



US009410784B1

(12) **United States Patent**
Nance et al.

(10) **Patent No.:** US 9,410,784 B1
(45) **Date of Patent:** *Aug. 9, 2016

(54) **INITIATOR ASSEMBLY WITH GAS AND/OR FRAGMENT CONTAINMENT CAPABILITIES**

F42B 3/125; F42B 3/127; F42B 3/13; F42B 3/18; F42B 3/185; F42C 19/12; F42C 19/0819; F42C 19/02; F42C 19/08; F02K 9/95

(71) Applicant: **Reynolds Systems, Inc.**, Middletown, CA (US)

USPC 102/202.1, 202.2, 202.5, 202.7, 202.8, 102/202.9, 202.11, 202.12, 202.14, 530, 102/531

(72) Inventors: **Christopher J. Nance**, Middletown, CA (US); **Michael Amendola**, Kelseyville, CA (US)

See application file for complete search history.

(73) Assignee: **Reynolds Systems, Inc.**, Middletown, CA (US)

(56) **References Cited**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

U.S. PATENT DOCUMENTS

(21) Appl. No.: **14/686,862**

(22) Filed: **Apr. 15, 2015**

4,316,412 A *	2/1982	Dinegar	.....	F42B 3/103
				102/202.5
4,592,280 A *	6/1986	Shores	.....	F42B 3/188
				102/202.14
5,291,828 A *	3/1994	Nerheim	.....	F42C 19/08
				102/202
5,293,821 A *	3/1994	True	.....	F42B 3/16
				102/275.12
5,345,872 A *	9/1994	Takahashi	.....	F42B 3/18
				102/202.14
5,602,359 A *	2/1997	Hambro	.....	F42B 3/103
				102/202.14
6,418,853 B1 *	7/2002	Duguet	.....	F42B 3/121
				102/202.2
7,430,963 B2 *	10/2008	Hennings	.....	F42B 3/103
				102/202.1

Related U.S. Application Data

(63) Continuation of application No. 13/779,057, filed on Feb. 27, 2013, now Pat. No. 9,038,538.

(60) Provisional application No. 61/604,255, filed on Feb. 28, 2012.

(Continued)

(51) **Int. Cl.**
F42C 19/02 (2006.01)
F42C 19/12 (2006.01)
F42B 3/10 (2006.01)
F42B 3/12 (2006.01)
F42B 3/18 (2006.01)
F42B 3/185 (2006.01)

Primary Examiner — James S Bergin
(74) *Attorney, Agent, or Firm* — Harness, Dickey & Pierce, P.L.C.

(52) **U.S. Cl.**
CPC . **F42C 19/12** (2013.01); **F42B 3/10** (2013.01);
F42B 3/12 (2013.01); **F42B 3/125** (2013.01);
F42B 3/18 (2013.01); **F42B 3/185** (2013.01);
F42C 19/02 (2013.01)

(57) **ABSTRACT**

An initiator assembly that includes an initiator and a containment shell. The initiator has an initiator housing, an initiator device mounted inside the initiator housing, and an input charge that is formed of an energetic material. The initiator device is configured to initiate at least one of a combustion event, a deflagration event and a detonation event in the input charge. The containment shell is coupled to the initiator housing and defines a space into which gas and/or particles are ejected from the initiator housing if the initiator device is not activated and the input charge is cooked off.

(58) **Field of Classification Search**
CPC F42B 3/10; F42B 3/103; F42B 3/12;

22 Claims, 6 Drawing Sheets

