

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
12 December 2002 (12.12.2002)

PCT

(10) International Publication Number
WO 2002/099355 A3

(51) International Patent Classification⁷: **F42B 12/60**

(21) International Application Number:
PCT/US2002/017429

(22) International Filing Date: 4 June 2002 (04.06.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/295,731 4 June 2001 (04.06.2001) US
09/938,022 23 August 2001 (23.08.2001) US

(71) Applicant: **RAYTHEON COMPANY** [US/US]; 141
Spring Street, Lexington, MA 02421 (US).

(72) Inventor: **LLOYD, Richard, M.**; 71 Lincoln Street, Mel-
rose, MA 02176 (US).

(74) Agents: **COLEMAN, Roy, J.** et al.; Iandiorio & Teska,
260 Bear Hill Road, Waltham, MA 02451-1018 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,
SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN,
YU, ZA, ZM, ZW.

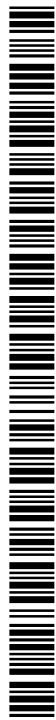
(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

(88) Date of publication of the international search report:
18 November 2004

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*



WO 2002/099355 A3

(54) Title: KINETIC ENERGY ROD WARHEAD WITH OPTIMAL PENETRATORS

(57) Abstract: A kinetic energy rod warhead includes a projectile core in a hull including a plurality of individual uniquely shaped and densely packaged projectiles and an explosive charge in the hull about the core. The individual projectiles are preferably aligned when the explosive charge deploys the projectiles. The projectiles may also be aimed in a specific direction.

INTERNATIONAL SEARCH REPORT

International application No.:

PCT/US02/17429

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : F42B 12/60

US CL : 102/492

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 102/492

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-------------------------------|
| X | US 3,565,009 A (ALLRED et al) 23 FEB 1971 (23.02.1971), Fig. 1, col. 2, lines 1-70. | 1, 19, 20, 21, 27, 30, 31, 66 |
| X | US 3,949,674 A (TALLEY) 19 APRIL 1976 (19.04.1976), whole document. | 1, 19, 20, 21, 30-33, 66 |

Further documents are listed in the continuation of Box C.

See patent family annex.

| * Special categories of cited documents: | |
|---|--|
| "A" document defining the general state of the art which is not considered to be of particular relevance | "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 |
| "E" earlier application or patent published on or after the international filing date | "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 |
| "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) | "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 |
| "O" document referring to an oral disclosure, use, exhibition or other means | "&" document member of the same patent family |
| "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

17 July 2004 (17.07.2004)

Date of mailing of the international search report

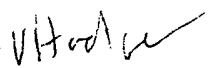
04 OCT 2004

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. (703)305-3230

Authorized officer

Charles T Jordan 
Telephone No. 703-308-1134