



- (51) International Patent Classification:
F41A 1/10 (2006.01)
- (21) International Application Number:
PCT/US2014/061374
- (22) International Filing Date:
20 October 2014 (20.10.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
14/059,002 21 October 2013 (21.10.2013) US
- (63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:
US 14/059,002 (CON)
Filed on 21 October 2013 (21.10.2013)
- (72) Inventor; and
(71) Applicant : GRANT, Kevin, Paul [US/US]; 1304 Constitution Drive, Slidell, Louisiana 70458 (US).
- (74) Agents: FITZPATRICK, Julia, M. et al.; Garvey, Smith, Nehrbass & North, L.L.C., 3838 N. Causeway Blvd., Suite 3290, Metairie, Louisiana 70002 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,

BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

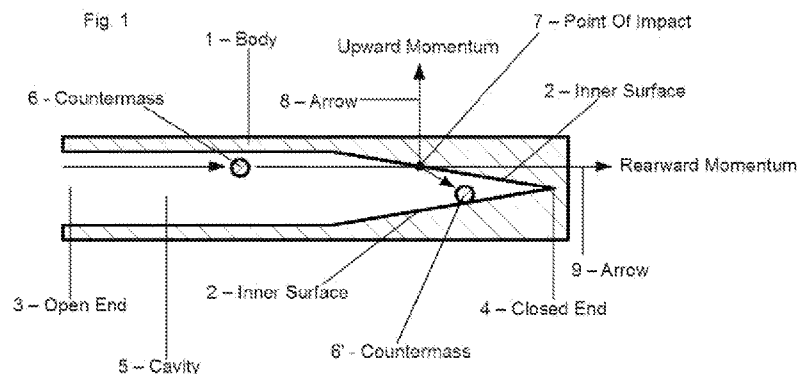
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

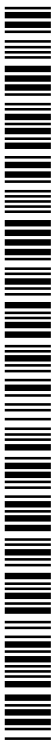
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

- (88) Date of publication of the international search report:
24 September 2015

(54) Title: A METHOD AND DEVICE FOR IMPROVING COUNTERMASS-BASED RECOIL CONTROL IN PROJECTILE LAUNCHERS



(57) Abstract: A recoil controller is disclosed whose body (1) incorporates a strategically designed inner surface or surfaces (2). A moving counter-mass (6) impacts one or more times against one or more inner surfaces (2). During this process momentum is transferred from the counter-mass (6), to the inner surfaces (2), and then to the body (1) of the recoil controller, and then to anything to which it is attached or against which it is braced. The distributions, over time, of the momenta resulting from this transfer of momentum will depend on various factors including the composition, geometry and placement of the inner surfaces (2). A given recoil controller is designed such that the distributions, over time, of the momenta resulting from its use, are preferable to the distributions, over time, of the original momenta. The counter-mass (6') shown in Figure (1) is the counter-mass 6 shown after one impact.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 14/61374

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - F41A 1/10 (2015.01)

CPC - F41A 1/10

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 1/10 (2015.01)

CPC - F41A 1/10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

IPC(8) - F41A 1/08, F41A 1/10 (2015.01)

CPC - F41A 1/08, F41A 1/10 (Search Terms Limited, See Below)

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

PatBase, Google Patents, Google Scholar. Search Terms Included: recoil control device for projectile launcher having a countermass; cartridge retaining weapons system; weapons barrel having recess; recoil control devices utilizing magnetic fields; countermass OR counterweight; counter mass OR counter weight; adhesive%; method%; recoilless; magnetic

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| X -- A | US 8,322,264 B1 (Van De Wal) 04 December 2012 (04.12.2012), entire document, especially Fig 1-3; Col 2, ln 65-67; Col 3, ln 11-16; Claim 1 | 1-3, 21-22, 26-28, 31, 33, 44, 46-47 ----- 13, 38 |
| X -- Y -- A | US 4,527,457 A (Fikse) 09 July 1985 (09.07.1985), entire document, especially Fig 1; Col 3, ln 44-46; Claim 9 | 1, 4, 6, 14, 26, 29, 39 ----- 10-12, 35-37 ----- 13, 38 |
| X -- Y -- A | US 5,491,917 A (Dilhan et al.) 20 February 1996 (20.02.1996), entire document, especially Fig 1, 3-5 | 1, 5, 8-9, 15-17, 19-20, 23-26, 30, 34, 40-42, 45, 48-50 ----- 7, 18, 32, 43 ----- 13, 38 |
| Y | US 6,354,035 B1 (Niebuhr et al.) 12 March 2002 (12.03.2002), entire document, especially Fig 2 | 7, 32 |
| Y | US 2003/0056639 A1 (Giza) 27 March 2003 (27.03.2003), entire document, especially para [0008]; Claim 7 | 10-11, 35-36 |
| Y | US 5,551,330 A (Reuche) 03 September 1996 (03.09.1996), entire document, especially Fig 1; Claim 3 | 12, 37 |

Further documents are listed in the continuation of Box C.

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| * Special categories of cited documents: | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| "A" document defining the general state of the art which is not considered to be of particular relevance | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| "E" earlier application or patent but published on or after the international filing date | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" document member of the same patent family |
| "O" document referring to an oral disclosure, use, exhibition or other means | |
| "P" document published prior to the international filing date but later than the priority date claimed | |

Date of the actual completion of the international search
29 June 2015 (29.06.2015)

Date of mailing of the international search report

28 JUL 2015

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. 571-273-8300

Authorized officer:
Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 14/61374

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

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

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

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

- 3. Claims Nos.: 51
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

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

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

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 14/61374

| C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| Y | US 3,899,954 A (Jayne et al.) 19 August 1975 (19.08.1975), entire document, especially Fig 13; Col 8, ln 23-50 | 18, 43 |
| A | US 4,244,293 A (Grosswendt et al.) 13 January 1981 (13.01.1981), entire document | 1, 26 |
| A | US 1,395,630 A (Davis) 18 November 1920 (18.11.1920), entire document | 1, 26 |
| A | US 4,043,248 A (Bulman et al.) 23 August 1977 (23.08.1977), entire document | 1, 26 |
| A | US 3,489,058 A (Wallberg et al.) 16 April 1968 (16.04.1968), entire document | 1, 26 |