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# United States Patent [19]

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Lerche et al.

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[54] **FIRING SYSTEM FOR A PERFORATING GUN INCLUDING AN EXPLODING FOIL INITIATOR AND AN OUTER HOUSING FOR CONDUCTING WIRELINE CURRENT AND EFI CURRENT**

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[57] **ABSTRACT**

[73] Assignee: **Schlumberger Technology Corporation**, Houston, Tex.

A firing head for a firing system adapted for use in a perforating gun includes an outer pressure bulkhead housing which simultaneously conducts two separate and independent currents: a wireline current from a wireline and a return current from an initiator embodied in the firing head. A fire set circuit provides a discharge pulse to the firing head, and a wireline conductor cable provides a wireline current to the fire set circuit. The firing head includes an outer pressure bulkhead housing adapted for conducting the wireline current from the wireline conductor cable to the fire set circuit, and an exploding foil initiator (EFI) responsive to the discharge pulse from the fire set circuit for initiating the detonation of a secondary explosive. The discharge pulse energizing the firing head passes through the exploding foil initiator (EFI) and emerges from the EFI as an EFI return current. As a result, the outer pressure bulkhead housing of the firing head conducts two separate and independent currents: the EFI return current from the EFI to a ground potential, and the wireline current from the wireline conductor cable to the fire set circuit.

[21] Appl. No.: **116,082**

[22] Filed: **Sep. 1, 1993**

[51] Int. Cl.<sup>5</sup> ..... **F42C 11/00**

[52] U.S. Cl. .... **102/202.14**

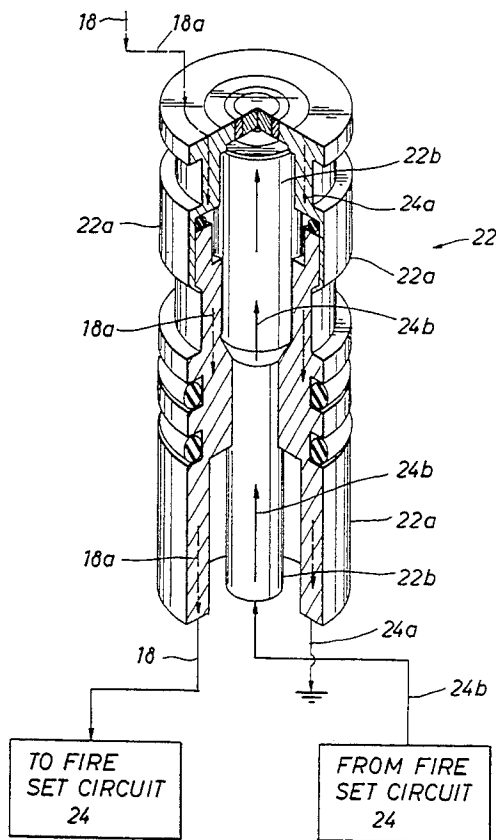
[58] Field of Search ..... 102/202.14, 200, 202.5, 102/202.7, 206

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**22 Claims, 7 Drawing Sheets**



TO SHAPED CHARGES  
IN PERFORATING GUN

FIG. 1

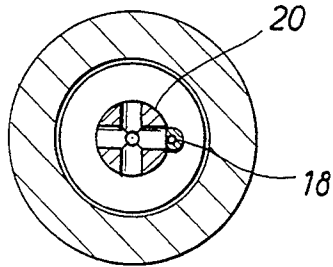
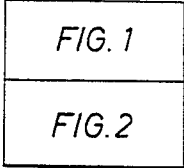
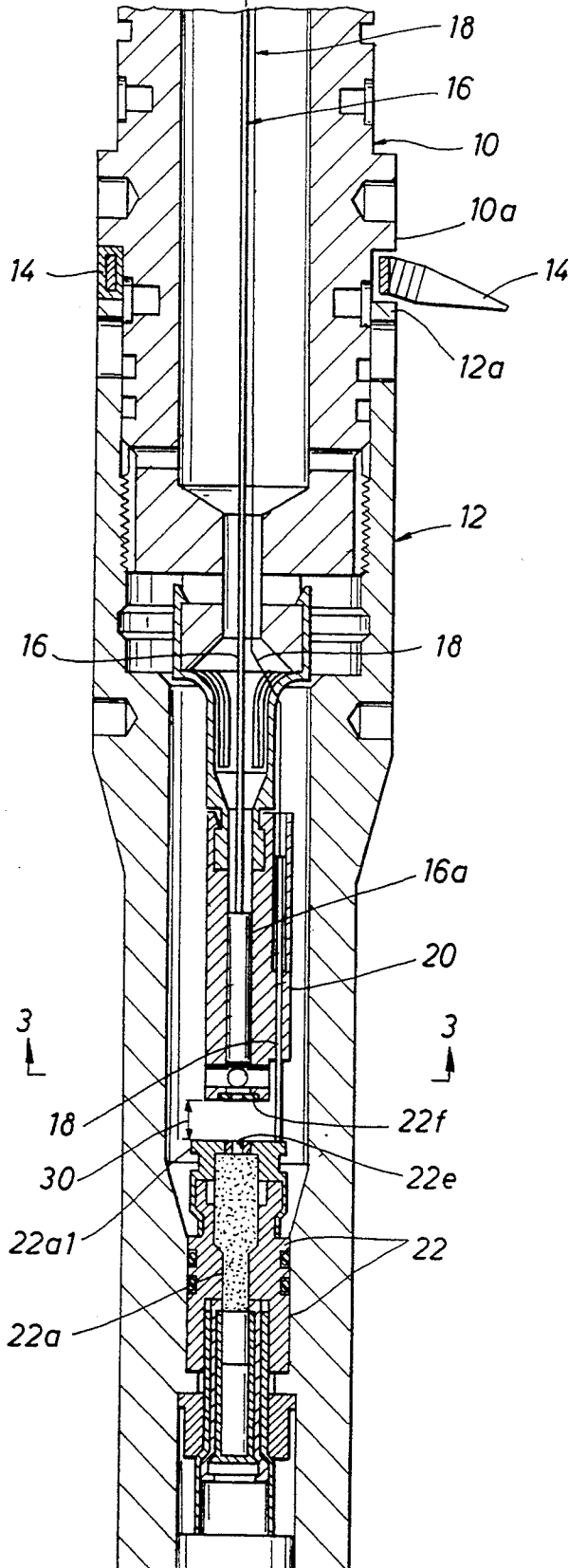


FIG. 3

FIG. 2

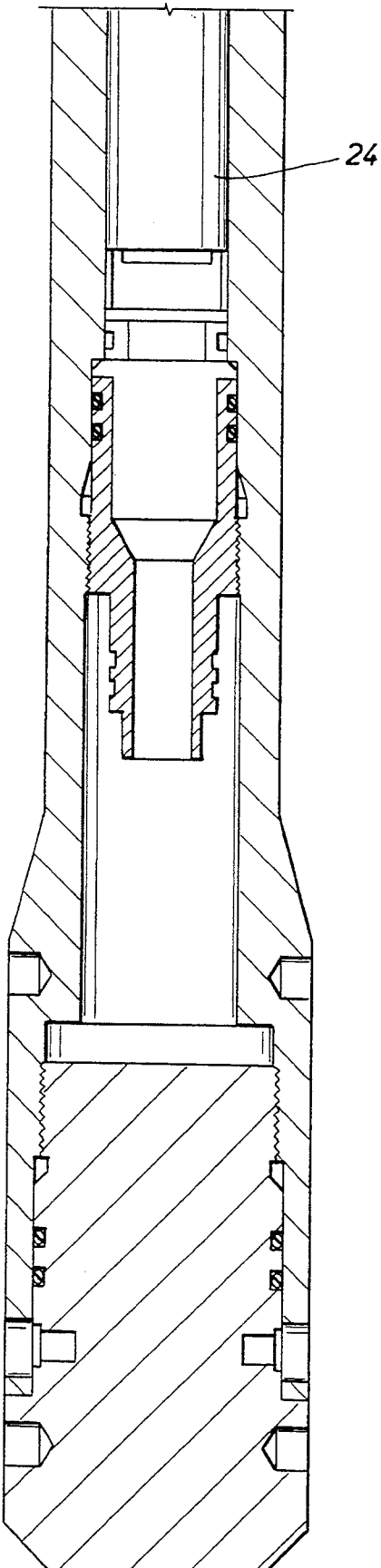


FIG. 5

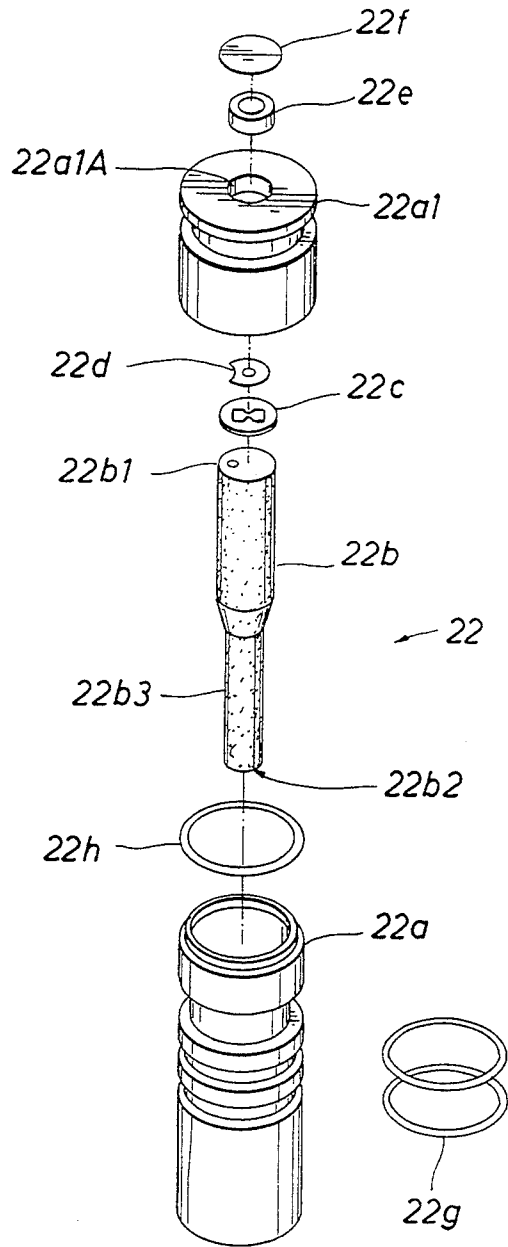


FIG. 4

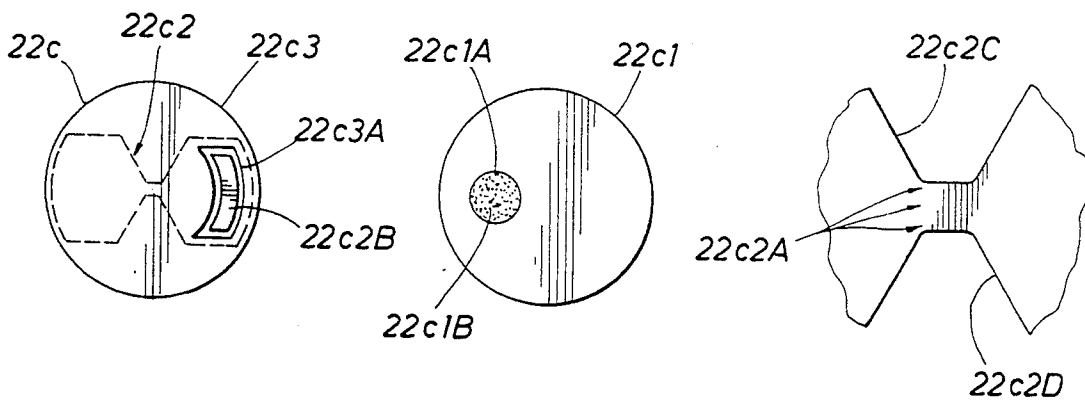
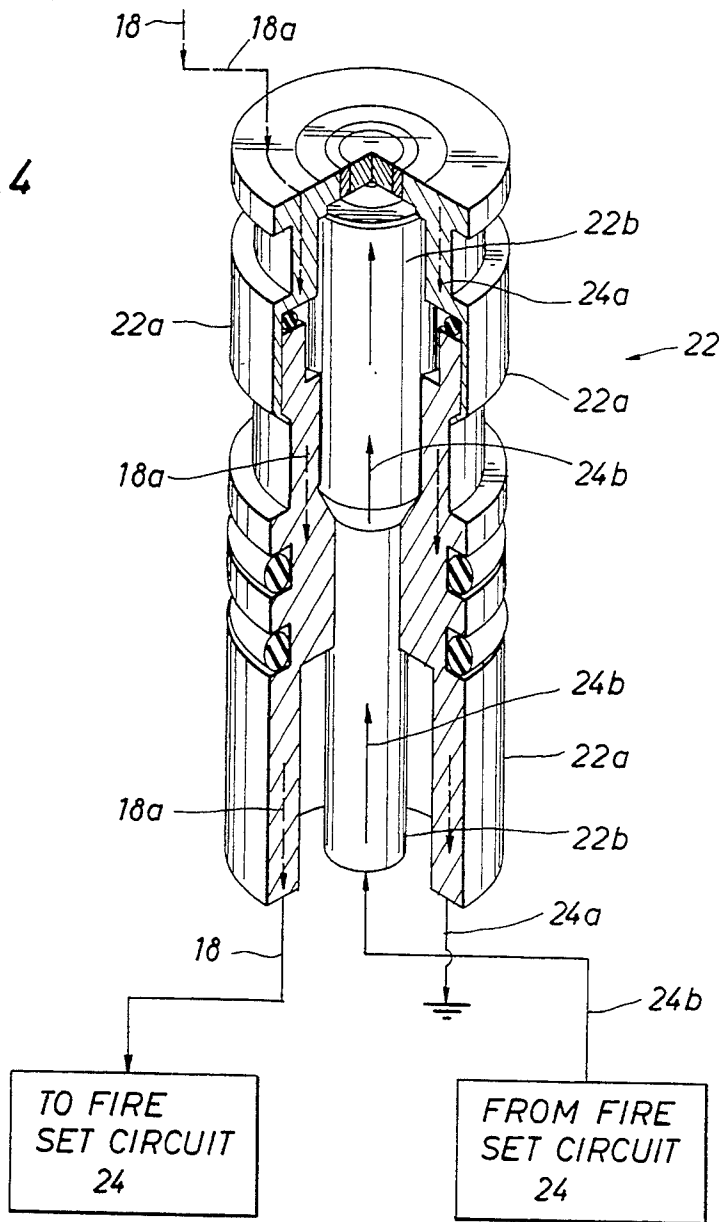


FIG. 7

FIG. 8

FIG. 6

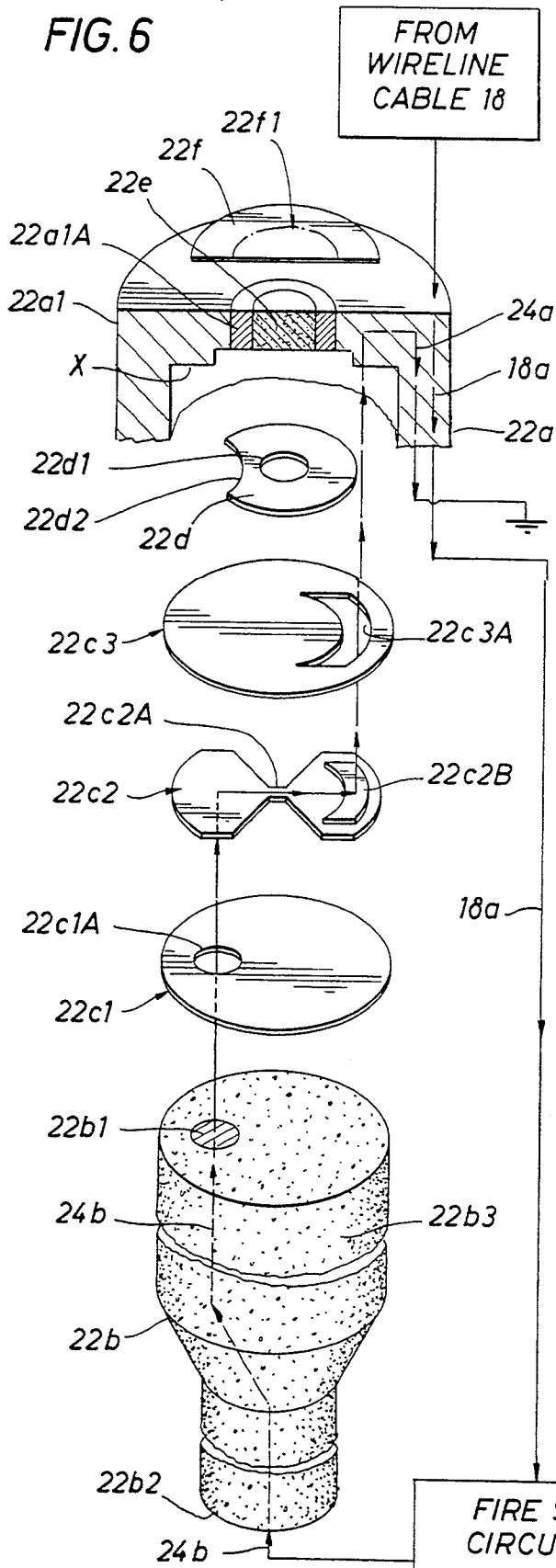


FIG. 10

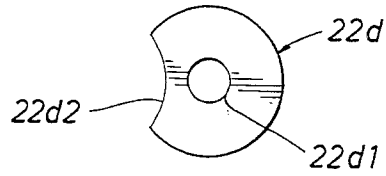


FIG. 11

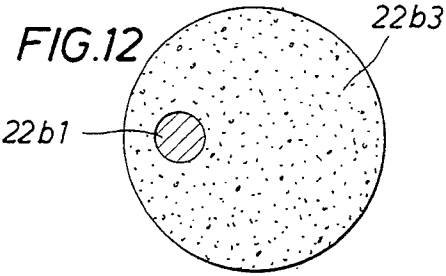
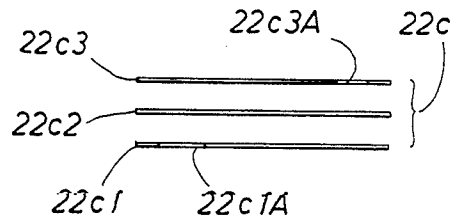
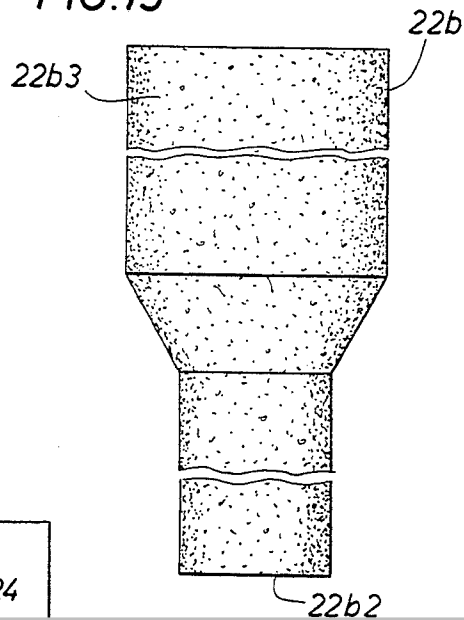


FIG. 13



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