



US008091477B2

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

(10) **Patent No.:** **US 8,091,477 B2**  
(45) **Date of Patent:** **Jan. 10, 2012**

(54) **INTEGRATED DETONATORS FOR USE WITH EXPLOSIVE DEVICES**

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**Nolan C. Lerche**, Stafford, TX (US);  
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(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 811 days.

(Continued)

(21) Appl. No.: **10/711,809**

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(22) Filed: **Oct. 6, 2004**

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(65) **Prior Publication Data**

US 2005/0178282 A1 Aug. 18, 2005

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**Related U.S. Application Data**

(63) Continuation-in-part of application No. 10/304,205, filed on Nov. 26, 2002, now Pat. No. 7,549,373.

*Primary Examiner* — Michael David

(60) Provisional application No. 60/521,088, filed on Feb. 19, 2004, provisional application No. 60/333,586, filed on Nov. 27, 2001.

(74) *Attorney, Agent, or Firm* — Dan Hu; Kevin McGoff

(51) **Int. Cl.**  
**F42B 3/10** (2006.01)  
**F42C 11/00** (2006.01)  
**F23Q 7/00** (2006.01)

(57) **ABSTRACT**

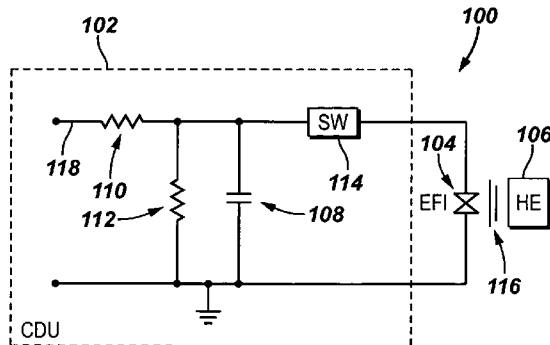
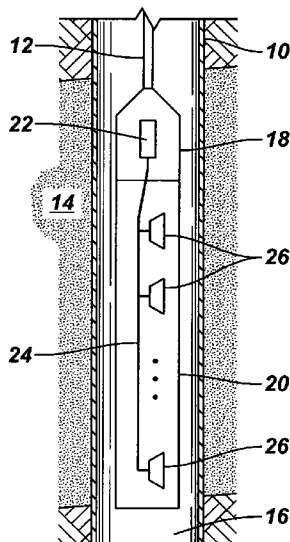
A detonator assembly includes a capacitor, an initiator, a transformer and an addressable chip. The initiator is electrically connected to the capacitor, the transformer is mechanically and electrically connected to the capacitor and the addressable chip is mechanically and electrically connected to the transformer. The initiator may be bonded or fused to the capacitor, and the transformer may be bonded or fused to the capacitor. The capacitor, initiator, transformer and addressable chip form a unified integrated detonating unit.

(52) **U.S. Cl.** ..... 102/202.7; 102/202.14; 102/206; 102/207; 102/215; 102/217; 102/218; 102/275.11; 361/248; 361/249; 361/251; 361/252

(58) **Field of Classification Search** ..... 102/202.5, 102/202.7, 202.14, 206, 207, 210, 215, 217, 102/218, 275.11; 361/248, 249, 251, 252

See application file for complete search history.

**56 Claims, 10 Drawing Sheets**



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FIG. 1A

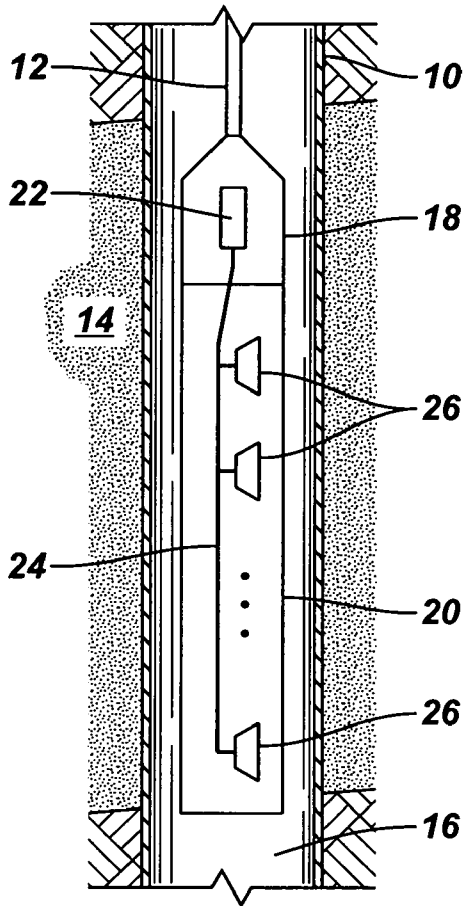


FIG. 1B

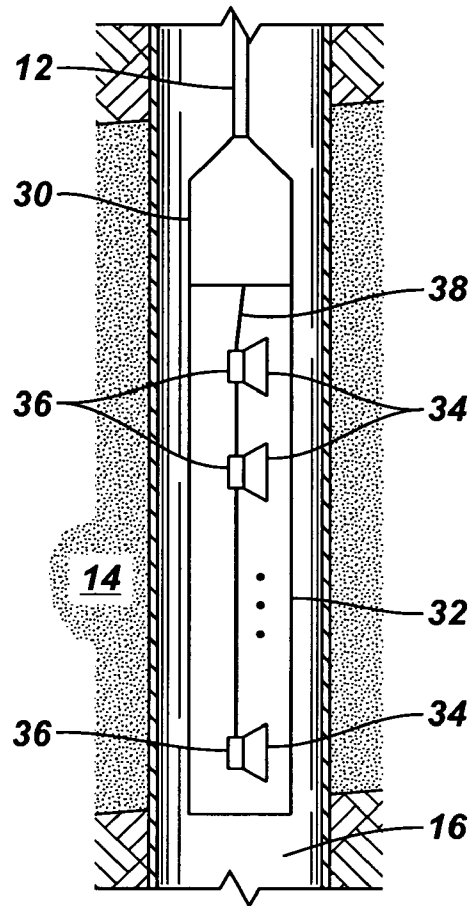


FIG. 2

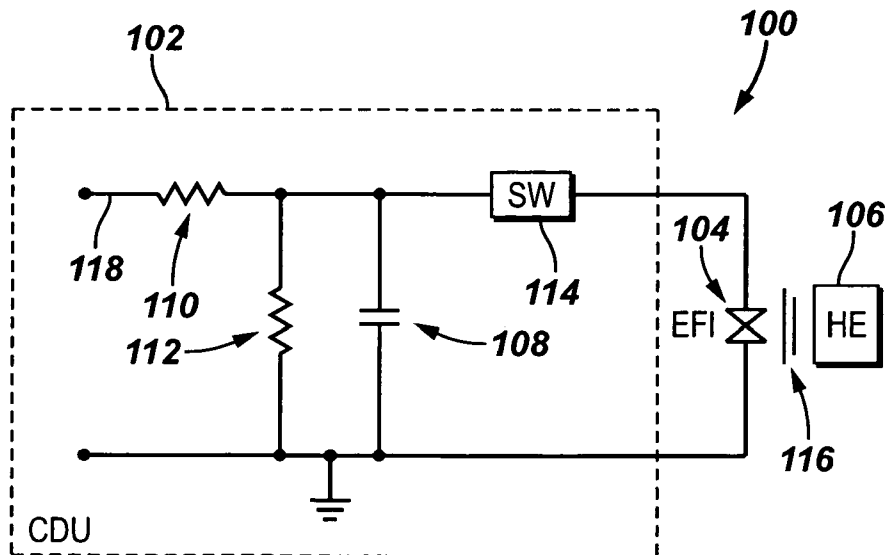


FIG. 3

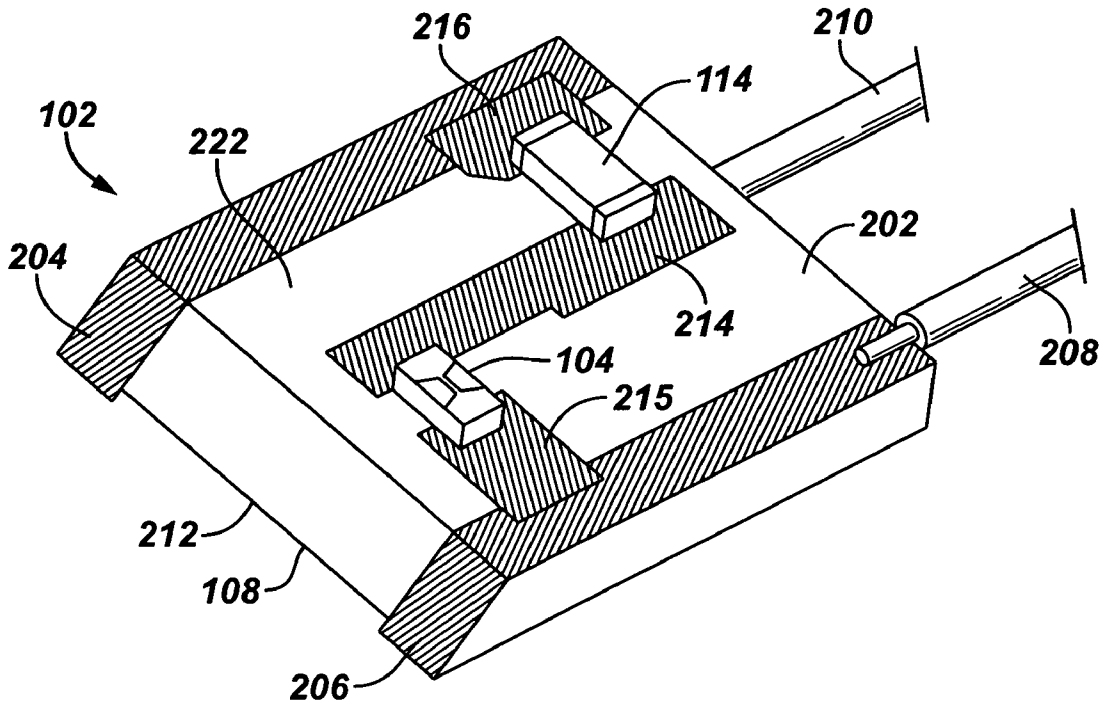


FIG. 4

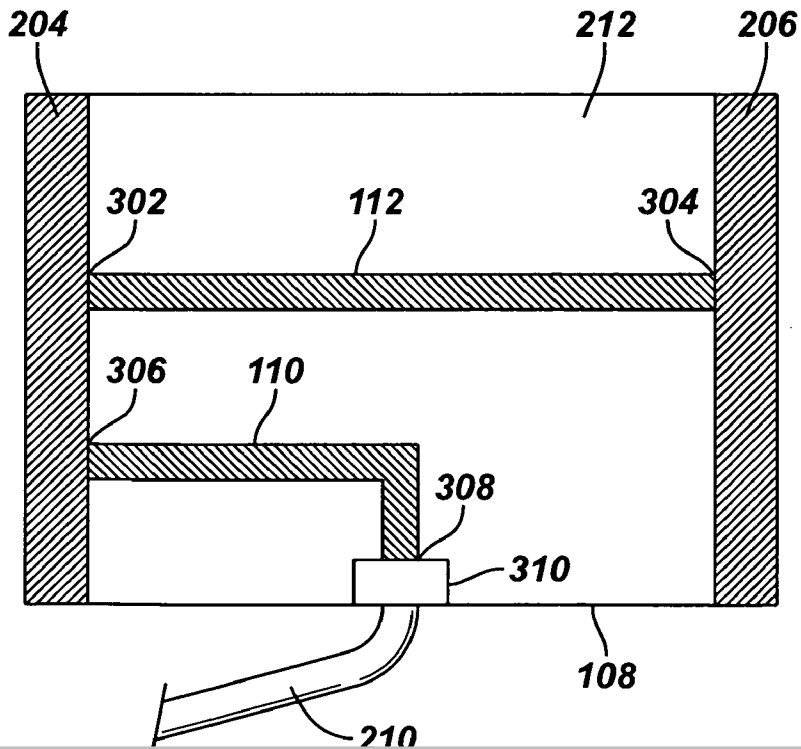


FIG. 5

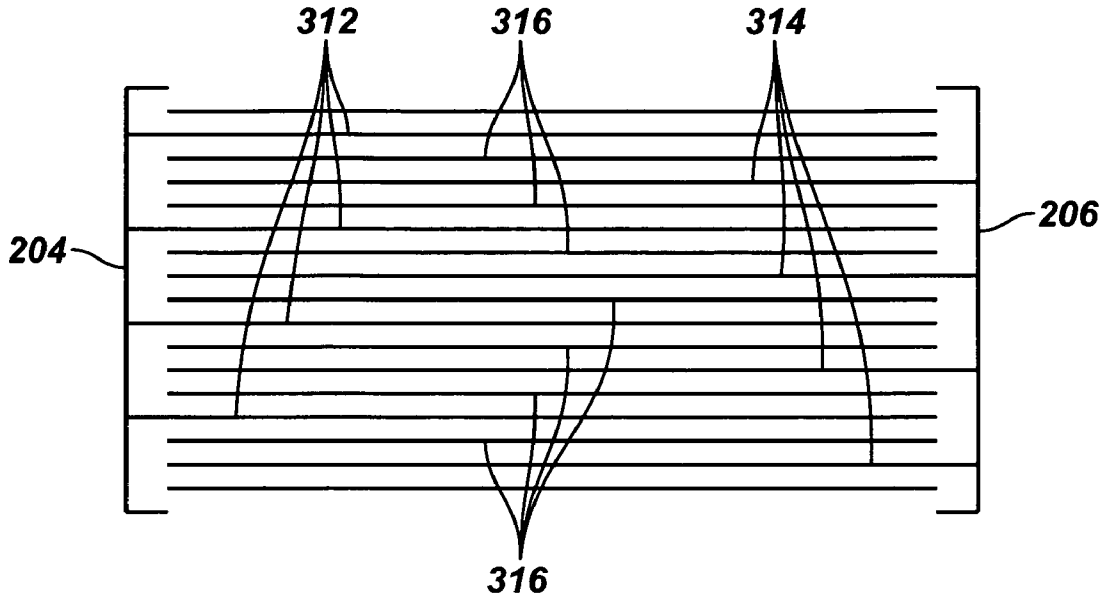
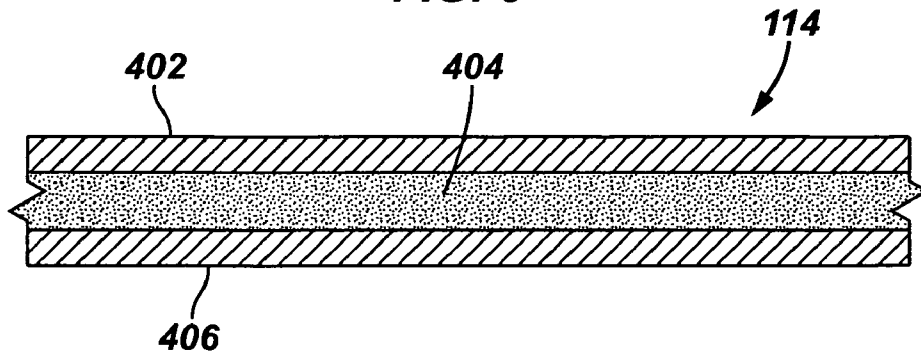


FIG. 6



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