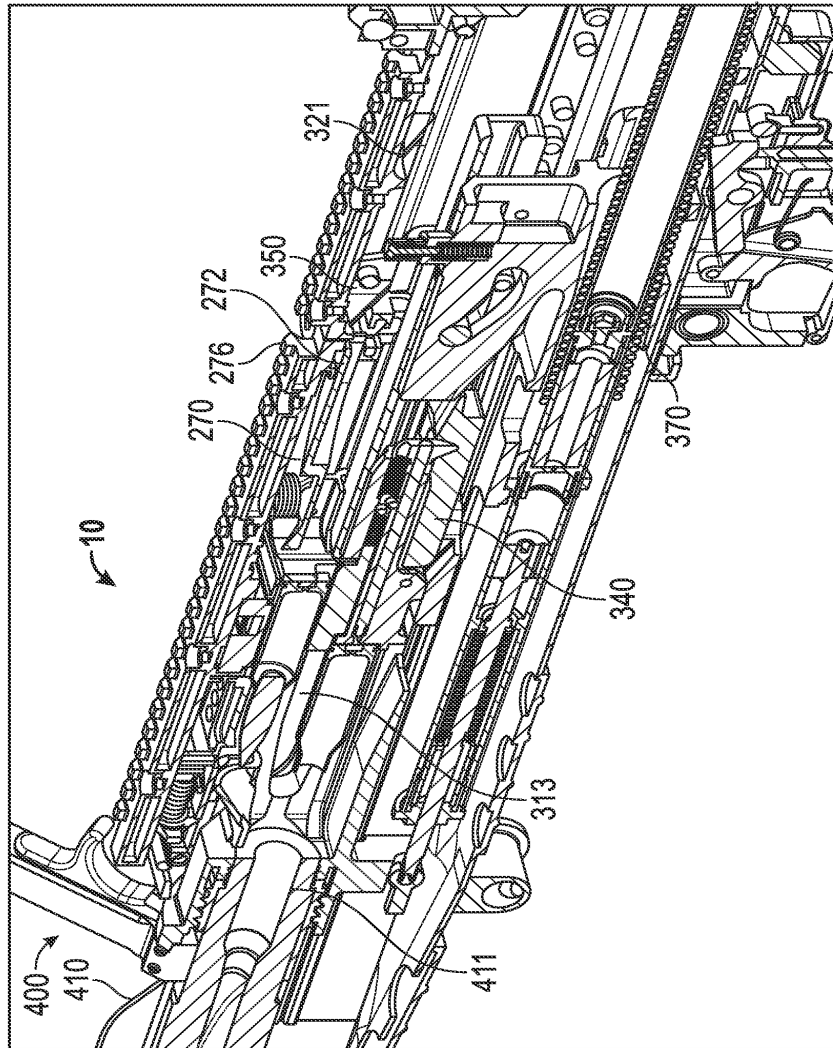


FIG. 23

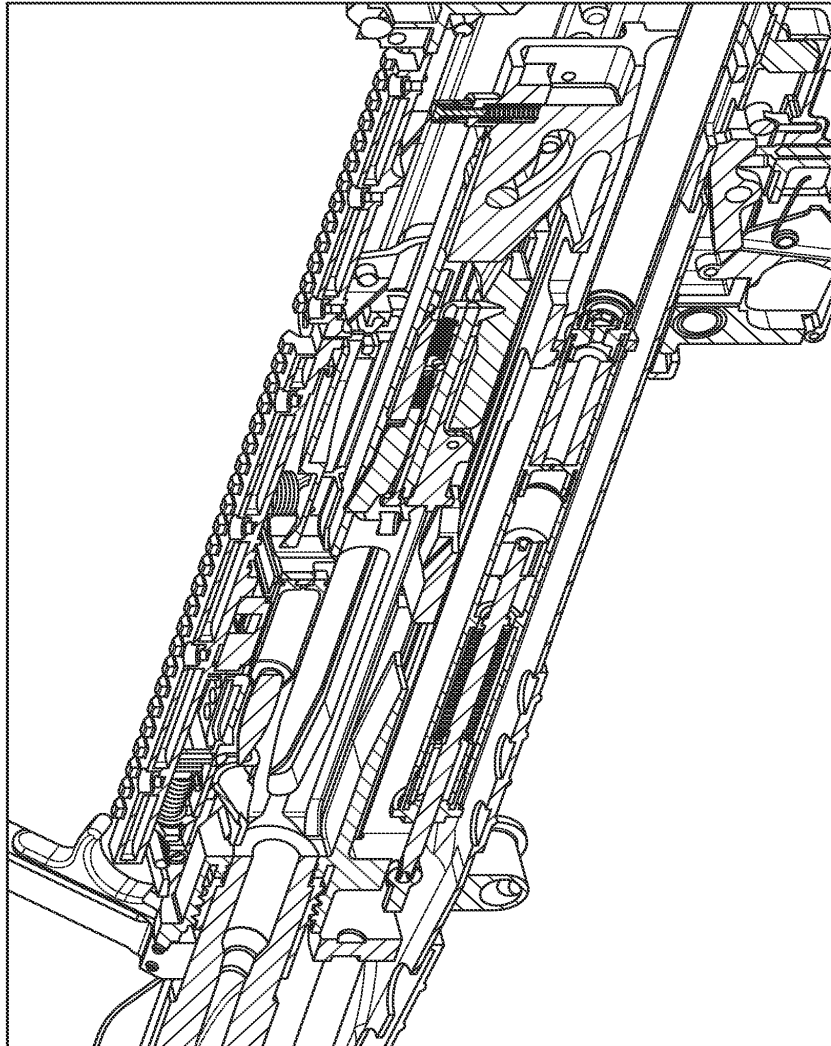


FIG. 24

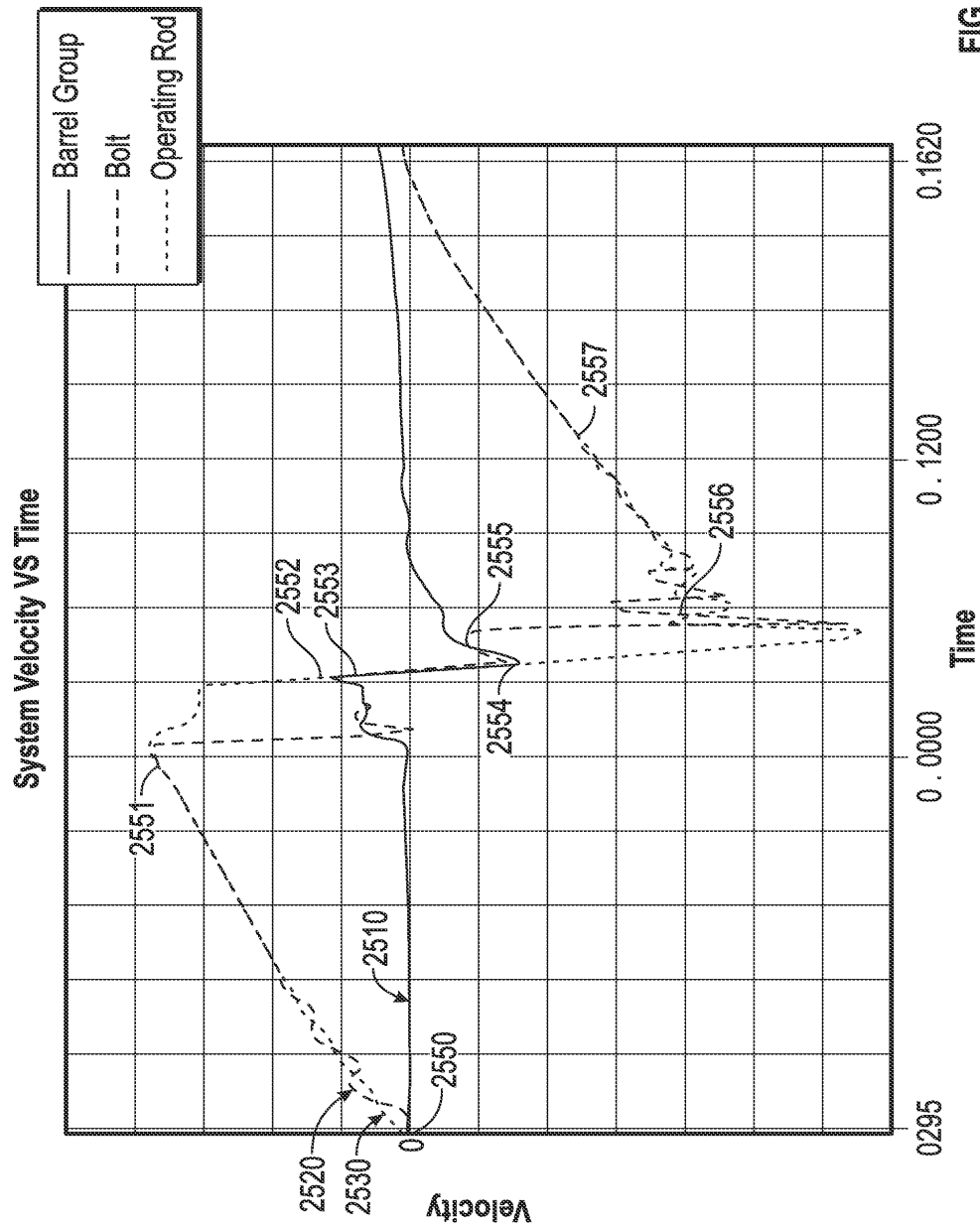


FIG. 25

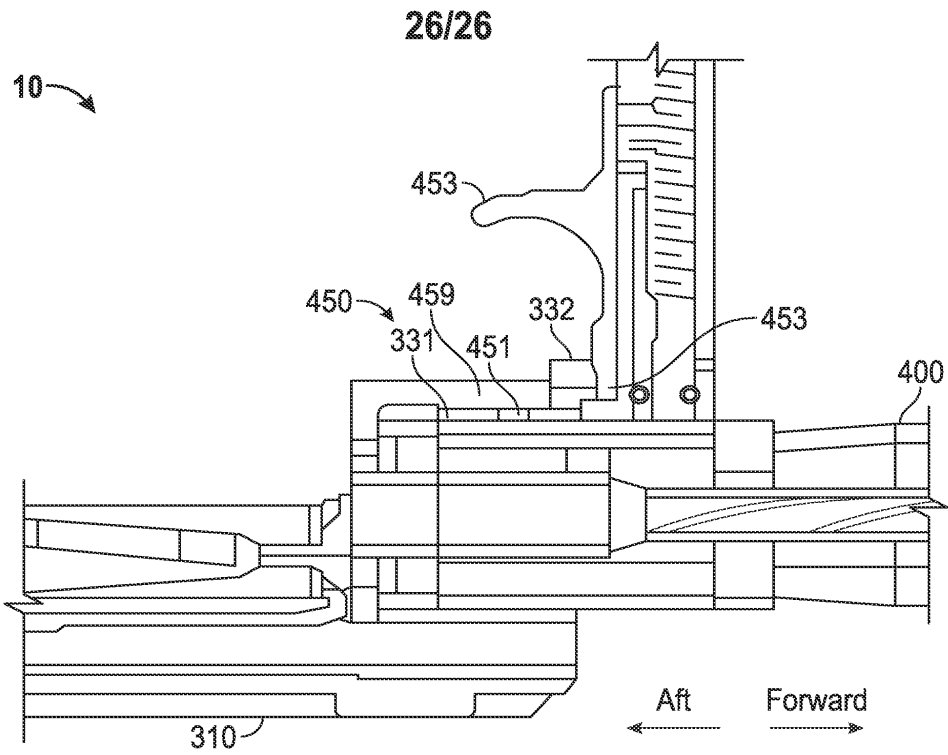


FIG. 26

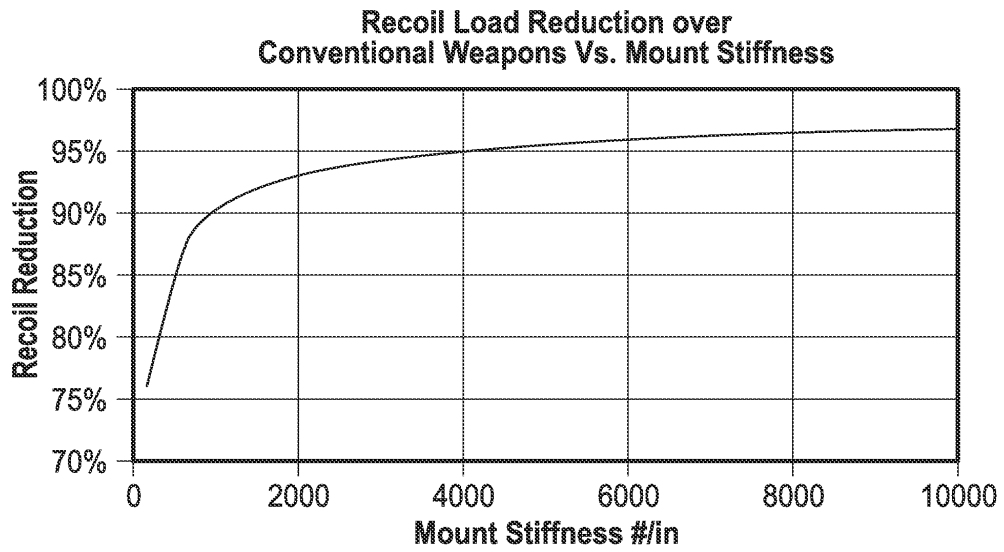


FIG. 27

**COMBINED DECLARATION AND POWER OF ATTORNEY FOR A
UNITED STATES UTILITY PATENT APPLICATION**

As a below named inventor, I hereby declare that:

My residence, mailing address, and country of citizenship are stated below next to my full name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter, which is claimed and for which a patent is sought on the invention entitled:

**WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING
GROUP**

the specification of which:

☒ is attached hereto;

☐ was filed on _____ and assigned U.S. application serial no. or PCT
application no. _____;

☐ and was amended on _____ (if applicable).

I hereby authorize the Assignee (current or subsequently identified) of the above-identified application, its successors and assigns, or anyone it may properly designate, to insert in this instrument the date of execution and/or filing date and serial number of said application when ascertained.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above, if any.

I hereby acknowledge the duty to disclose information which is material to patentability as defined by 37 C.F.R. § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119 or 365 of any foreign application(s) for patent, inventor's or plant breeders rights certificate(s), listed below and have also identified below, any foreign application for patent, inventor's or plant breeders rights certificate(s), or of any PCT international application having a filing date before that of the application of which priority is claimed:

Foreign Application No. Country

Foreign Filing Date

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States Provisional applications listed below:

<u>Application No.</u>	<u>Filing Date</u>
------------------------	--------------------

I hereby claim the benefit under 35 U.S.C. 120 of 365 of any United States application(s) or of any PCT international application designating the United States of America, listed below:

<u>U.S. Parent Application or PCT Parent No.</u>	<u>Country</u>	<u>Foreign Filing Date</u>
--	----------------	----------------------------

As a named inventor, I hereby appoint the attorney(s) and/or agent(s) associated with Customer Number 73411 to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Direct all correspondence and telephone calls to the address and phone number associated with Customer Number 73411.

AUTHORIZATION TO PERMIT ACCESS TO APPLICATION BY PARTICIPATING OFFICES

☒ If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified application is filed access to the above-identified patent application.
--

I hereby declare that all statements made herein of my own knowledge are true and that all statements 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 18 U.S.C. 1001 and that willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Sole or First Inventor: David Steimke

Signature of Sole or First Inventor:  Date: 7/24/2012

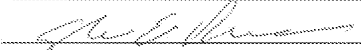
Residence City: Burlington Residence State: VT

Residence Country: US Citizenship: US

Home or Business Post Office Address: 120 Nottingham

City: Burlington State: VT Zip Code: 05408

Full Name of Second Inventor: Glenn Rossier

Signature of Second Inventor:  Date: 7/24/2012

Residence City: Ferrisburg Residence State: VT

Residence Country: US Citizenship: US

Home or Business Post Office Address: 5220 Rt 7

City: Ferrisburg State: VT Zip Code: 05456



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
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APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/562,078	07/30/2012	David Steimke	014.5009

73411
INGRASSIA FISHER & LORENZ, P.C. (GD-C4Sys)
7010 E. COCHISE ROAD
SCOTTSDALE, AZ 85253

CONFIRMATION NO. 1130

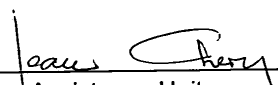


Date Mailed: 08/13/12

IMPROPER AUTHORIZATION TO PERMIT ACCESS

Applicant's Authorization to Permit Access by a Foreign Intellectual Property Office is improper because the Authorization is insufficient with respect to the requirements set forth in 37 CFR 1.14(h)(1) and (3). See forms PTO/SB/39 and PTO/SB/01 for an acceptable Authorization.

Questions relating to this Notice should be directed to the Application Assistance Unit at 571-272-4200.


Application Assistance Unit
(571) 272-4200



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
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO.	TOT CLAIMS	IND CLAIMS
13/562,078	07/30/2012		1250	014.5009	20	2

CONFIRMATION NO. 1130

FILING RECEIPT

73411
INGRASSIA FISHER & LORENZ, P.C. (GD-C4Sys)
7010 E. COCHISE ROAD
SCOTTSDALE, AZ 85253



OC00000055918318

Date Mailed: 08/14/2012

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)

David Steimke, La Burlington, VT;
Glenn Rossier, Ferrisburg, VT;

Assignment For Published Patent Application

GENERAL DYNAMICS ARMAMENT AND TECHNICAL PRODUCTS, INC., Charlotte, NC

Power of Attorney: The patent practitioners associated with Customer Number 73411

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/526,580 08/23/2011
and claims benefit of 61/526,569 08/23/2011

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.)

Projected Publication Date: To Be Determined - pending completion of Security Review

Non-Publication Request: No

Early Publication Request: No

Title

WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP

Preliminary Class**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

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

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

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

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

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

LICENSE FOR FOREIGN FILING UNDER**Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier

page 2 of 3

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).

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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, facilitate, and accelerate 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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 13/562,078	
APPLICATION AS FILED - PART I							
(Column 1)		(Column 2)		SMALL ENTITY		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	380
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	620
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	250
TOTAL CLAIMS (37 CFR 1.16(i))	20	minus 20 = *			OR	x 60 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2	minus 3 = *				x 250 =	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 \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))						0.00	
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1250
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(\$)	OR	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(\$)	OR	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.							



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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/562,078	07/30/2012	David Steimke	014.5009

73411
INGRASSIA FISHER & LORENZ, P.C. (GD-C4Sys)
7010 E. COCHISE ROAD
SCOTTSDALE, AZ 85253

CONFIRMATION NO. 1130
MISCELLANEOUS NOTICE



Date Mailed: 08/14/2012

A communication which cannot be delivered in electronic form has been mailed to the applicant.

Doc Code: PD.TO.AUTH

Document Description: Authorization to access Appl. by Trilateral Office

PTO/SB/39 (07-09)

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

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

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AUTHORIZATION TO PERMIT ACCESS TO APPLICATION BY PARTICIPATING OFFICES	
Send completed form to: Commissioner for Patents P.O. Box 1450, Alexandria, VA 22313-1450	
COMPLETE IF KNOWN	
Application Number	13562078
Filing Date	30-JUL-2012
First Named Inventor	David Steimke
Attorney Docket Number	014.5009
Title (Required)	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP

The undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified patent application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h).

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the above-identified application with respect to: 1) the above-identified patent application-as-filed; 2) any foreign application to which the above-identified patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified patent application; and 3) any U.S. application-as-filed from which benefit is sought in the above-identified patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Offices.

This written authorization should be submitted prior to the filing of a subsequent foreign application, in which priority is claimed to the above-identified patent application, with any intellectual property office (e.g., the EPO, JPO, KIPO, or DAS Accessing Office). However, if applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the above-identified patent application is filed to have access to the above-identified patent application, this written authorization should not be filed.

No fee will be charged under 37 CFR 1.19(b)(1) for providing a participating intellectual property office with an electronic copy of the above-identified patent application.

This form must be signed by an authorized party in accordance with 37 CFR 1.14(c).

/CHAD C. ANDERSON/

Signature

Chad C. Anderson

Printed or Typed Name

Attorney of Record

Title

8/22/2012

Date

480-385-5060

Telephone Number

44,505

Registration Number, if applicable

This collection of information is required by 37 CFR 1.14(h). 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.

Privacy Act Statement

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

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

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

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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

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

I hereby appoint:

☒ Practitioners associated with the Customer Number:

13864

OR

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

Name	Registration Number	Name	Registration Number

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

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

☒ The address associated with Customer Number:

13864

OR

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

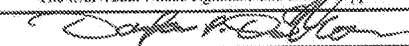
Assignee Name and Address:

General Dynamics Armament and Technical Products, Inc.
2118 Water Ridge Parkway
Charlotte, NC 28217

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

SIGNATURE of Assignee of Record

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

Signature		Date	25 Jan 2012
Name	Douglas P. DeMoss	Telephone	704-714-8005
Title	Vice President & General Counsel		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1480, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: General Dynamics Armament and Technical Products, Inc.

Application No./Patent No.: 13/562,078

Filed/Issue Date: July 30, 2012

Titled: WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP

General Dynamics Armament and Technical Products, Inc., a

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)
the patent application/patent identified above, by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 028678, Frame 0714, or for which a copy therefore is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/CHAD C. ANDERSON/

2012-08-22

Signature

Date

Chad C. Anderson

Attorney of Record

Printed or Typed Name

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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.

UTILITY PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: David Steimke Group Art Unit: Unknown
Serial No.: 13/562,078 Examiner: Unknown
Filed: July 30, 2012 Attorney Docket No.: 014.5009
For: WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING
OPERATING GROUP

REQUEST FOR CORRECTED FILING RECEIPT

Mail Stop Filing Receipt Corrections
Office of Initial Patent Examination
Commissioner for Patents
P.O. Box 1450
Arlington, VA 22313-1450

Sir:

Applicants are in receipt of the official Filing Receipt, dated August 15, 2012, for the above-identified application, and have noted an error thereon. Specifically, Applicants note that the customer number is incorrect. Please change the customer number to 13864. A copy of the Filing Receipt with the changes noted thereon is attached hereto.

Should the Office of Initial Patent Examination's Filing Receipt Corrections have any questions, Applicants request that the Examiner contact the undersigned at (480) 385-5060.

Respectfully submitted,
Ingrassia, Fisher & Lorenz, P.C.

Dated August 22, 2012

/CHAD C. ANDERSON/
Chad C. Anderson
Registration No. 44,505



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
13/562,078	07/30/2012		1250	014,5009	20	2

CONFIRMATION NO. 1130

73444 13864

INGRASSIA FISHER & LORENZ, P.C. (GD-C4Sys)
7010 E. COCHISE ROAD
SCOTTSDALE, AZ 85253

FILING RECEIPT



OC000000055918318

Date Mailed: 08/14/2012

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)

David Steimke, La Burlington, VT;
Glenn Rossier, Ferrisburg, VT;

Assignment For Published Patent Application

GENERAL DYNAMICS ARMAMENT AND TECHNICAL PRODUCTS, INC., Charlotte, NC

Power of Attorney: The patent practitioners associated with Customer Number ~~73444~~ 13864

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/526,580 08/23/2011
and claims benefit of 61/526,569 08/23/2011

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.)

Projected Publication Date: To Be Determined - pending completion of Security Review

Non-Publication Request: No

Early Publication Request: No

Title

WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP

Preliminary Class

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stoptakes.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

page 2 of 3

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).

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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, facilitate, and accelerate 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.

UTILITY PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: David Steinke Group Art Unit: Unknown
Serial No.: 13/562,078 Examiner: Unknown
Filed: July 30, 2012 Attorney Docket No.: 014.5009
For: WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING
GROUP

**SUBMISSION OF SUPPLEMENTAL APPLICATION
DATA SHEET 37 CFR 1.76 (c)**

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

Sir:

Applicant submits herewith a Supplemental Application Data Sheet. The Application Data Sheet was corrected due to the customer number being incorrect. Please change customer number to 13864.

If for some reason Applicants need to submit a fee with this filing, please consider this as authorization to charge Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,
Ingrassia, Fisher & Lorenz, P.C.

Dated August 22, 2012

/CHAD C. ANDERSON/
Chad C. Anderson
Registration No. 44,505

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	014.5009
		Application Number	
Title of Invention	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

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

Applicant Information:

Applicant 1				
Applicant Authority ☒ Inventor		☐ Legal Representative under 35 U.S.C. 117		☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix
	David		Steinke	
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service				
City	La Burlington	State/Province	VT	Country of Residence
				US
Citizenship under 37 CFR 1.41(b)		US		
Mailing Address of Applicant:				
Address 1		120 Nottingham		
Address 2				
City	La Burlington	State/Province	VT	
Postal Code	05408	Country	US	
Applicant 2				
Applicant Authority ☒ Inventor		☐ Legal Representative under 35 U.S.C. 117		☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix
	Glenn		Rossier	
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service				
City	Ferrisburg	State/Province	VT	Country of Residence
				US
Citizenship under 37 CFR 1.41(b)		US		
Mailing Address of Applicant:				
Address 1		5220 Rt 7		
Address 2				
City	Ferrisburg	State/Province	VT	
Postal Code	05456	Country	US	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.				
				Add

Correspondence Information:

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

EFS Web 2.2.2

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	014.5009	
		Application Number		
Title of Invention	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP			
Customer Number	73444 13864			
Email Address			Add Email	Remove Email

Application Information:

Title of the Invention	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		
Attorney Docket Number	014.5009	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	26	Suggested Figure for Publication (if any)	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)	
☐	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.			
Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	73444 13864		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61526580	2011-08-23
Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61526569	2011-08-23

EFS Web 2.2.2

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	014.5009
		Application Number	
Title of Invention	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		

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

Foreign Priority Information:

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

Remove			
Application Number	Country ¹	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			☐ Yes ☒ No
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			

Assignee Information:

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

Assignee 1

If the Assignee is an Organization check here. ☒

Organization Name	GENERAL DYNAMICS ARMAMENT AND TECHNICAL PRODUCTS, INC.
-------------------	--

Mailing Address Information:

Address 1	Four LakePointe Plaza		
Address 2	2118 Water Ridge Parkway		
City	Charlotte	State/Province	NC
Country ¹	US	Postal Code	28217-4526
Phone Number		Fax Number	
Email Address			

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

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/CHAD C. ANDERSON/		Date (YYYY-MM-DD)	2012-07-30
First Name	Chad C.	Last Name	Anderson	Registration Number
			44505	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	014.5009
		Application Number	
Title of Invention	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		

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

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

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

Electronic Acknowledgement Receipt	
EFS ID:	13523512
Application Number:	13562078
International Application Number:	
Confirmation Number:	1130
Title of Invention:	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP
First Named Inventor/Applicant Name:	David Steimke
Customer Number:	73411
Filer:	Chad Clifford Anderson
Filer Authorized By:	
Attorney Docket Number:	014.5009
Receipt Date:	22-AUG-2012
Filing Date:	30-JUL-2012
Time Stamp:	16:32:39
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	Authorization to access Appl. by Trilateral Office	20120822_AuthPermitAccess.pdf	80642 0b7293153979ca4861152f625682065f33598b27	no	2

Warnings:

Information:

2	Power of Attorney	20120822_PowerOfAttorney.pdf	504358 cf66eb03762fb9959c5214ebb20b76d4b0eac73a	no	1
Warnings:					
Information:					
3	Assignee showing of ownership per 37 CFR 3.73(b).	20120822_StatmentUnder373.pdf	427450 43eccaee31ac03736a81159af18446d20449b4d4	no	2
Warnings:					
Information:					
4	Request for Corrected Filing Receipt	20120822_CorrectFR.pdf	3663068 ffc19967fed03f486991307b3e5ee39b661d700	no	4
Warnings:					
Information:					
5	Miscellaneous Incoming Letter	20120822_SupplementalADS.pdf	64776 d1b9733c22859f60fd83826b3c425fce0366	no	1
Warnings:					
Information:					
6	Application Data Sheet	20120822_ReplacementADS.pdf	93233 f2389627d03551ca9e56393a367c48f49b7e239d	no	5
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
Total Files Size (in bytes):			4833527		
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
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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
13/562,078	07/30/2012	David Steimke	014.5009

13864
Ingrassa Fisher & Lorenz, P.C. (GD - ATP)
7010 E. Cochise Road
Scottsdale, AZ 85253

CONFIRMATION NO. 1130
POA ACCEPTANCE LETTER



0C000000056153606

Date Mailed: 08/29/2012

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/22/2012.

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.

/sleutchit/

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	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/562,078	07/30/2012	David Steimke	014.5009

73411
INGRASSIA FISHER & LORENZ, P.C. (GD-C4Sys)
7010 E. COCHISE ROAD
SCOTTSDALE, AZ 85253

CONFIRMATION NO. 1130
POWER OF ATTORNEY NOTICE



Date Mailed: 08/29/2012

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/22/2012.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sleutchit/

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
13/562,078	07/30/2012		1250	014.5009	20	2

CONFIRMATION NO. 1130

REPLACEMENT FILING RECEIPT

13864
Ingrassa Fisher & Lorenz, P.C. (GD - ATP)
7010 E. Cochise Road
Scottsdale, AZ 85253



OC000000056154210

Date Mailed: 08/29/2012

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)

David Steimke, La Burlington, VT;
Glenn Rossier, Ferrisburg, VT;

Assignment For Published Patent Application

GENERAL DYNAMICS ARMAMENT AND TECHNICAL PRODUCTS, INC., Charlotte, NC

Power of Attorney: The patent practitioners associated with Customer Number 13864

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/526,580 08/23/2011
and claims benefit of 61/526,569 08/23/2011

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.)

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

Projected Publication Date: To Be Determined - pending completion of Security Review

Non-Publication Request: No

Early Publication Request: No

Title

WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP

Preliminary Class

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

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

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier

page 2 of 3

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).

SelectUSA

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, facilitate, and accelerate 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.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078	
	Filing Date		2012-07-30	
	First Named Inventor	David Steimke		
	Art Unit			
	Examiner Name			
	Attorney Docket Number	014.5009		

U.S.PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	4475438	A	1984-10-09	Sullivan			
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S.PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² i	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1							☐
If you wish to add additional Foreign Patent Document citation information please click the Add button.							Add	
NON-PATENT LITERATURE DOCUMENTS							Remove	
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078
	Filing Date		2012-07-30
	First Named Inventor	David Steimke	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	014.5009	

	1	"Field Manual No. 23-65- Browning Machine Gun, Caliber .50 HB, M2" 19 June 1991 (19.06.1991) entire document.	☐
	2	PCT Search Report and Written Opinion mailed April 15, 2013 in PCT/US12/49054.	☐
If you wish to add additional non-patent literature document citation information please click the Add button Add			
EXAMINER SIGNATURE			
Examiner Signature			Date Considered
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078
	Filing Date		2012-07-30
	First Named Inventor	David Steinke	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	014.5009	

CERTIFICATION STATEMENT			
Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):			
☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).			
OR			
☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).			
☒ See attached certification statement.			
☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.			
☐ A certification statement is not submitted herewith.			
SIGNATURE			
A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.			
Signature	/CHAD C. ANDERSON/	Date (YYYY-MM-DD)	2012-07-30
Name/Print	Chad C. Anderson	Registration Number	44505
This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.			

Privacy Act Statement

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

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

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

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

To: CHAD C. ANDERSON INGRASSIA FISHER & LORENZ, P.C. 7010 E. COCHISE ROAD SCOTTSDALE, AZ 85253	Date of mailing (day/month/year) 15 APR 2013
Applicant's or agent's file reference 0145009PC	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT/US 12/49054	International filing date (day/month/year) 31 July 2012 (31.07.2012)
Applicant GENERAL DYNAMICS ARAMENT AND TECHNICAL PRODUCTS, INC.	

1.	☒	The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith. Filing of amendments and statement under Article 19: The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46). When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report. Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70 For more detailed instructions, see PCT Applicant's Guide, International Phase, paragraphs 9.004 -- 9.011.
2.	☐	The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.
3.	☐	With regard to any protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that: ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.
4.	Reminders The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public. Shortly after the expiration of 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3). Within 19 months from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later); otherwise, the applicant must, within 20 months from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices. In respect of other designated Offices, the time limit of 30 months (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the <i>PCT Applicant's Guide, National Chapters</i> .	

Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1480, Alexandria, Virginia 22313-1480 Facsimile No. 571-273-3204	Authorized officer Len W. Young PCT Helpdesk: 571-272-4300 Telephone No. PCT OSP: 571-272-7774
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Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To: CHAD C. ANDERSON INGRASSIA FISHER & LORENZ, P.C. 7010 E COCHISE ROAD SCOTTSDALE, AZ 85253

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference 0145009PC	Date of mailing <i>(day/month/year)</i> 15 APR 2013
International application No. PCT/US 12/49054	International filing date <i>(day/month/year)</i> 31 July 2012 (31.07.2012)
Applicant GENERAL DYNAMICS ARAMENT AND TECHNICAL PRODUCTS, INC.	

1.	☒	The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith. Filing of amendments and statement under Article 19: The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46). When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report. Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70 For more detailed instructions, see PCT Applicant's Guide, International Phase, paragraphs 9.004 – 9.011.
2.	☐	The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.
3.	☐	With regard to any protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that: ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices. ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.
4.		Reminders The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public. Shortly after the expiration of 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3). Within 19 months from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later); otherwise, the applicant must, within 20 months from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices. In respect of other designated Offices, the time limit of 30 months (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the PCT Applicant's Guide, National Chapters.

Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISAR/US Commissioner for Patents P.O. Box 1460, Alexandria, Virginia 22313-1460 Facsimile No. 571-273-3224	Authorized officer Lee W. Young PCT Helpdesk: 571-272-6300 PCT ODP: 571-272-7775
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Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 0145008PC	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US 12/49054	International filing date (day/month/year) 31 July 2012 (31.07.2012)	(Earliest) Priority Date (day/month/year) 23 August 2011 (23.08.2011)
Applicant GENERAL DYNAMICS ARAMENT AND TECHNICAL PRODUCTS, INC.		

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

This international search report consists of a total of 2 sheets.

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

1. Basis of the report

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

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

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

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

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

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

4. With regard to the **title**,

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

5. With regard to the **abstract**,

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

6. With regard to the **drawings**,

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

Form PCT/ISA/210 (first sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 12/49054

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - F41A 5/18 (2013.01)

USPC - 42/1.06; 89/14.3

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)

IPC(8) - F41A 5/18 (2013.01)

USPC - 42/1.06; 89/14.3

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 88/1.703, 132, 156, 159, 161, 162, 191.01, 192, 42.01, 44.01

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase, Google Patent, Google Scholar

Firearm, gun, rifle, weapon, recoil, buffer, absorb, spring, bias, receiver, barrel, barrel extension, operating rod, translate, reciprocate, gas accelerator, cam, lock

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 6,349,536 B1 (Fossier et al.) 05 February 2002 (05.02.2002) col. 4, lns. 6-12, col. 4, ln 30-41, col. 5, ln 12-30, col. 5, ln 12-19, col. 6, ln 20-30, col. 6, ln 23-33, col. 8, ln 57-62, col. 9, ln 19-30, col. 9, ln 31-48, col. 9, ln 30-48	1-9, 13, 15-19 10-12, 14, 20
Y	US 7,584,891 B2 (Steinke et al.) 08 September 2009 (09.09.2009) col. 7, ln 65 to col.8, ln 2, col. 8, ln 3-17	10-12, 20
Y	US 4,475,438 A (Sullivan) 09 October 1984 (09.10.1984) col. 11, ln 3-15	14
A	"Field Manual No. 23-55 - Browning Machine Gun, Caliber .50 HB, M2" 19 June 1991 (19.06.1991) entire document	1-20

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

* Special categories of cited documents:

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

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

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

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

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

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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

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

"&" document member of the same patent family

Date of the actual completion of the international search

08 March 2013 (08.10.2013)

Date of mailing of the international search report

15 APR 2013

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-3201

Authorized officer:

Lee W. Young

PCT Helpline: 571-272-4300

PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: CHAD C. ANDERSON
INGRASSIA FISHER & LORENZ, P.C.
7010 E. COCHISE ROAD
SCOTTSDALE, AZ 85253

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year) .. **15 APR 2013**

Applicant's or agent's file reference
0145009PC

FOR FURTHER ACTION

See paragraph 2 below

International application No.
PCT/US 12/49054

International filing date (day/month/year)
31 July 2012 (31.07.2012)

Priority date (day/month/year)
23 August 2011 (23.08.2011)

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - F41A 5/18 (2013.01)
USPC - 42/1.06; 89/14.3

Applicant **GENERAL DYNAMICS ARAMENT AND TECHNICAL PRODUCTS, INC.**

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Pm PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Date of completion of this opinion
11 March 2013 (11.03.2013)

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4100
PCT CEP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 12/48054

Box No. 1 Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
☒ the international application in the language in which it was filed.
☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43bis, (a)).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
 - a. (means)
☐ on paper
☐ in electronic form
 - b. (time)
☐ in the international application as filed
☐ together with the international application in electronic form
☐ subsequently to this Authority for the purposes of search
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Form PCT/ISA/237 (Box No. 1) (July 2011)

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 12/49054

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	10-12, 14, 20	YES
	Claims	1-9, 13, 15-19	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-20	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims	None	NO

2. Citations and explanations:

Claims 1-9, 13 and 15-19 lack novelty under PCT Article 33(2) as being anticipated by US 6,343,536 B1 to Rossier et al. (hereinafter "Rossier").

Regarding claim 1, Rossier discloses weapon system for firing a round, comprising:

a receiver (22) (col. 4, in 8-12);
an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition (col. 5, in 12-30), the operating group comprising:
a barrel extension (60) at least partially housed within the receiver and arranged to axially translate relative to the receiver (col. 4, in 30-41, col. 5, in 12-19);
an operating rod (op-rod) assembly (92) at least partially housed and arranged to axially translate within the barrel extension in the charge condition, the firing condition, and the recoil condition (col. 5, in 20-30); and
a bolt assembly (42) coupled to the op-rod assembly and at least partially housed and arranged to axially translate within the barrel extension (60) (col. 5, in 12-19);
a barrel (52) coupled to the barrel extension and defining a chamber (col. 5, in 12-19);
a gas accelerator (82) with a first end coupled to the barrel and a second end coupled to the op-rod assembly (92) (col. 9, in 19-35); and
a buffer assembly (140) comprising a drive spring (160; col. 7, in 23-29) having a first end coupled to the receiver and a second end coupled to the op-rod assembly (col. 7, in 12-22);
wherein, in the charged condition, the op-rod assembly (92) and the bolt assembly (42) are retracted against the drive spring (44) (col. 6, in 23-33; col. 9, in 49-59);
wherein, in the firing condition, the op-rod assembly and bolt assembly are driven by the drive spring such that the round is guided into the chamber and the op-rod assembly and bolt assembly are locked to the barrel extension and a forward momentum of the op-rod assembly is imparted to the operating group and the round is fired (col. 8, in 57 to col. 9, in 19);
wherein a portion of an impulse of the fired round stops the forward momentum of the operating group (col. 9, in 19-32); and
wherein, in the recoil condition, the operating group is driven rearward by the remaining portion of the impulse of the fired round (col. 9, in 31-48), the gas accelerator (82) imparts additional rearward momentum to the op-rod assembly (92) and bolt assembly (42) and stops rearward momentum of the barrel (52) and barrel extension (60) (col. 9, in 19-35), and the op-rod assembly (92) and the bolt assembly (42) are stopped by the drive spring (44) (col. 9, in 30-48).

Regarding claim 2, Rossier discloses the weapon system of claim 1, wherein the buffer further includes a hydraulic piston (152) configured to resist forward and rearward movement of the barrel extension (col. 7, in 31-57).

Regarding claim 3, Rossier discloses the weapon system of claim 2, wherein the buffer (140) further includes a self-centering spring (160) configured to resist forward and rearward movement of the barrel extension (col. 7, in 68 to col. 8, in 6).

Regarding claim 4, Rossier discloses the weapon system of claim 3, wherein the hydraulic piston and the self-centering spring are configured such that any force transfer between the barrel extension and the receiver occurs through the hydraulic piston and the self-centering spring (col. 7, in 68 to col. 8, in 6).

Regarding claim 5, Rossier discloses the weapon system of claim 1, further comprising a lock assembly configured to secure the bolt assembly to the op-rod assembly in the charged condition through chambering the round (col. 9 in 4-15).

Regarding claim 6, Rossier discloses the weapon system of claim 5, wherein the lock assembly is configured to release the bolt assembly from the op-rod assembly in the firing condition (col. 9 in 19-30).

Regarding claim 7, Rossier discloses the weapon system of claim 6, wherein the lock assembly is further configured to secure the bolt assembly (42) to the barrel extension (60) in the firing condition (col. 8 in 17-26).

Regarding claim 8, Rossier discloses the weapon system of claim 7, wherein the lock assembly includes a lock pin (96), a first cam (91) defined in the op-rod assembly, and a second cam in the barrel extension, wherein the lock pin engages the first cam and the second cam to secure and release the bolt assembly relative to the barrel extension (col. 5, in 38-48) and the op-rod group (col. 9, in 4-18).

--- See Supplemental Box ---

Form PCT/ISA/237 (Box No. V) (July 2011)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US 12/49054

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:
Box V(2) Citations and Explanations

Regarding claim 9, Rossier discloses the weapon system of claim 5, wherein in a first portion of the firing condition, the lock pin is engaged by the first cam and the second cam to secure the bolt assembly to the op-rod assembly such that the op-rod assembly forces the bolt assembly forward (col. 5, in 39-48), and wherein, in a second portion of the firing condition upon contact of the bolt assembly and the barrel extension, the lock pin disengages from the second cam and the first cam guides the lock pin such that the bolt assembly forms a locking engagement with the barrel extension (col. 9, in 4-18).

Regarding claim 13, Rossier discloses a method for firing a weapon, comprising:
retracing a bolt assembly (42) and an operating rod (op-rod) assembly (82) relative to a barrel extension (60) against a drive spring (44) (col. 6, in 23-33);
driving the bolt assembly and the op-rod assembly with a forward momentum within the barrel extension such that the bolt assembly chambers a round and contacts the barrel extension (col. 8, in 63 to col. 9, in 3), imparting forward momentum to the op-rod assembly, the bolt assembly and the barrel extension such that the round is fired (col. 9, in 4-18), whereby the firing of the round stops the forward momentum and imparts an impulse of rearward momentum on the op-rod assembly, the bolt assembly, and the barrel extension (col. 9, in 31-48);
guiding gases from the round with a gas accelerator to drive the op-rod assembly rearward and to stop the rearward momentum of the barrel extension (col. 9, in 19-35); and
absorbing the rearward momentum of the op-rod assembly with the drive spring (col. 9 in 49-58).

Regarding claim 15, Rossier discloses the method of claim 13, further comprising the step of restraining movement of the op-rod assembly in forward and aft directions with a buffer assembly (col. 7, in 12-22).

Regarding claim 16, Rossier discloses the method of claim 15, wherein the restraining step includes restraining movement of the barrel extension assembly in forward and aft directions with a soft spring and a hydraulic piston valve of the buffer assembly (col. 7, in 12-35).

Regarding claim 17, Rossier discloses the method of claim 13, wherein the driving step includes securing the bolt assembly to the op-rod assembly in the charged condition until the bolt assembly engages the barrel extension (col. 8 in 4-18).

Regarding claim 18, Rossier discloses the method of claim 17, wherein the driving step includes releasing the bolt assembly from the op-rod assembly when the bolt assembly engages the barrel extension (col. 9 in 19-30).

Regarding claim 19, Rossier discloses the method of claim 18, wherein the driving step includes securing the bolt assembly to the barrel extension during the contact with the barrel extension (col. 8 in 17-26).

Claims 10-12 and 20 lack an inventive step under PCT Article 33(3) as being obvious over Rossier in view of US 7,584,681 B2 Steinke et al. (hereinafter "Steinke").

Regarding claim 10, Rossier discloses the weapon system of claim 9, but does not explicitly disclose wherein, in the recoil condition, the rearward movement of the op-rod assembly guides the lock pin within the second cam such that the bolt assembly is released relative to the barrel extension. However, Steinke discloses a weapon system wherein, in the recoil condition, the rearward movement of the op-rod assembly (326) guides the lock pin (344) within the second cam such that the bolt assembly (332) is released relative to the barrel extension (302) (col. 7, in. 55 to col. 8, in. 2). Accordingly, it would have been obvious to one of ordinary skill in the art to combine the lock pin guiding arrangement of Steinke with the weapon system of Rossier as a known means of releasing the bolt assembly from the barrel extension during a recoil condition.

Regarding claim 11, Rossier discloses the weapon system of claim 1, including ejection of a spent casing from the bolt face (col. 9, in. 25-30) but does not explicitly disclose wherein in an ejection condition, a case of the round is coupled to the bolt assembly. However, Steinke discloses a weapon system, wherein in an ejection condition, a case of the round (110) is coupled to the bolt assembly (331) (col. 8, in 3-17). Accordingly, it would have been obvious to one of ordinary skill in the art to combine the round coupling of Steinke as a known means of ejecting the case fired in Rossier.

Regarding claim 12, Rossier and Steinke disclose the weapon system of claim 11. Steinke discloses wherein the barrel extension includes an extractor (336) such that, in the ejection condition, the extractor engages the case (110) during the rearward movement of the bolt assembly to remove round from chamber and eject the case from the weapon system (col. 8, in 3-17).

Regarding claim 20, Rossier discloses the method of claim 19, but does not explicitly disclose wherein the step of securing the bolt assembly to the barrel extension includes guiding a cam on the bolt assembly into a cam relief of a hold-up cam on the barrel extension and down an op-rod cam on the op-rod assembly such that a first lock surface of bolt assembly pivots to engage a second lock surface of the bolt assembly. Steinke discloses wherein the step of securing the bolt assembly to the barrel extension includes guiding a cam on the bolt assembly (cam way 330 on bolt assembly 308, col. 4, in. 46-47) into a cam relief of a hold-up cam on the barrel extension (barrel extension 302 with cam ways 320, col. 4, in. 35-35) but not specifically down an op-rod cam on the op-rod assembly such that a first lock surface of bolt assembly pivots to engage a second lock surface of the bolt assembly. It would have been obvious to one of ordinary skill in the art to combine the steps of Steinke as a known method for securing the bolt assembly of Rossier. In addition, it would be mere routine experimentation to provide further mating cam and camway surfaces for mounting the barrel extension of Steinke on the op-rod assembly in order to allow fast mounting of the barrel extension to the assembly.

--- See supplemental box ---

Form PCT/ISA/237 (Supplemental Box) (July 2011)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 12/49554

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:
Box V(2) Citations and Explanations

Claim 14 lacks an inventive step under PCT Article 33(3) as being obvious over *Rossier* in view of US 4,476,438 A *Sullivan*.

Regarding claim 14, *Rossier* discloses the method of claim 13. *Rossier* discloses the forward momentum of the barrel assembly not to be great enough to cancel the recoil impulse of the round and that the remainder of the recoil impulse is great enough to move barrel assembly (54) to the rearward position (col. 8, ln. 63; col. 9, ln. 57). However, *Rossier* does not explicitly disclose a step of driving the bolt assembly and the op-rod assembly with the forward momentum that is approximately one-third to one-half of the impulse of the round. However, *Sullivan* discloses a step of driving the bolt assembly and the op-rod assembly with the forward momentum that is approximately one-half of the impulse of the round (col. 11, ln. 3-15). It would have been obvious to one of ordinary skill in the art to modify the amount forward momentum imparted to the bolt assembly and the op-rod assembly of *Rossier* to be approximately one-third to one-half to achieve sufficient forward momentum for firing while also allowing sufficient excess energy to move the bolt assembly and op-rod assembly to the rearward position.

Claims 1-20 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.

Form PCT/ISA/237 (Supplemental Box) (July 2011)

Electronic Acknowledgement Receipt	
EFS ID:	15610648
Application Number:	13562078
International Application Number:	
Confirmation Number:	1130
Title of Invention:	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP
First Named Inventor/Applicant Name:	David Steimke
Customer Number:	13864
Filer:	Chad Clifford Anderson/Melanie Bartnek
Filer Authorized By:	Chad Clifford Anderson
Attorney Docket Number:	014.5009
Receipt Date:	25-APR-2013
Filing Date:	30-JUL-2012
Time Stamp:	18:34:49
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	Transmittal Letter	20130425_IDScert.pdf	55489 bd877434571e29cc3cfc9be3323f26987899 d4e09	no	1
Warnings:					
Information:					

2	Information Disclosure Statement (IDS) Form (SB08)	20130425_IDS.pdf	612090	no	4
			2a7b4ab283bd9d684a14fb288f28c67d7276b61		
Warnings:					
Information:					
3	Non Patent Literature	20130415_SrchRpt_WrOp.pdf	3572558	no	9
			daad6408caac62a249d488d727056a87368e2732		
Warnings:					
Information:					
4	Non Patent Literature	TableOfContents.pdf	138429	no	3
			0594834a4f4eda5eed3bd834f5f611d77761c99		
Warnings:					
Information:					
5	Non Patent Literature	Chapter1.pdf	3122757	no	20
			fb7683786d20a715e6fd80b2666ecdee024125ba		
Warnings:					
Information:					
6	Non Patent Literature	Chapter2.pdf	2278955	no	17
			1874736692d6c4944c2ca8c60a2285f7f642f949		
Warnings:					
Information:					
7	Non Patent Literature	Chapter3.pdf	2847470	no	19
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Warnings:					
Information:					
8	Non Patent Literature	Chapter4.pdf	1155119	no	6
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9	Non Patent Literature	Chapter5.pdf	8368850	no	45
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Information:					
10	Non Patent Literature	Chapter6.pdf	6059265	no	30
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Warnings:					
Information:					

11	Non Patent Literature	Chapter7.PDF	47728	no	3
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Warnings:					
Information:					
12	Non Patent Literature	AppendixA.PDF	13114	no	3
			292055596d8bc36386285bd7c5c7fe8a9bf2b8bd		
Warnings:					
Information:					
13	Non Patent Literature	AppendixB.PDF	198441	no	8
			8913420bea04dadb02d26f5597b32410e75700d		
Warnings:					
Information:					
14	Non Patent Literature	AppendixD.PDF	195353	no	6
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Warnings:					
Information:					
15	Non Patent Literature	AppendixE.PDF	64167	no	3
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Warnings:					
Information:					
16	Non Patent Literature	AppendixF.PDF	15872	no	2
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Warnings:					
Information:					
17	Non Patent Literature	ReferencesUsed.PDF	7456	no	1
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Warnings:					
Information:					
18	Non Patent Literature	AppendixC1-15.pdf	2825155	no	15
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Warnings:					
Information:					
19	Non Patent Literature	AppendixC16-33.pdf	2921613	no	18
			74edbb872ac22fe9897f79ca82e3de724b1c0a9a		
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.

IDS CERTIFICATION STATEMENTS

I. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(b): (check one box)

- ☐ Within three months of the filing date of a national application other than a continued prosecution application under 1.53(d).
- ☐ Within three months of the date of entry of the national stage as set forth in 1.491 in an international application.

Before the mailing date of a first Office Action on the merits. In the event that a first Office Action on the merits has been mailed, please consider this IDS under 37 C.F.R. 1.97(c) and see the statement under 1.97(e) or charge deposit account 50-2091 the fee specified by 37 C.F.R. 1.17(p) if such statement is not selected in Section IV.

- ☐ Before the mailing of a first Office Action after the filing of a request for continued examination under 1.114.

II. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(c):

- ☐ After the period specified in 37 C.F.R. 1.97(b) and before the mailing date of any of a final action under 1.113, a notice of allowance under 1.311 or an action that otherwise closes prosecution in the application, and accompanied by:

- ☐ a statement specified in 1.97(e) as subsequently provided in this IDS; or
- ☐ the fee set forth in 1.17(p).

III. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(d):

- ☐ After the period specified in 37 C.F.R. 1.97(c) and on or after the mailing date of any of a final action under 1.113, a notice of allowance under 1.311 or an action that otherwise closes prosecution in the application, but before or simultaneous with payment of the issue fee, and accompanied by a statement specified in 1.97(e) as subsequently provided in this IDS and the fee set forth in 1.17(p).

IV. Statement under 37 C.F.R. 1.97(e) (check only one box)

The undersigned hereby states that:

- ☒ Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS.
- ☐ No item of information contained in the IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this IDS.

V. Statement under 37 C.F.R. §1.704(d) :

- The undersigned hereby states that each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart application and that this
- ☐ communication was not received by any individual designated in 37 C.F.R. §1.56(c) more than thirty days prior to the filing of the information disclosure statement.

VI. CONCLUSION

It is respectfully submitted that the claims presently on file patently distinguish the present invention from each of the references cited in this IDS. The references cited in this IDS are being cited only in the interest of candor and without any admission that they constitute statutory prior art or contain matter which anticipates the invention or which would render the same obvious, either singly or in a combination, to a person of ordinary skill in the art. Furthermore the filing of this IDS should not be construed to be an admission that the information cited in this IDS is, or is considered to be, material to patentability as defined in 1.56(b). In addition, the filing of this IDS should not be construed as a representation that a search has been made.

If the Examiner has any questions concerning this IDS, the Examiner is requested to contact the undersigned at the telephone number associated with Customer No. 29,906. If it is determined that this IDS has been filed under the wrong rule, the PTO is requested to consider this IDS under the proper rule, with a petition if necessary, and charge the appropriate fee to Deposit Account No. 50-2091.



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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/562,078	07/30/2012	David Steimke	014.5009

13864
Ingrassa Fisher & Lorenz, P.C. (GD - ATP)
7010 E. Cochise Road
Scottsdale, AZ 85253

CONFIRMATION NO. 1130
NEW OR REVISED PPD NOTICE



0C000000065499135

NOTICE OF NEW OR REVISED PROJECTED PUBLICATION DATE

The above-identified application has a new or revised projected publication date. The current projected publication date for this application is 03/20/2014. If this is a new projected publication date (there was no previous projected publication date), the application has been cleared by Licensing & Review or a secrecy order has been rescinded and the application is now in the publication queue.

If this is a revised projected publication date (one that is different from a previously communicated projected publication date), the publication date has been revised due to processing delays in the USPTO or the abandonment and subsequent revival of an application. The application is anticipated to be published on a date that is more than six weeks different from the originally-projected publication date.

More detailed publication information is available through the private side of Patent Application Information Retrieval (PAIR) System. The direct link to access PAIR is currently <http://pair.uspto.gov>. Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Questions relating to this Notice should be directed to the Office of Data Management, Application Assistance Unit at (571) 272-4000, or (571) 272-4200, or 1-888-786-0101.



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/562,078	07/30/2012	David Steimke	014.5009

CONFIRMATION NO. 1130

PUBLICATION NOTICE

13864
Ingrassa Fisher & Lorenz, P.C. (GD - ATP)
7010 E. Cochise Road
Scottsdale, AZ 85253



0000000067262677

Title:WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP

Publication No.US-2014-0076145-A1

Publication Date:03/20/2014

NOTICE OF PUBLICATION OF APPLICATION

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/562,078	07/30/2012	David Steimke	014.5009	1130
13864 7590 03/27/2014 Ingrassa Fisher & Lorenz, P.C. (GD - ATP) 7010 E. Cochise Road Scottsdale, AZ 85253			EXAMINER HAYES, BRET C	
			ART UNIT	PAPER NUMBER
			3641	
			NOTIFICATION DATE	DELIVERY MODE
			03/27/2014	ELECTRONIC

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

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

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

docketing@ifllaw.com

Office Action Summary	Application No. 13/562,078	Applicant(s) STEIMKE ET AL.	
	Examiner Bret Hayes	Art Unit 3641	AIA (First Inventor to File) Status No

-- 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 MONTHS 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 _____.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10) ☐ The specification is objected to by the Examiner.

11) ☒ The drawing(s) filed on 30 JUL 12 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).

Priority under 35 U.S.C. § 119

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

Certified copies:

a) ☐ All b) ☐ Some** c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

4) ☐ Other: _____.

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

DETAILED ACTION

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

(a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 3 and 4 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.
4. The recitation of "a self-centering spring" is not defined in the written description sufficiently. Paragraphs [0059], [0060] and [0075] address the spring. Paragraph [0059] discloses that a "buffer assembly 600 includes a housing 610 that houses a centering spring 620 and a piston assembly 640," and further, "the centering spring 620 is a preloaded double acting spring which functions as bias spring keeping the barrel Extension in the same position under static loading and provide an energy absorption mechanism that tends to mitigate energy storage or return during firing when the preload is exceeded," whereas paragraph [0060], the only instance of "self-centering," discloses that the "position of the piston 642 within the chamber 646 is

generally maintained by self-centering spring 620 arranged on the piston rod 650," and paragraph [0075] merely discloses that the "buffer assembly 600 absorbs a portion of the rearward momentum through the centering spring 620 and fluid damping of the hydraulic fluid through the piston 642." How the spring is to be construed as centering, let alone self-centering, is not defined adequately.

5. Note that the passage "a preloaded double acting spring which functions as bias spring keeping the barrel Extension in the same position under static loading and provide an energy absorption mechanism..." in paragraph [0059] is understood to mean --a preloaded double acting spring which functions as [a] bias spring keeping the barrel [e]xtension in the same position under static loading and provid[ing] an energy absorption mechanism...--.

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

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

7. Claims 3 and 4 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

8. In light of the rejection under 35 USC 112, 1st paragraph above, the metes and bounds of the claim "self-centering spring" cannot be accurately determined.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of pre-AIA 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.

10. Claims 1 – 9, 11 – 13 and 15 – 19 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by US 6,343,536 to Rossier et al. (hereinafter Rossier, cited by Applicants).

11. Re – claim 1, Rossier discloses the claimed invention including a weapon system for firing a round, comprising: a receiver **22**, Figs. 1 – 3, for example, and set forth at col. 4, lines 6 through 12 (hereinafter 4:6-12, for example); an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition, 5:12-30, the operating group comprising a barrel extension **60**, also shown in Figs. 4 and 6, for example, at least partially housed within the receiver and arranged to axially translate relative to the receiver, 4:30-41 and 5:12-19; an operating rod (op-rod) assembly **92**, also shown in Figs. 5, 7 and 8, for example, at least partially housed and arranged to axially translate within the barrel extension in the charge condition, the firing condition, and the recoil condition, 5:20-30; and a bolt assembly **42**, also shown in Figs. 11 – 16, for example, coupled to the op-rod assembly and at least partially housed and arranged to axially translate within the barrel extension; a barrel **52** coupled to the barrel extension and defining a chamber; a gas accelerator **82** with a first end coupled to the barrel and a second end coupled to the op-rod assembly, 9:19-32; and a buffer assembly **140**, Figs. 9 and 10, for example, comprising a drive spring **160** having a first end coupled to the receiver and a second end coupled to the op-rod assembly, 7:23-29, wherein, in the

charged condition, the op-rod assembly and the bolt assembly are retracted against the drive spring, 6:23-33 and 9:30-48; wherein, in the firing condition, the op-rod assembly and bolt assembly are driven by the drive spring such that the round is guided into the chamber and the op-rod assembly and bolt assembly are locked to the barrel extension and a forward momentum of the op-rod assembly is imparted to the operating group and the round is fired, 8:57-9:19, wherein a portion of an impulse of the fired round stops the forward momentum of the operating group, 9:19-32; and wherein, in the recoil condition, the operating group is driven rearward by the remaining portion of the impulse of the fired round, 9:31-48, the gas accelerator imparts additional rearward momentum to the op-rod assembly and bolt assembly and stops rearward momentum of the barrel and barrel extension, and the op-rod assembly and the bolt assembly are stopped by the drive spring, 9:30-48.

12. Re – claim 2, Rossier further discloses a hydraulic piston **152**.

13. Re – claims 3 and 4, Rossier further discloses a self-centering spring, the other of **160** shown in Fig. 10, for example, configured as claimed, 7:68-8:6.

14. Re – claims 5 – 9, Rossier further discloses a lock assembly configured as claimed, 9:4-18, 9:19-30, 8:17-26, 5:39-48, and as noted above.

15. Re – claims 11 and 12, Rossier further discloses wherein in an ejection condition, a case of the round is coupled to the bolt assembly, 9:19-30, and at least implies an extractor therein.

16. Anent claims 13 and 15 – 19, in light of the structure disclosed by Rossier, the method of firing the weapon would have been inherent, since it is the normal and logical manner in which the weapon can be fired.

Claim Rejections - 35 USC § 103

17. The following is a quotation of pre-AIA 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.

18. Claims 12, 13 and 15 – 19 are alternatively rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Rossier.

19. Re – claim 12, while Rossier only implies an extractor, such is well known in the art to be used with such a bolt face as disclosed for the purpose of extracting casings and would be within routine skill in the art to incorporate into Rossier. Evidence provided upon request.

20. Anent claims 13 and 15 – 19, in light of the structure disclosed by Rossier, the method of firing the weapon would have been obvious, since it is the normal and logical manner in which the weapon can be fired.

21. Claims 1 – 20 are provisionally rejected under pre-AIA 35 U.S.C. 103(a) as being obvious over copending Application No. 13/562,077 which has a common assignee and inventors with the instant application. Based upon the earlier effective U.S. filing date of the copending application, it would constitute prior art under pre-AIA 35 U.S.C. 102(e) if published or patented. This provisional rejection under pre-AIA 35 U.S.C. 103(a) is based upon a presumption of future publication or patenting of the copending application.

The claims are fully supported by the disclosure of '077 as evidenced by ¶¶[0032] – [0108] therein as well as the drawings of both applications being identical. Further, similar claimed subject matter, i.e., structure, therein must function the same way as claimed herein.

Note that, while '077 claims a feeder, for example, it sufficiently discloses the claimed invention and appears to claim sufficient structure to obviate the claimed invention by omitting the feeder, etc., because it would have been obvious to one having ordinary skill in the art at the time the invention was made to omit any claimed elements, since it has been held that omission of an element and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art. *In re Karlson*, 136 USPQ 184.

Evidence to the contrary is welcome.

This provisional rejection might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the copending application was derived from the inventor of this application and is thus not the invention “by another,” or by a showing of a date of invention for the instant application prior to the effective U.S. filing date of the copending application under 37 CFR 1.131(a). This rejection might also be overcome by showing that the copending application is disqualified under pre-AIA 35 U.S.C. 103(c) as prior art in a rejection under pre-AIA 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Double Patenting

22. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible

harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit <http://www.uspto.gov/forms/>. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to <http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp>.

23. Claims 1 – 20 are alternatively directed to the same invention as that of claims 1, 2 and 4 – 15 of commonly assigned 13/562,077. The issue of priority under pre-AIA 35 U.S.C. 102(g) and possibly pre-AIA 35 U.S.C. 102(f) of this single invention must be resolved.

Since the U.S. Patent and Trademark Office normally will not institute an interference between applications or a patent and an application of common ownership (see MPEP Chapter 2300), the assignee is required to state which entity is the prior inventor of the commonly claimed subject matter. A terminal disclaimer has no effect in this situation since the basis for refusing more than one patent is priority of invention under pre-AIA 35 U.S.C. 102(f) or (g) and not an extension of monopoly.

Failure to comply with this requirement will result in a holding of abandonment of this application.

Conclusion

Any inquiry concerning this communication should be directed to Bret Hayes at telephone number (571) 272 – 6902, fax number (571) 273-6902, or email address bret.hayes@uspto.gov, which is preferred, especially for requesting interviews, general questions, etc. Note, however, that return correspondence cannot be made in the event that information subject to the confidentiality requirement as set forth in 35 U.S.C. 122 has been included. See MPEP §§ 502.03 and 713.01, **I**, regarding email communications. The examiner can normally be reached Monday through Friday from 5:30 am to 2:00 pm, Eastern Standard Time.

The Central FAX Number is **571-273-8300**.

Application/Control Number: 13/562,078
Art Unit: 3641

Page 10

If attempts to contact the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone, can be reached at (571) 272 – 6873.

/Bret Hayes/
Primary Examiner, Art Unit 3641
24-Mar-14

Notice of References Cited	Application/Control No. 13/562,078		Applicant(s)/Patent Under Reexamination STEIMKE ET AL.	
	Examiner Bret Hayes		Art Unit 3641	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2,718,390 A	09-1955	Taylor, Morris P.	267/34
*	B	US-2,950,653 A	08-1960	Harvey, Earle M.	89/185
*	C	US-4,291,611 A	09-1981	Wells et al.	89/47
*	D	US-4,358,986 A	11-1982	Giorgio, Charles	89/142
*	E	US-4,505,182 A	03-1985	Sullivan, Leroy J.	89/132
*	F	US-4,587,879 A	05-1986	Savioli, Giulio V.	89/33.25
*	G	US-5,351,598 A	10-1994	Schuetz, Robert C. E.	89/185
*	H	US-2005/0081707 A1	04-2005	Herring, Geoffrey A.	089/033.14
*	I	US-2007/0033851 A1	02-2007	Hochstrate et al.	042/075.01
*	J	US-2012/0311908 A1	12-2012	Kenney et al.	42/75.02
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FOREIGN PATENT DOCUMENTS

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078 - GAU: 3641	
	Filing Date			
	First Named Inventor	David Steimke		
	Art Unit			
	Examiner Name			
	Attorney Docket Number	014.5009		

U.S. PATENTS						Remove		
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	6343536	B1	2002-02-05	Rossier et al.			
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	1	20080236379	A1	2008-10-02	Steimke et al.			
	2	20090077852	A1	2009-03-26	Steimke et al.			
	3	20090120276	A1	2009-05-14	Steimke et al.			
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078 - GAU: 3641
	Filing Date		
	First Named Inventor	David Steinke	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	014.5009	

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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.				

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078	13562078 - GAU: 3641
	Filing Date		2012-07-30	
	First Named Inventor	David Steimke		
	Art Unit			
	Examiner Name			
	Attorney Docket Number	014.5009		

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	1	4475438	A	1984-10-09	Sullivan			
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078	13562078 - GAU: 3641
	Filing Date		2012-07-30	
	First Named Inventor	David Steimke		
	Art Unit			
	Examiner Name			
	Attorney Docket Number		014.5009	

1	"Field Manual No. 23-65- Browning Machine Gun, Caliber .50 HB, M2" 19 June 1991 (19.06.1991) entire document.	☐
2	PCT Search Report and Written Opinion mailed April 15, 2013 in PCT/US12/49054.	☐
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Search Notes 	Application/Control No. 13562078	Applicant(s)/Patent Under Reexamination STEIMKE ET AL.
	Examiner BRET HAYES	Art Unit 3641

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
89	191.01, 191.02, 192, 193, 33.01, 33.2, 159, 161, 162, 14.3	24 MAR 14	/bh/
42	75.01, 75.02	"	"

SEARCH NOTES		
Search Notes	Date	Examiner

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

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From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING
TRANSMITTAL OF COPY OF INTERNATIONAL
PRELIMINARY REPORT ON PATENTABILITY
(CHAPTER I OF THE PATENT COOPERATION
TREATY)

(PCT Rule 44bis.1(c))

To:

ANDERSON, Chad, C.
Ingrassia Fisher & Lorenz, P.C.
7010 E. Cochise Road
Scottsdale, AZ 85253
ETATS-UNIS D'AMERIQUE

Date of mailing (<i>day/month/year</i>) 06 March 2014 (06.03.2014)		IMPORTANT NOTICE	
Applicant's or agent's file reference 0145009PC			
International application No. PCT/US2012/049054	International filing date (<i>day/month/year</i>) 31 July 2012 (31.07.2012)	Priority date (<i>day/month/year</i>) 23 August 2011 (23.08.2011)	
Applicant GENERAL DYNAMICS ARAMENT AND TECHNICAL PRODUCTS, INC. et al			

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Yukari Nakamura
Facsimile No. +41 22 338 82 70	e-mail: pf07.pct@wipo.int

Form PCT/IB/326 (January 2004)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 0145009PC	FOR FURTHER ACTION		See item 4 below
International application No. PCT/US2012/049054	International filing date (day/month/year) 31 July 2012 (31.07.2012)	Priority date (day/month/year) 23 August 2011 (23.08.2011)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant GENERAL DYNAMICS ARAMENT AND TECHNICAL PRODUCTS, INC.			

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a). 2. This REPORT consists of a total of 6 sheets, including this cover sheet. In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.																								
3. This report contains indications relating to the following items: <table border="0"> <tr> <td>☒</td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td>☐</td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td>☐</td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td>☐</td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td>☒</td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td>☐</td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td>☐</td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td>☐</td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> 4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).	☒	Box No. I	Basis of the report	☐	Box No. II	Priority	☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	☐	Box No. IV	Lack of unity of invention	☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	☐	Box No. VI	Certain documents cited	☐	Box No. VII	Certain defects in the international application	☐	Box No. VIII	Certain observations on the international application
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☐	Box No. VIII	Certain observations on the international application																						

	Date of issuance of this report 25 February 2014 (25.02.2014)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Yukari Nakamura e-mail: pt07.pct@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: CHAD C. ANDERSON
INGRASSIA FISHER & LORENZ, P.C.
7010 E. COCHISE ROAD
SCOTTSDALE, AZ 85253

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year)

15 APR 2013

Applicant's or agent's file reference
0145009PC

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/US 12/49054

International filing date (day/month/year)

31 July 2012 (31.07.2012)

Priority date (day/month/year)

23 August 2011 (23.08.2011)

International Patent Classification (IPC) or both national classification and IPC

IPC(8) - F41A 5/18 (2013.01)

USPC - 42/1.06; 89/14.3

Applicant **GENERAL DYNAMICS ARAMENT AND TECHNICAL PRODUCTS, INC.**

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Date of completion of this opinion
11 March 2013 (11.03.2013)

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4100
PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 12/49054

Box No. 1	Basis of this opinion
1.	With regard to the language, this opinion has been established on the basis of: ☒ the international application in the language in which it was filed. ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2.	☐ This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43 <i>bis</i>.1(a)).
3.	With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished: a. (means) ☐ on paper ☐ in electronic form b. (time) ☐ in the international application as filed ☐ together with the international application in electronic form ☐ subsequently to this Authority for the purposes of search
4.	☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5.	Additional comments:

Form PCT/ISA/237 (Box No. I) (July 2011)

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 12/49054

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	10-12, 14, 20	YES
	Claims	1-9, 13, 15-19	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-20	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims	None	NO

2. Citations and explanations:

Claims 1-9, 13 and 15-19 lack novelty under PCT Article 33(2) as being anticipated by US 6,343,536 B1 to Rossier et al. (hereinafter "Rossier").

Regarding claim 1, Rossier discloses weapon system for firing a round, comprising:

a receiver (22) (col. 4, ln 6-12);
an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition (col. 5, ln 12-30), the operating group comprising:
a barrel extension (60) at least partially housed within the receiver and arranged to axially translate relative to the receiver (col. 4, ln 30-41; col. 5, ln 12-19);
an operating rod (op-rod) assembly (92) at least partially housed and arranged to axially translate within the barrel extension in the charge condition, the firing condition, and the recoil condition (col. 5, ln 20-30); and
a bolt assembly (42) coupled to the op-rod assembly and at least partially housed and arranged to axially translate within the barrel extension (60) (col. 5, ln 12-19);
a barrel (52) coupled to the barrel extension and defining a chamber (col. 5, ln 12-19);
a gas accelerator (82) with a first end coupled to the barrel and a second end coupled to the op-rod assembly (92) (col. 9, ln 19-35); and
a buffer assembly (140) comprising a drive spring (160; col. 7, ln 23-29) having a first end coupled to the receiver and a second end coupled to the op-rod assembly (col. 7, ln 12-22);
wherein, in the charged condition, the op-rod assembly (92) and the bolt assembly (42) are retracted against the drive spring (44) (col. 6, ln 23-33; col. 9, ln 49-59);
wherein, in the firing condition, the op-rod assembly and bolt assembly are driven by the drive spring such that the round is guided into the chamber and the op-rod assembly and bolt assembly are locked to the barrel extension and a forward momentum of the op-rod assembly is imparted to the operating group and the round is fired (col. 8, ln 57 to col. 9, ln 19);
wherein a portion of an impulse of the fired round stops the forward momentum of the operating group (col. 9, ln 19-32); and
wherein, in the recoil condition, the operating group is driven rearward by the remaining portion of the impulse of the fired round (col. 9, ln 31-48), the gas accelerator (82) imparts additional rearward momentum to the op-rod assembly (92) and bolt assembly (42) and stops rearward momentum of the barrel (52) and barrel extension (60) (col. 9, ln 19-35), and the op-rod assembly (92) and the bolt assembly (42) are stopped by the drive spring (44) (col. 9, ln 30-48).

Regarding claim 2, Rossier discloses the weapon system of claim 1, wherein the buffer further includes a hydraulic piston (152) configured to resist forward and rearward movement of the barrel extension (col. 7, ln 31-57).

Regarding claim 3, Rossier discloses the weapon system of claim 2, wherein the buffer (140) further includes a self-centering spring (160) configured to resist forward and rearward movement of the barrel extension (col. 7, ln 68 to col. 8, ln 6).

Regarding claim 4, Rossier discloses the weapon system of claim 3, wherein the hydraulic piston and the self-centering spring are configured such that any force transfer between the barrel extension and the receiver occurs through the hydraulic piston and the self-centering spring (col. 7, ln 68 to col. 8, ln 6).

Regarding claim 5, Rossier discloses the weapon system of claim 1, further comprising a lock assembly configured to secure the bolt assembly to the op-rod assembly in the charged condition through chambering the round (col. 9 ln 4-18).

Regarding claim 6, Rossier discloses the weapon system of claim 5, wherein the lock assembly is configured to release the bolt assembly from the op-rod assembly in the firing condition (col. 9 ln 19-30).

Regarding claim 7, Rossier discloses the weapon system of claim 6, wherein the lock assembly is further configured to secure the bolt assembly (42) to the barrel extension (60) in the firing condition (col. 8 ln 17-26).

Regarding claim 8, Rossier discloses the weapon system of claim 7, wherein the lock assembly includes a lock pin (90), a first cam (91) defined in the op-rod assembly, and a second cam in the barrel extension, wherein the lock pin engages the first cam and the second cam to secure and release the bolt assembly relative to the barrel extension (col. 5, ln 39-48) and the op-rod group (col. 9, ln 4-18).

---- See Supplemental Box ----

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 12/49054

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:
Box V(2) Citations and Explanations

Regarding claim 9, Rossier discloses the weapon system of claim 8, wherein in a first portion of the firing condition, the lock pin is engaged by the first cam and the second cam to secure the bolt assembly to the op-rod assembly such that the op-rod assembly forces the bolt assembly forward (col. 5, in 39-48), and wherein, in a second portion of the firing condition upon contact of the bolt assembly and the barrel extension, the lock pin disengages from the second cam and the first cam guides the lock pin such that the bolt assembly forms a locking engagement with the barrel extension (col. 9, in 4-18).

Regarding claim 13, Rossier discloses a method for firing a weapon, comprising:
retracting a bolt assembly (42) and an operating rod (op-rod) assembly (92) relative to a barrel extension (60) against a drive spring (44) (col. 6, in 23-33);
driving the bolt assembly and the op-rod assembly with a forward momentum within the barrel extension such that the bolt assembly chambers a round and contacts the barrel extension (col. 8, in 63 to col. 9, in 3), imparting forward momentum to the op-rod assembly, the bolt assembly and the barrel extension such that the round is fired (col. 9, in 4-18), whereby the firing of the round stops the forward momentum and imparts an impulse of rearward momentum on the op-rod assembly, the bolt assembly, and the barrel extension (col. 9, in 31-48);
guiding gases from the round with a gas accelerator to drive the op-rod assembly rearward and to stop the rearward momentum of the barrel extension (col. 9, in 19-35); and
absorbing the rearward momentum of the op-rod assembly with the drive spring (col. 9 in 49-59).

Regarding claim 15, Rossier discloses the method of claim 13, further comprising the step of restraining movement of the op-rod assembly in forward and aft directions with a buffer assembly (col. 7, in 12-22).

Regarding claim 16, Rossier discloses the method of claim 15, wherein the restraining step includes restraining movement of the barrel extension assembly in forward and aft directions with a soft spring and a hydraulic piston valve of the buffer assembly (col. 7, in 12-35).

Regarding claim 17, Rossier discloses the method of claim 13, wherein the driving step includes securing the bolt assembly to the op-rod assembly in the charged condition until the bolt assembly engages the barrel extension (col. 9 in 4-18).

Regarding claim 18, Rossier discloses the method of claim 17, wherein the driving step includes releasing the bolt assembly from the op-rod assembly when the bolt assembly engages the barrel extension (col. 9 in 19-30).

Regarding claim 19, Rossier discloses the method of claim 18, wherein the driving step includes securing the bolt assembly to the barrel extension during the contact with the barrel extension (col. 8 in 17-26).

Claims 10-12 and 20 lack an inventive step under PCT Article 33(3) as being obvious over Rossier in view of US 7,584,691 B2 Steimke et al. (hereinafter "Steimke").

Regarding claim 10, Rossier discloses the weapon system of claim 9, but does not explicitly disclose wherein, in the recoil condition, the rearward movement of the op-rod assembly guides the lock pin within the second cam such that the bolt assembly is released relative to the barrel extension. However, Steimke discloses a weapon system wherein, in the recoil condition, the rearward movement of the op-rod assembly (326) guides the lock pin (344) within the second cam such that the bolt assembly (332) is released relative to the barrel extension (302) (col. 7, in 55 to col. 8, in 2). Accordingly, it would have been obvious to one of ordinary skill in the art to combine the lock pin guiding arrangement of Steimke with the weapon system of Rossier as a known means of releasing the bolt assembly from the barrel extension during a recoil condition.

Regarding claim 11, Rossier discloses the weapon system of claim 1, including ejection of a spent casing from the bolt face (col. 9, in 25-30) but does not explicitly disclose wherein in an ejection condition, a case of the round is coupled to the bolt assembly. However, Steimke discloses a weapon system, wherein in an ejection condition, a case of the round (110) is coupled to the bolt assembly (331) (col. 8, in 3-17). Accordingly, it would have been obvious to one of ordinary skill in the art to combine the round coupling of Steimke as a known means of ejecting the case fired in Rossier.

Regarding claim 12, Rossier and Steimke disclose the weapon system of claim 11. Steimke discloses wherein the barrel extension includes an extractor (336) such that, in the ejection condition, the extractor engages the case (110) during the rearward movement of the bolt assembly to remove round from chamber and eject the case from the weapon system (col. 8, in 3-17).

Regarding claim 20, Rossier discloses the method of claim 19, but does not explicitly disclose wherein the step of securing the bolt assembly to the barrel extension includes guiding a cam on the bolt assembly into a cam relief of a hold-up cam on the barrel extension and down an op-rod cam on the op-rod assembly such that a first lock surface of bolt assembly pivots to engage a second lock surface of the bolt assembly. Steimke discloses wherein the step of securing the bolt assembly to the barrel extension includes guiding a cam on the bolt assembly (cam way 330 on bolt assembly 306, col. 4, in 46-47) into a cam relief of a hold-up cam on the barrel extension (barrel extension 302 with cam ways 320, col. 4, in 30-35) but not specifically down an op-rod cam on the op-rod assembly such that a first lock surface of bolt assembly pivots to engage a second lock surface of the bolt assembly. It would have been obvious to one of ordinary skill in the art to combine the steps of Steimke as a known method for securing the bolt assembly of Rossier. In addition, it would be mere routine experimentation to provide further mating cam and camway surfaces for mounting the barrel extension of Steimke on the op-rod assembly in order to allow fast mounting of the barrel extension to the assembly.

--- See supplemental box ---

Form PCT/ISA/237 (Supplemental Box) (July 2011)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 12/49054

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:
Box V(2) Citations and Explanations

Claim 14 lacks an inventive step under PCT Article 33(3) as being obvious over Rossier in view of US 4,475,438 A Sullivan.

Regarding claim 14, Rossier discloses the method of claim 13. Rossier discloses the forward momentum of the barrel assembly not to be great enough to cancel the recoil impulse of the round and that the remainder of the recoil impulse is great enough to move barrel assembly (34) to the rearward position (col. 8, ln. 63 . col. 9, ln. 57). However, Rossier does not explicitly disclose a step of driving the bolt assembly and the op-rod assembly with the forward momentum that is approximately one-third to one-half of the impulse of the round. However, Sullivan discloses a step of driving the bolt assembly and the op-rod assembly with the forward momentum that is approximately one-half of the impulse of the round (col. 11, ln 3-15). It would have been obvious to one of ordinary skill in the art to modify the amount forward momentum imparted to the bolt assembly and the op-rod assembly of Rossier to be approximately one-third to one-half to achieve sufficient forward momentum for firing while also allowing sufficient excess energy to move the bolt assembly and op-rod assembly to the rearward position.

Claims 1-20 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.

Electronic Acknowledgement Receipt	
EFS ID:	18692895
Application Number:	13562078
International Application Number:	
Confirmation Number:	1130
Title of Invention:	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP
First Named Inventor/Applicant Name:	David Steimke
Customer Number:	13864
Filer:	Chad Clifford Anderson/Misty Standridge
Filer Authorized By:	Chad Clifford Anderson
Attorney Docket Number:	014.5009
Receipt Date:	07-APR-2014
Filing Date:	30-JUL-2012
Time Stamp:	17:52:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

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File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	20140407_IDS.pdf	612275 778a07f311ae6218e44fb4457e75dcd6d5453e8	no	4
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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.

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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.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078
	Filing Date		2012-07-30
	First Named Inventor	David Steimke	
	Art Unit	3641	
	Examiner Name	Bret C. Hayes	
	Attorney Docket Number	014.5009	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078
	Filing Date		2012-07-30
	First Named Inventor	David Steinke	
	Art Unit	3641	
	Examiner Name	Bret C. Hayes	
	Attorney Docket Number	014.5009	

1	THE INTERNATIONAL BUREAU OF WIPO, International Preliminary Report on Patentability for International Application No. PCT/US2012/049054, mailed March 6, 2014 (014.5009PC).	☐
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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.		

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078
	Filing Date		2012-07-30
	First Named Inventor	David Steinke	
	Art Unit	3641	
	Examiner Name	Bret C. Hayes	
	Attorney Docket Number	014.5009	

CERTIFICATION STATEMENT			
Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):			
☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).			
OR			
☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).			
☒ See attached certification statement.			
☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.			
☐ A certification statement is not submitted herewith.			
SIGNATURE			
A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.			
Signature	/CHAD C. ANDERSON/	Date (YYYY-MM-DD)	2014-04-07
Name/Print	Chad C. Anderson	Registration Number	44,505
This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.			

Privacy Act Statement

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

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

IDS CERTIFICATION STATEMENTS

I. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(b): (check one box)

- ☐ Within three months of the filing date of a national application other than a continued prosecution application under 1.53(d).
- ☐ Within three months of the date of entry of the national stage as set forth in 1.491 in an international application.
- Before the mailing date of a first Office Action on the merits. In the event that a first Office Action on the merits has been mailed, please consider this IDS under 37 C.F.R. 1.97(c) and see the statement under 1.97(e) or charge deposit account 50-2091 the fee specified by 37 C.F.R. 1.17(p) if such statement is not selected in Section IV.
- ☐ Before the mailing of a first Office Action after the filing of a request for continued examination under 1.114.

II. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(c):

- After the period specified in 37 C.F.R. 1.97(b) and before the mailing date of any of a final action under 1.113, a notice of allowance under 1.311 or an action that otherwise closes prosecution in the application, and accompanied by:
- ☒ a statement specified in 1.97(e) as subsequently provided in this IDS; or
- ☐ the fee set forth in 1.17(p).

III. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(d):

- After the period specified in 37 C.F.R. 1.97(c) and on or after the mailing date of any of a final action under 1.113, a notice of allowance under 1.311 or an action that otherwise closes prosecution in the application, but before or simultaneous with
- ☐ payment of the issue fee, and accompanied by a statement specified in 1.97(e) as subsequently provided in this IDS and the fee set forth in 1.17(p).

IV. Statement under 37 C.F.R. 1.97(e) (check only one box)

The undersigned hereby states that:

- ☒ Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS.
- No item of information contained in the IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to knowledge of the person signing the certification after making reasonable inquiry, no item of
- ☐ information contained in the IDS was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this IDS.

V. Statement under 37 C.F.R. §1.704(d) :

- The undersigned hereby states that each item of information contained in the information disclosure statement: (i) was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement; or (ii) is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement..
- ☐

VI. CONCLUSION

It is respectfully submitted that the claims presently on file patently distinguish the present invention from each of the references cited in this IDS. The references cited in this IDS are being cited only in the interest of candor and without any admission that they constitute statutory prior art or contain matter which anticipates the invention or which would render the same obvious, either singly or in a combination, to a person of ordinary skill in the art. Furthermore the filing of this IDS should not be construed to be an admission that the information cited in this IDS is, or is considered to be, material to patentability as defined in 1.56(b). In addition, the filing of this IDS should not be construed as a representation that a search has been made.

If the Examiner has any questions concerning this IDS, the Examiner is requested to contact the undersigned at the telephone number associated with Customer No. 13864 . If it is determined that this IDS has been filed under the wrong rule, the PTO is requested to consider this IDS under the proper rule, with a petition if necessary, and charge the appropriate fee to Deposit Account No. 50-2091.

**TERMINAL DISCLAIMER TO OBIVATE A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)
014.5009

In re Application of: David Steinke, et. al.

Application No.: 13/562,078

Filed: 07-30-2012

For: WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP

The owner*, General Dynamics - QTS, Inc., of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 13/562,077 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization.

I hereby declare 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 Section 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 issued thereon.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 44,505

/CHAD C. ANDERSON/
Signature

2014-07-27
Date

Chad C. Anderson
Typed or printed name

480-385-5060
Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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.

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

This collection of information is required by 37 CFR 1.321. 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.

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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.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal				
Application Number:		13562078		
Filing Date:		30-Jul-2012		
Title of Invention:		WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		
First Named Inventor/Applicant Name:		David Steimke		
Filer:		Chad Clifford Anderson/Misty Standridge		
Attorney Docket Number:		014.5009		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description		Fee Code	Quantity	Sub-Total in USD(\$)
Basic Filing:				
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:				
Statutory or Terminal Disclaimer	1814	1	160	160
Total in USD (\$)				160

Electronic Acknowledgement Receipt	
EFS ID:	19441744
Application Number:	13562078
International Application Number:	
Confirmation Number:	1130
Title of Invention:	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP
First Named Inventor/Applicant Name:	David Steimke
Customer Number:	13864
Filer:	Chad Clifford Anderson/Misty Standridge
Filer Authorized By:	Chad Clifford Anderson
Attorney Docket Number:	014.5009
Receipt Date:	27-JUN-2014
Filing Date:	30-JUL-2012
Time Stamp:	17:31:55
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 160
RAM confirmation Number	5394
Deposit Account	502091
Authorized User	ANDERSON, CHAD C.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20140627_Response.pdf	116252 35b9e93acdefc70b83fc1087b6aa37589d211448	yes	13
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	1	
	Claims		2	6	
	Applicant Arguments/Remarks Made in an Amendment		7	13	
Warnings:					
Information:					
2	Terminal Disclaimer Filed	20140627_TerminalDisclaimer.pdf	147068 2e1c81325a11f09bcb52605d392ac2bc0178076	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30536 84b1a5beb302c5537487049408da775ba13d6b7a	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			293856		
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.					

UTILITY PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	David Steimke	Confirmation No. 1130
Appl. No.	:	13/562,078	
Filed	:	July 30, 2012	
Art Unit	:	3641	
Examiner	:	Bret C. Hayes	
Docket No.	:	014.5009	
Customer No.	:	13864	
Title	:	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP	

AMENDMENT AND RESPONSE PURSUANT TO 37 C.F.R. § 1.111

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

Sir:

In response to the Office Action mailed March 27, 2014, please consider the following:

AMENDMENTS TO THE CLAIMS begin on page 2 of this paper; and
REMARKS begin on page 8 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the above-identified application:

Listing of Claims:

1. (original): A weapon system for firing a round, comprising:
 - a receiver;
 - an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition, the operating group comprising
 - a barrel extension at least partially housed within the receiver and arranged to axially translate relative to the receiver;
 - an operating rod (op-rod) assembly at least partially housed and arranged to axially translate within the barrel extension in the charge condition, the firing condition, and the recoil condition; and
 - a bolt assembly coupled to the op-rod assembly and at least partially housed and arranged to axially translate within the barrel extension;
 - a barrel coupled to the barrel extension and defining a chamber;
 - a gas accelerator with a first end coupled to the barrel and a second end coupled to the op-rod assembly; and
 - a buffer assembly comprising a drive spring having a first end coupled to the receiver and a second end coupled to the op-rod assembly,
- wherein, in the charged condition, the op-rod assembly and the bolt assembly are retracted against the drive spring;
- wherein, in the firing condition, the op-rod assembly and bolt assembly are driven by the drive spring such that the round is guided into the chamber and the op-rod assembly and bolt assembly are locked to the barrel extension and a forward momentum of the op-rod assembly is imparted to the operating group and the round is fired, wherein a portion of an impulse of the fired round stops the forward momentum of the operating group; and
- wherein, in the recoil condition, the operating group is driven rearward by the remaining portion of the impulse of the fired round, the gas accelerator imparts additional

rearward momentum to the op-rod assembly and bolt assembly and stops rearward momentum of the barrel and barrel extension, and the op-rod assembly and the bolt assembly are stopped by the drive spring.

2. (original): The weapon system of claim 1, wherein the buffer further includes a hydraulic piston configured to resist forward and rearward movement of the barrel extension.

3. (currently amended): The weapon system of claim 2, wherein the buffer further includes a ~~self-centering~~ buffer spring configured to resist forward and rearward movement of the barrel extension.

4. (currently amended): The weapon system of claim 3, wherein the hydraulic piston and the ~~self-centering~~ buffer spring are configured such that any force transfer between the barrel extension and the receiver occurs through the hydraulic piston and the ~~self-centering~~ buffer spring.

5. (original): The weapon system of claim 1, further comprising a lock assembly configured to secure the bolt assembly to the op-rod assembly in the charged condition through chambering the round.

6. (original): The weapon system of claim 5, wherein the lock assembly is configured to release the bolt assembly from the op-rod assembly in the firing condition.

7. (original): The weapon system of claim 6, wherein the lock assembly is further configured to secure the bolt assembly to the barrel extension in the firing condition.

8. (original): The weapon system of claim 7, wherein the lock assembly includes a lock pin, a first cam defined in the op-rod assembly, and a second cam in the barrel

extension, wherein the lock pin engages the first cam and the second cam to secure and release the bolt assembly relative to the barrel extension and the op-rod group.

9. (original): The weapon system of claim 8, wherein in a first portion of the firing condition, the lock pin is engaged by the first cam and the second cam to secure the bolt assembly to the op-rod assembly such that the op-rod assembly forces the bolt assembly forward, and wherein, in a second portion of the firing condition upon contact of the bolt assembly and the barrel extension, the lock pin disengages from the second cam and the first cam guides the lock pin such that the bolt assembly forms a locking engagement with the barrel extension.

10. (original): The weapon system of claim 9, wherein, in the recoil condition, the rearward movement of the op-rod assembly guides the lock pin within the second cam such that the bolt assembly is released relative to the barrel extension.

11. (original): The weapon system of claim 1, wherein in an ejection condition, a case of the round is coupled to the bolt assembly.

12. (original): The weapon system of claim 11, wherein the barrel extension includes an extractor such that, in the ejection condition, the extractor engages the case during the rearward movement of the bolt assembly to remove round from chamber and eject the case from the weapon system.

13. (currently amended): A method for firing a weapon, comprising:
retracting a bolt assembly and an operating rod (op-rod) assembly relative to a barrel extension against a drive spring;

driving the bolt assembly and the op-rod assembly with a forward momentum within the barrel extension such that the bolt assembly chambers a round and contacts the barrel extension, imparting forward momentum to the op-rod assembly, the bolt assembly and the barrel extension such that the round is fired, whereby the firing of the round stops

the forward momentum and imparts an impulse of rearward momentum on the op-rod assembly, the bolt assembly, and the barrel extension,

wherein the driving step includes securing the bolt assembly to the op-rod assembly in the charged condition until the bolt assembly engages the barrel extension, wherein the driving step includes releasing the bolt assembly from the op-rod assembly when the bolt assembly engages the barrel extension, wherein the driving step includes securing the bolt assembly to the barrel extension during the contact with the barrel extension;

guiding gases from the round with a gas accelerator to drive the op-rod assembly rearward and to stop the rearward momentum of the barrel extension; and

absorbing the rearward momentum of the op-rod assembly with the drive spring.

14. (original): The method of claim 13, wherein the driving step includes driving the bolt assembly and the op-rod assembly with the forward momentum that is approximately one-third to one-half of the impulse of the round.

15. (original): The method of claim 13, further comprising the step of restraining movement of the op-rod assembly in forward and aft directions with a buffer assembly.

16. (original): The method of claim 15, wherein the restraining step includes restraining movement of the barrel extension assembly in forward and aft directions with a soft spring and a hydraulic piston valve of the buffer assembly

17. (canceled).

18. (canceled).

19. (canceled).

20. (currently amended): The method of claim 13 ~~[[19]]~~, wherein the step of securing the bolt assembly to the barrel extension includes guiding a cam on the bolt

assembly into a cam relief of a hold-up cam on the barrel extension and down an op-rod cam on the op-rod assembly such that a first lock surface of bolt assembly pivots to engage a second lock surface of the bolt assembly.

REMARKS

This is a full and timely response to the non-final Office Action mailed on March 27, 2014. Reconsideration in view of the foregoing amendments and following remarks is respectfully solicited.

Claim Status and Amendment Support

Claims 1-16 and 20 are pending in this application, with claims 1 and 13 being the independent claims. Claims 3, 4, 13, and 20 have been amended. No claims have been added. Claims 17-19 have been canceled. No new matter has been added. Support for the amendment to claim 13 can be found, for example, in original claims 17-19. Claims 3 and 4 were amended merely for clarity. Claim 20 was amended merely for consistency with amended claim 13.

Rejections under 35 U.S.C. § 112, first paragraph

Claims 3 and 4 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. The Office Action particularly noted the term “self-centering”. Claims 3 and 4 have been amended to remove this language and recite a “buffer spring” to overcome the rejection.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 3 and 4 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Office Action particularly noted the term “self-centering”. Claims 3 and 4 have been amended to remove this language and recite a “buffer spring” to overcome the rejection.

Rejections under 35 U.S.C. § 102

Claims 1-9, 11-13, and 15-19 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,343,536 to Rossier et al. (“Rossier”). Claims 17-19 have been canceled. The rejection of remaining claims 1-9, 11-13, 15, and 16 is respectfully traversed.

Claim 1 is directed to a weapon system and recites, inter alia, the following

structure:

wherein, in the firing condition, the op-rod assembly and bolt assembly are driven by the drive spring such that the round is guided into the chamber and the op-rod assembly and bolt assembly are locked to the barrel extension and a forward momentum of the op-rod assembly is imparted to the operating group and the round is fired, wherein a portion of an impulse of the fired round stops the forward momentum of the operating group; and

wherein, in the recoil condition, the operating group is driven rearward by the remaining portion of the impulse of the fired round, the gas accelerator imparts additional rearward momentum to the op-rod assembly and bolt assembly and stops rearward momentum of the barrel and barrel extension, and the op-rod assembly and the bolt assembly are stopped by the drive spring

Rossier fails to disclose these features.

Rossier is directed to an automated weapon, and the Office Action identifies the barrel extension 60, an op-rod assembly (“bolt carriage”) 92, and bolt assembly 42. As noted by the Office Action, the firing mechanism in Rossier is described in col. 8, line 57 to col. 9, line 19. However, contrary to the arguments in the Office Action, the op-rod assembly and the bolt assembly are not locked to the barrel extension during the firing condition. Rossier fails to disclose any such locking mechanism.

As such, claim 1 distinguishes over Rossier. Claims 2-9, 11, and 12 depend on claim 1 and distinguish over Rossier at least for that reason. The dependent claims recite additional features that further distinguish over Rossier. For example, claims 5-9 recite details of the lock assembly that are not disclosed by Rossier.

Independent claim 13 is directed to a method for firing a weapon and recites, inter alia, “wherein the driving step includes securing the bolt assembly to the op-rod assembly in the charged condition until the bolt assembly engages the barrel extension, wherein the driving step includes releasing the bolt assembly from the op-rod assembly when the bolt assembly engages the barrel extension, wherein the driving step includes securing the

bolt assembly to the barrel extension during the contact with the barrel extension.” As noted above, Rossier fails to disclose this combination of features. Claims 14-16 depend on claim 13 and distinguish over Rossier at least for that reason.

Rejections under 35 U.S.C. § 103

Claims 12, 13, and 15-19 were alternately rejected under 35 U.S.C. § 103 as being unpatentable over Rossier. As noted above, these claims distinguish over Rossier.

Claims 1-20 were provisionally rejected under 35 U.S.C. § 103 as being obvious over copending Application 13/562,077 (the ‘077 application). As described below, the ‘077 application is not prior art with respect to the present application. Both applications were filed on the same day. However, to expedite prosecution, the following statement pursuant to 35 U.S.C. § 103 (c) is provided:

Applicants’ attorney hereby states that, at the time the invention described and claimed in the present application (Application Serial No. 13/562,078) was made, the application and the reference in question (Application Serial No. 13/562,077) were made, owned by, or subject to an obligation of assignment to General Dynamics Armament and Technical Products, Inc. (now General Dynamics – OTS, Inc.).

Double Patenting

The Office Action includes a nonstatutory double patenting rejection. A terminal disclaimer is being filed herewith to address this rejection.

The Office Action additionally states that claims 1-20 of the present application and claims 1, 2, and 4-15 of the ‘077 application are directed to the same invention. The Office Action requests a statement as to which entity is the prior inventor of the commonly claimed subject matter. Reconsideration of this requirement is respectfully requested.

It is respectfully submitted that such a requirement is inappropriate in this situation. Both applications were filed the same day, and thus, entitled to the same priority date. Moreover, the applications are commonly owned, thereby excluding the

possibility of an interference. Finally, the claims of the applications are not directed to the same invention.

As an example, claim 1 of each application is reproduced below, with portions of the differences are emphasized:

Present Application	The '077 Application
1. A weapon system for firing a round, comprising: a receiver; an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition, the operating group comprising a barrel extension at least partially housed within the receiver and arranged to axially translate relative to the receiver; an operating rod (op-rod) assembly at least partially housed and arranged to axially translate within the barrel extension in the charge condition, the firing condition, and the recoil condition; and a bolt assembly coupled to the op-rod assembly and at least partially housed and arranged to axially translate within the barrel	1 A weapon system for firing a round from a belt of rounds, the weapon system comprising: a receiver; an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition, the operating group comprising a barrel extension at least partially housed within the receiver and arranged to axially translate relative to the receiver; an operating rod (op-rod) assembly at least partially housed within the barrel extension and arranged to axially translate within the barrel extension between the charged condition, the firing condition, and the recoil condition; and a bolt assembly coupled to the op-rod assembly and at least

extension; a barrel coupled to the barrel extension and defining a chamber; a gas accelerator with a first end coupled to the barrel and a second end coupled to the op-rod assembly; and a buffer assembly comprising a drive spring having a first end coupled to the receiver and a second end coupled to the op-rod assembly, <u>wherein, in the charged condition, the op-rod assembly and the bolt assembly are retracted against the drive spring;</u> <u>wherein, in the firing condition, the op-rod assembly and bolt assembly are driven by the drive spring such that the round is guided into the chamber and the op-rod assembly and bolt assembly are locked to the barrel extension and a forward momentum of the op-rod assembly is imparted to the operating group and the round is fired, wherein a portion of an impulse of the fired round stops the forward momentum of the operating group; and</u> <u>wherein, in the recoil condition, the operating group is driven rearward by the remaining portion of the impulse of the fired round, the gas accelerator</u>	partially housed within the barrel extension and arranged to axially translate within the barrel extension <u>between the charged condition, the firing condition, and the recoil condition;</u> a barrel coupled to the barrel extension and defining a chamber and a bore, <u>wherein the op-rod assembly and the bolt assembly are interlocked such that the bolt assembly is limited in axial movement by the op-rod assembly to provide a redundant containment of the op-rod assembly and bolt assembly within the barrel extension;</u> a gas accelerator with a first end coupled to the barrel and a second end coupled to the op-rod assembly; a buffer assembly comprising a spring and a hydraulic piston assembly having a first end coupled to the receiver and a second end coupled to the barrel extension; and <u>a feeder coupled to the receiver and configured to provide the round to the operating group.</u>
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<u>imparts additional rearward momentum to the op-rod assembly and bolt assembly and stops rearward momentum of the barrel and barrel extension, and the op-rod assembly and the bolt assembly are stopped by the drive spring.</u>	
---	--

If either claim is patentably distinct from the other claim, then such a requirement is clearly inappropriate. In the present situation, it is submitted that both claims are patentably distinct from the other. The Office Action provides no evidence to the contrary.

These distinctions are further defined by the dependent claims. For example, claims 2-4 of the present application recite elements of the buffer spring, claims 5-10 recite elements of the lock assembly, and claims 11 and 12 recite features of the ejector assembly. The claims of the '077 application are not directed to any of these features. Similarly, claims of the '077 application recite features that are clearly not addressed by the claims of the present application.

The Examiner is invited to call the undersigned to cooperate in addressing this issue.

Conclusion

Accordingly, it is respectfully submitted that the pending claims distinguish over the cited prior art as well as the prior art made of record and not relied upon. Applicant submits that the present application is in condition for allowance. Favorable reconsideration and withdrawal of the objections and rejections set forth in the above-noted Office Action, and an early Notice of Allowance are requested.

If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

Appl. No. 13/562,078
Reply to Office Action mailed March 27, 2014

If for some reason Applicant has not paid a sufficient fee for this response, please consider this as authorization to charge Ingrassia, Fisher & Lorenz, Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

INGRASSIA FISHER & LORENZ

Dated: June 27, 2014

By: /CHAD C. ANDERSON/
Chad C. Anderson
Registration No. 44,505
(480) 385-5060

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 13/562,078		Filing Date 07/30/2012		☐ To be Mailed	
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO										
APPLICATION AS FILED – PART I										
(Column 1)		(Column 2)								
FOR	NUMBER FILED	NUMBER EXTRA		RATE (\$)		FEE (\$)				
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A						
☐ SEARCH FEE (37 CFR 1.16(k), (j), or (m))	N/A	N/A		N/A						
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A						
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		X \$ =						
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		X \$ =						
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL						
APPLICATION AS AMENDED – PART II										
(Column 1)		(Column 2)		(Column 3)						
AMENDMENT	06/27/2014	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0	X \$80 =		0		
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	X \$420 =		0		
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE		0		
(Column 1)		(Column 2)		(Column 3)						
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =				
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =				
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE				
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** 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.						SLIE /WANDA BROWN/				

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.

Application Number 	Application/Control No. 13/562,078	Applicant(s)/Patent under Reexamination STEIMKE ET AL.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 06/27/14	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:	
Angie Walker	

U.S. Patent and Trademark Office



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NOTICE OF ALLOWANCE AND FEE(S) DUE

13864 7590 09/10/2014
Ingrassia Fisher & Lorenz, P.C. (GD - OTS,INC.)
7010 E. Cochise Road
Scottsdale, AZ 85253

EXAMINER

HAYES, BRET C

ART UNIT

PAPER NUMBER

3641

DATE MAILED: 09/10/2014

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/562,078	07/30/2012	David Steinke	014.5009	1130

TITLE OF INVENTION: WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	12/10/2014

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

13864 7590 09/10/2014
Ingrassia Fisher & Lorenz, P.C. (GD - OTS,INC.)
7010 E. Cochise Road
Scottsdale, AZ 85253

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.
13/562,078	07/30/2012	David Steimke	014.5009	1130

TITLE OF INVENTION: WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	12/10/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
HAYES, BRET C	3641	089-191010

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

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

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

Page 2 of 3



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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/562,078	07/30/2012	David Steinke	014.5009	1130
13864 7590 09/10/2014 Ingrassia Fisher & Lorenz, P.C. (GD - OTS,INC.) 7010 E. Cochise Road Scottsdale, AZ 85253			EXAMINER HAYES, BRET C	
			ART UNIT 3641	PAPER NUMBER
DATE MAILED: 09/10/2014				

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

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 13/562,078	Applicant(s) STEIMKE ET AL.	
	Examiner Bret Hayes	Art Unit 3641	AIA (First Inventor to File) Status No

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

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

1. ☒ This communication is responsive to the Response filed 27 JUN 14.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3. ☒ The allowed claim(s) is/are 1-16 and 20. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
Certified copies:
a) ☐ All b) ☐ Some *c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: _____.

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

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

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

Attachment(s)

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

/Bret Hayes/ Primary Examiner, Art Unit 3641	
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BIB DATA SHEET

CONFIRMATION NO. 1130

SERIAL NUMBER 13/562,078	FILING or 371(c) DATE 07/30/2012 RULE	CLASS 089	GROUP ART UNIT 3641	ATTORNEY DOCKET NO. 014.5009		
APPLICANTS INVENTORS David Steimke, La Burlington, VT; Glenn Rossier, Ferrisburg, VT; ** CONTINUING DATA ***** This appln claims benefit of 61/526,580 08/23/2011 and claims benefit of 61/526,569 08/23/2011 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/Bret Hayes/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY VT	SHEETS DRAWINGS 26	TOTAL CLAIMS 20	INDEPENDENT CLAIMS 2
ADDRESS Ingrassia Fisher & Lorenz, P.C. (GD - OTS,INC.) 7010 E. Cochise Road Scottsdale, AZ 85253 UNITED STATES						
TITLE WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP						
FILING FEE RECEIVED 1250	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			

Search Notes 	Application/Control No. 13562078	Applicant(s)/Patent Under Reexamination STEIMKE ET AL.
	Examiner BRET HAYES	Art Unit 3641

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
89	191.01, 191.02, 192, 193, 33.01, 33.2, 159, 161, 162, 14.3	24 MAR 14	/bh/
42	75.01, 75.02	"	"

SEARCH NOTES		
Search Notes	Date	Examiner
Updated Search	03 SEP 14	/bh/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
89	191.01, 191.02, 192, 193, 33.01, 33.2, 159, 161, 162, 14.3	03 SEP 14	/bh/
42	75.01, 75.02	"	"

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Issue Classification 	Application/Control No. 13562078	Applicant(s)/Patent Under Reexamination STEIMKE ET AL.	
	Examiner BRET HAYES	Art Unit 3641	

CPC					Type	Version
Symbol						
F41A		5		02	F	2013-01-01
F41A		5		26	I	2013-01-01
F41A		9		29	I	2013-01-01
F41A		21		481	I	2013-01-01
F41A		25		12	I	2013-01-01
F41A		3		78	I	2013-01-01
F41A		5		18	I	2013-01-01
F41A		15		14	I	2013-01-01
F41A		5		34	I	2013-01-01

CPC Combination Sets					
Symbol				Type	Version

NONE		Total Claims Allowed:	
		17	
(Assistant Examiner)	(Date)		
/Bret Hayes/ Primary Examiner.Art Unit 3641	09/03/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	9, 10

U.S. Patent and Trademark Office

Part of Paper No. 20140903

Issue Classification 	Application/Control No. 13562078	Applicant(s)/Patent Under Reexamination STEIMKE ET AL.
	Examiner BRET HAYES	Art Unit 3641

US ORIGINAL CLASSIFICATION						INTERNATIONAL CLASSIFICATION									
CLASS			SUBCLASS			CLAIMED					NON-CLAIMED				
89			191.01			F	4	1	A	5 / 02 (2006.01.01)					
CROSS REFERENCE(S)						F	4	1	A	15 / 14 (2006.01.01)					
						F	4	1	A	3 / 78 (2006.01.01)					
						F	4	1	A	5 / 18 (2006.01.01)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					F	4	1	A						

NONE		Total Claims Allowed:	
		17	
(Assistant Examiner)	(Date)		
/Bret Hayes/ Primary Examiner.Art Unit 3641	09/03/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	9, 10

Issue Classification 	Application/Control No. 13562078	Applicant(s)/Patent Under Reexamination STEIMKE ET AL.
	Examiner BRET HAYES	Art Unit 3641

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1	-	17												
	2	-	18												
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	16														

NONE		Total Claims Allowed:	
		17	
(Assistant Examiner)	(Date)	O.G. Print Claim(s)	O.G. Print Figure
/Bret Hayes/ Primary Examiner: Art Unit 3641	09/03/2014	1	9, 10
(Primary Examiner)	(Date)		

U.S. Patent and Trademark Office

Part of Paper No. 20140903

EAST Search History**EAST Search History (Interference)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L3	4	((89/191.01,191.02,192,193,33.01,33.2,159,161,162,14.3) or (42/75.01,75.02)).CCLS.	UPAD	OR	OFF	2014/09/03 09:03

9/ 3/ 2014 9:03:44 AM**C:\Users\bhayes\Documents\EAST\Workspaces\13 562 078 short recoil impulse avg
weapon 89 191 01.wsp**

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078
	Filing Date		2012-07-30
	First Named Inventor	David Steimke	
	Art Unit	3641	
	Examiner Name	Bret C. Hayes	
	Attorney Docket Number	014.5009	

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13562078
	Filing Date		2012-07-30
	First Named Inventor	David Steinke	
	Art Unit	3641	
	Examiner Name	Bret C. Hayes	
	Attorney Docket Number	014.5009	

/B.H./	1	THE INTERNATIONAL BUREAU OF WIPO, International Preliminary Report on Patentability for International Application No. PCT/US2012/049054, mailed March 6, 2014 (014.5009PC).	☐
If you wish to add additional non-patent literature document citation information please click the Add button Add			
EXAMINER SIGNATURE			
Examiner Signature	/Bret Hayes/		Date Considered 09/03/2014
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

"FEE ADDRESS" INDICATION FORM

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

Fax to:
571-273-6500

- OR -

INSTRUCTIONS: The issue fee must have been paid for application(s) listed on this form. In addition, only an address represented by a Customer Number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application. **When to check the first box below:** If you have a Customer Number to represent the fee address. **When to check the second box below:** If you have no Customer Number representing the desired fee address, in which case a completed Request for Customer Number (PTO/SB/125) must be attached to this form. For more information on Customer Numbers, see the Manual of Patent Examining Procedure (MPEP) § 403.

For the following listed application(s), please recognize as the "Fee Address" under the provisions of 37 CFR 1.363 the address associated with:

☒ Customer Number: 128409

OR

☐ The attached Request for Customer Number (PTO/SB/125) form.

PATENT NUMBER (if known)	APPLICATION NUMBER
	13/562,078

Completed by (check one):

☐ Applicant/Inventor	<u>/CHAD C. ANDERSON/</u> Signature
☒ Attorney or Agent of record <u>44505</u> (Reg. No.)	<u>Chad C. Anderson</u> Typed or printed name
☐ 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)	<u>480-385-5060</u> Requester's telephone number
☐ Assignee recorded at Reel _____ Frame _____	<u>November 25, 3014</u> Date

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 _____ forms are submitted.

This collection of information is required by 37 CFR 1.363. 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 5 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 COMPLETE D FORMS TO THIS ADDRESS. **SEND TO: Mail Stop M Correspondence, 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.

Privacy Act Statement

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

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

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

Electronic Patent Application Fee Transmittal				
Application Number:		13562078		
Filing Date:		30-Jul-2012		
Title of Invention:		WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP		
First Named Inventor/Applicant Name:		David Steimke		
Filer:		Chad Clifford Anderson/Misty Standridge		
Attorney Docket Number:		014.5009		
Filed as Large 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	1501	1	960	960
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				960

Electronic Acknowledgement Receipt	
EFS ID:	20790884
Application Number:	13562078
International Application Number:	
Confirmation Number:	1130
Title of Invention:	WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP
First Named Inventor/Applicant Name:	David Steimke
Customer Number:	13864
Filer:	Chad Clifford Anderson/Misty Standridge
Filer Authorized By:	Chad Clifford Anderson
Attorney Docket Number:	014.5009
Receipt Date:	25-NOV-2014
Filing Date:	30-JUL-2012
Time Stamp:	15:13:34
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 960
RAM confirmation Number	1875
Deposit Account	502091
Authorized User	ANDERSON, CHAD C.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

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)	20141125_FeeTransmittal.pdf	74643 2ad922cb1276dff380ff6ced86c94f17dd88b0	no	1
Warnings:					
Information:					
2	Maintenance Fee Address Change	20141125_FeeAddress.pdf	203893 816210ab8fa197cd9e3a72fd026527e47bfcd3d	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30691 b0550851fa8f789bfc6d650543e10b2718951028	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			309227		
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.					

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
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Alexandria, Virginia 22313-1450
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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.

13864 7590 09/10/2014
Ingrassia Fisher & Lorenz, P.C. (GD - OTS,INC.)
7010 E. Cochise Road
Scottsdale, AZ 85253

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.
13/562,078	07/30/2012	David Steimke	014.5009	1130

TITLE OF INVENTION: WEAPON SYSTEM WITH SHORT RECOIL IMPULSE AVERAGING OPERATING GROUP

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	12/10/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
HAYES, BRET C	3641	089-191010

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☒ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 Ingrassia, Fisher & Lorenz, P.C.
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)

General Dynamics - OTS, Inc.

St. Petersburg, Florida

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee

☒ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

☐ A check is enclosed.

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

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 502091 (enclose an extra copy of this form).

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

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /CHAD C. ANDERSON/

Date November 25, 2014

Typed or printed name Chad C. Anderson

Registration No. 44,505

Page 2 of 3

PTOL-85 Part B (10-13) Approved for use through 10/31/2013.

OMB 0651-0033

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

**IPR2025-00410
Sig Sauer v. Lonestar
EX 1002 - Page 198 of 199**



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/562,078	12/30/2014	8919238	014.5009	1130

13864 7590 12/10/2014
Ingrassia Fisher & Lorenz, P.C. (GD - OTS, INC.)
7010 E. Cochise Road
Scottsdale, AZ 85253

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 178 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):

David Steinke, La Burlington, VT;
Glenn Rossier, Ferrisburg, VT;

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.

IR103 (Rev. 10/09)