

PROVISIONAL PATENT APPLICATION

PERFORATING GUN WITH INTEGRATED INITIATOR

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BACKGROUND:

Hydrocarbon fluids such as oil and natural gas are obtained from a subterranean geologic formation, referred to as a reservoir, by drilling a well that penetrates the hydrocarbon-bearing formation. Once a wellbore is drilled, various forms of well completion components may be installed in order to control and enhance the efficiency of producing the various fluids from the reservoir.

SUMMARY:

Some embodiments may take the form of a perforating gun with integrated initiator for transportation. The perforating gun with integrated initiator may include one or more of the following:

- A bulkhead that may be disposable or reusable;
- The initiator may be used in different size loading tubes;
- A pair of plastic centralizing rings serve to both centralize the loading tube as well as dampen impacts and vibrations;
- Wire retention clips may be molded as a strip to lower cost and ease assembly;

- Wire retention clips may be keyed to ease assembly and only allow assembly in one direction;
- Spring-loaded plastic parts that prevent disconnection;
- Double-sides chamfered plastic centralizing ring that is not direction dependent;
- Spring-loaded connectors to prevent shock-related disconnections;
- A hand tool used to make connectors between the detonator wires and the IDC that controls and limits insertion force, aligns the wire with the IDC, and trims the detonator wires to the proper length.

BRIEF DESCRIPTION OF THE DRAWINGS:

Certain embodiments of the disclosure will hereafter be described with reference to the accompanying drawings, wherein like reference numerals denote like elements. It should be understood, however, that the accompanying drawings illustrate only the various implementations described herein and are not meant to limit the scope of various technologies described herein. The drawings show and describe various embodiments of the current disclosure.

DETAILED DESCRIPTION:

In the following description, numerous details are set forth to provide an understanding of the present disclosure. However, it will be understood by those skilled in the art that the embodiments of the present disclosure may be practiced without these details and that numerous variations or modifications from the described embodiments may be possible.

In the specification and appended claims: the terms “connect”, “connection”, “connected”, “in connection with”, and “connecting” are used to mean “in direct connection with” or “in connection with via one or more elements”; and the term “set” is used to mean “one element” or “more than one element”. Further, the

terms “couple”, “coupling”, “coupled”, “coupled together”, and “coupled with” are used to mean “directly coupled together” or “coupled together via one or more elements”. As used herein, the terms “up” and “down”, “upper” and “lower”, “upwardly” and “downwardly”, “upstream” and “downstream”; “above” and “below”; and other like terms indicating relative positions above or below a given point or element are used in this description to more clearly describe some embodiments of the disclosure.

Embodiments may take the form of a perforating system that is fully assembled including the initiator at a location other than the wellsite. Generally, two initiator options may exist, an R.F. Safe version as well as a conventional system. These initiator systems are either inherently safe for transportation with an assembled perforating gun or through a ballistic interrupt guarantees safety.

Shipping an assembled gun from the shop to the wellsite opens up the possibility of a number of design features as well as technologies for its implementation. This disclosure covers both the features and implementing technologies.

This disclosure is related to, and incorporates by reference, provisional patent applications _____ “Perforating Gun with Integrated Initiator” (Docket No. IS12.3369-US-PSP) and _____ “Method and Device for initiating an explosive train” (Docket IS11.0701).

A loading tube may include the following features:

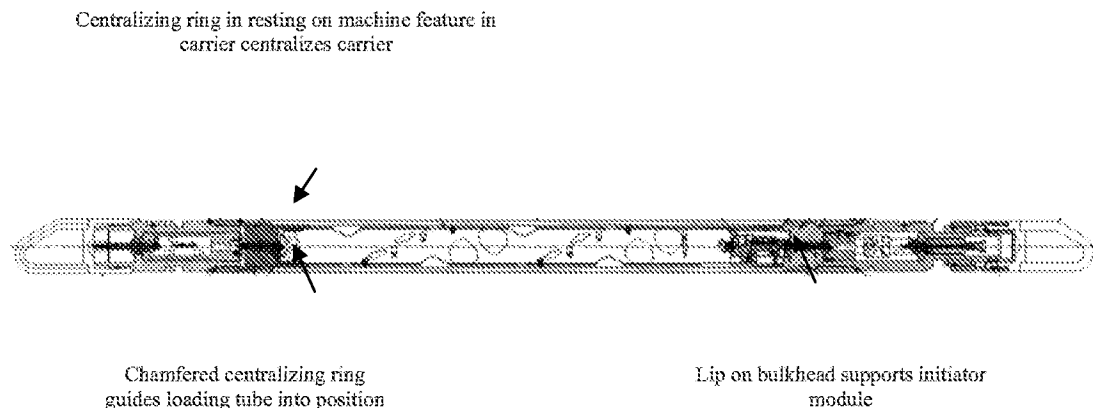


Fig. 1: Fractal Assembly

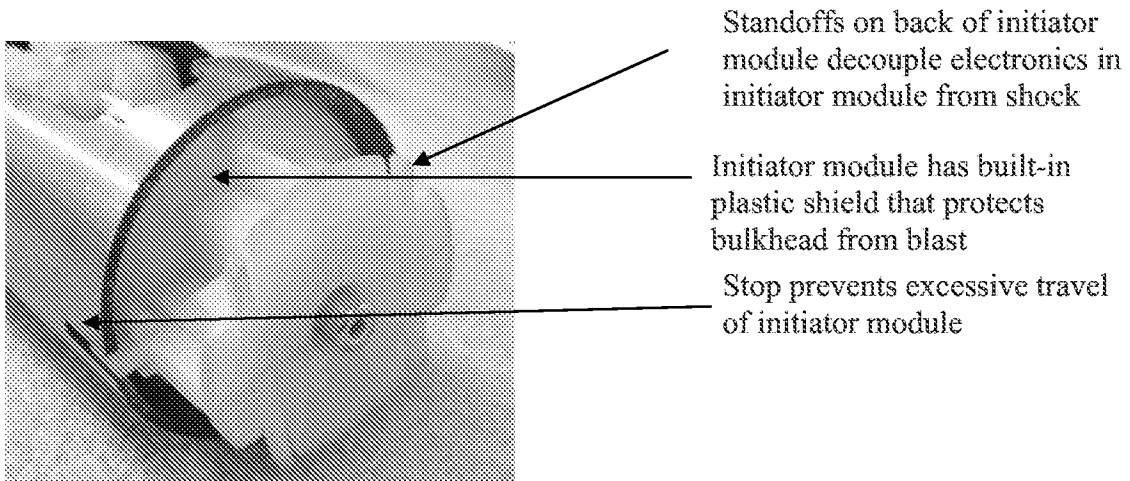
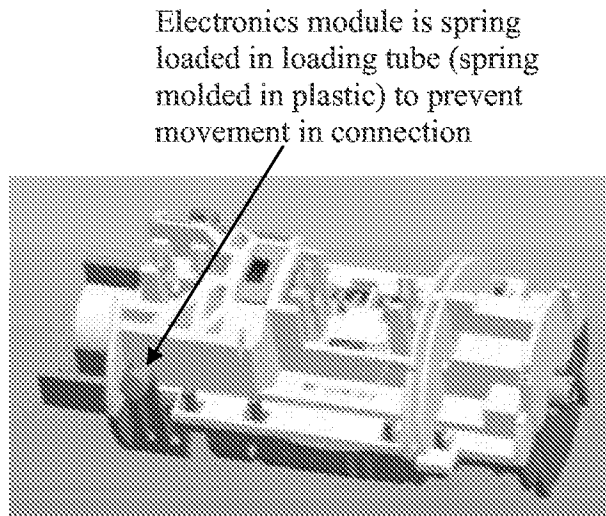
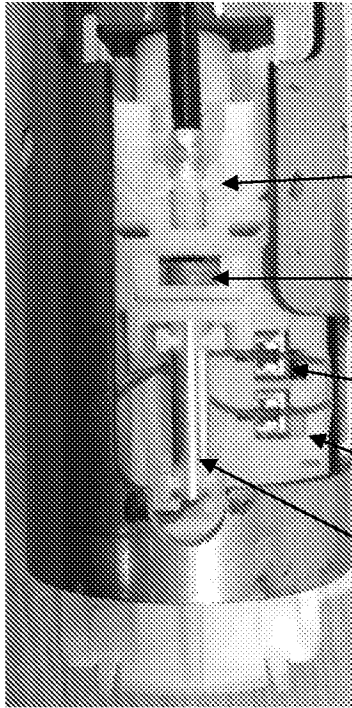


Fig. 2: Loading Tube End

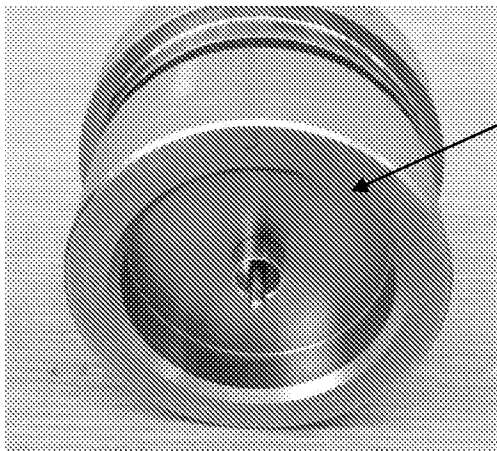
Fig. 3: Eclipse Initiator Module





- Detonator and loading tube latch in initiator module
- Composite shutter from stamped steel and layer of plastic attenuates blast without spalling better than simple steel or plastic shutter
- Insulation Displacement Connector (IDC) build in circuit board
- IDC slot is keyed to accept assembly tool in proper direction
- Detonator in line with detonating cord to allow detonation when shutter open- detonating cord has crimp shell to allow firm retention

Fig. 4: Loading Tube End (Top)



- Bulkhead designed to support initiator and maintain centralization

Fig. 5: Bulkhead End

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