This Sheet Has Been Replaced

SAFETY VALVE, SEALING RING AND SEAL ASSEMBLY

ABSTRACT

A downhole, inline well safety shutoff valve (30a) has a spring-loaded flapper shutoff valve element (31) opened by downward movement of an operator tube (40a) slidable within the tubing string bore. The operator tube is vertically driven by a rod structure (90) in an offset passageway (80a) in the valve housing and operated by fluid control pressure transmitted from the surface. To preclude undesired communication in the passageway between pressurized production and control fluids, the rod structure is slidable within a seal structure including a cylindrical sleeve (226a) coaxially received in the passageway, and a sealing ring (224a) between the top of the sleeve and an annular ledge in the passageway. The sealing ring creates a dynamic seal around the rod side surface and a static seal with the interior passageway surface. When the rod structure is driven upwardly, a seating ball (250) carried on its top end contacts an annular sealing surface (252) to form a static seal above the sealing ring. When the rod structure is driven downwardly, an undercut portion (243a) forms a static seal with a lower end portion (238a) of the sleeve.

(Fig 9)