

DEVICE AND METHOD FOR PERFORMING DOWNHOLE FUNCTIONSAbstract of the Disclosure

A downhole device and method for performing a function in a well. The device has a series of dedicated hydro-mechanical locks that prevent occurrence of an associated function. The hydro-mechanical locks are capable of being released directly by a respective elevated hydraulic activating pressure condition, and are constructed and arranged for sequential operation, such that a successive lock in the series cannot be released until after the hydraulic pressure condition required to release the preceding lock in the series has occurred. In a preferred embodiment, an actuator sequentially releases each lock in a series of locks, subsequently moving an operator to perform a function. A preferred implementation employs a series of resilient rings movable, sequentially, from a locking to an unlocking position, and a common actuator that effects these movements. Multiple devices of this construction are advantageously arranged in a string of tools to perform functions in any preprogrammed order by pre-selecting the number of locks in each device. In one embodiment, movement of the operator arms an associated ballistic tool downhole. Methods of performing sequences of downhole well functions are also disclosed.

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